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**Environmentally conscious design
for electrical and electronic
products**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by the Japan Electrical Manufacturers' Association (JEMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

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Environmentally conscious design for electrical and electronic products

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **IEC 62430** published in 2009 without modifying the technical contents.

The portions underlined with dots are the matters not given in the corresponding International Standard.

IEC 62430 was prepared by TC 111 of **IEC** “Environmental standardization for electrical and electronic products and systems” and published as an International Standard by **IEC** Central Office in February, 2009.

Every product has an effect on the environment, which may occur at any or all stages of its life cycle – raw-material acquisition, manufacture, distribution, use, maintenance, re-use and end of life. These effects may 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).

The widespread use of electrical and electronic products has drawn increased awareness to their environmental impacts. As a result, legislation, as well as market-driven requirements for environmentally conscious design, are emerging.

The goal of environmentally conscious design is the reduction of adverse environmental impacts of a product throughout its entire life cycle. This can involve balancing the environmental aspects of the product with other factors, such as its intended use, performance, cost, marketability and quality, and choosing methods to meet legal and regulatory requirements in the most environmentally friendly way. In striving for this goal, multiple benefits can be achieved for the organization, its customers and other stakeholders. Environmentally conscious design is not a separate design activity; rather, it is an integral part of the existing design process. The “design” in this context includes the activities associated with the processes of product planning, development and decision-making as well as the creation of policies within the organization.

The impetus to create an International Standard was triggered by common circumstances impacting many industries in the global marketplace, since the compositional elements of a product (such as materials, components and services) are provided across national borders. The existence of an International Standard provides for a consistent approach to life cycle management.

This Standard is intended for use by all those involved in the design and development of electrical and electronic products. This includes all parties in the supply chain regardless of organization type, size, location and complexity. It is applicable for all types of products, new as well as modified. Sector-specific documents may be developed to address needs not covered in this Standard. The use of this Standard as a base reference is encouraged so as to ensure consistency throughout the electrotechnical sector.

This Standard provides a set of requirements for the process of environmentally conscious design reflecting the contents of **IEC Guide 114** and **TR Q 0007**.

1 Scope

This Standard specifies requirements and procedures to integrate environmental aspects into design and development processes of electrical and electronic products, including combination of products, and the materials and components of which they are composed (hereafter referred to as “products”).

NOTE 1 The existence of this Standard does not preclude particular sectors from generating their own, more specific, standards or guidelines. Where such documents are produced it is recommended that they use this Standard as the reference in order to ensure consistency throughout the electrotechnical sector.

NOTE 2 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

IEC 62430:2009 *Environmentally conscious design for electrical and electronic products* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

No normative references are cited. Informative references are noted in the bibliography.

3 Terms and definitions

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

3.1 design and development

activities that take an idea or requirement and transform these into a product

NOTE : The process of design and development usually follows a series of defined steps starting with an initial idea, transforming that into a formal specification, and resulting in the creation of a working prototype and whatever documentation is required to support production of the goods or provision of the service.

3.2 environment

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

NOTE : Surroundings in this context extend from within an organization to the global system. (**JIS Q 14001:2004**, definition **3.5**)

3.3 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. (**JIS Q 14001:2004**, definition **3.6**, modified)

3.4 environmental impact

any change to the environment, whether adverse or beneficial, wholly or partly resulting from an organization's environmental aspects (**JIS Q 14001:2004**, definition **3.7**)

3.5 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, etc.

3.6 environmentally conscious design (ECD)

systematic approach which takes into account environmental aspects in the design and development process with the aim to reduce adverse environmental impacts

3.7 environmentally conscious design tool

formalized method which facilitates qualitative or quantitative analysis, comparison and/or solution finding during the ECD process

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 (**JIS Q 14040:2010**, 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 (**JIS Q 14040:2010**, definition **3.2**)

3.10 life cycle stage

element of a life cycle

NOTE 1 The phrase 'life cycle phase' is sometimes used interchangeably with 'life cycle stage'.

NOTE 2 Examples of life cycle stages are: raw material acquisition and production; manufacturing; packaging and distribution; installation and use, maintenance and upgrading and end of life.

3.11 life cycle thinking (LCT)

consideration of all relevant environmental aspects during the entire life cycle of products (**IEC Guide 109:2003**, modified)

3.12 organization

group of people and facilities with an arrangement of responsibilities, authorities and relationships (**JIS Q 9000:2006**, definition **3.3.1**, modified)

Example : Company, corporation, firm, enterprise, institution, charity, sole trader, association, or parts or combination thereof.

3.13 process

set of interrelated or interacting activities which transform inputs into outputs

NOTE 1 Inputs to a process are generally outputs of other processes.

NOTE 2 Processes in an organization are generally planned and carried out under controlled conditions to add value. (**JIS Q 9000:2006**, definition **3.4.1**, modified)

3.14 product

any goods or service

NOTE : This includes interconnected and/or interrelated goods or services. (**JIS Q 14040:2010**, definition **3.9**, modified)

3.15 product category

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

3.16 stakeholder

individual, group or organization that has an interest in an organization or activity

NOTE : Usually a stakeholder can affect or is affected by the organization or the activity. (**JIS Q 14050:2003** definition **1.5**, modified)

4 Fundamentals of environmentally conscious design (ECD)

NOTE : More detailed information relating to clause 4 is provided in Annex A.

4.1 General

Clause 4 describes the fundamental requirements of ECD to be implemented by the organization. Clause 5 describes the ECD process to be implemented on an operational basis.

4.2 Life cycle thinking

Environmentally conscious design shall be based on the concept of life cycle thinking (LCT), which requires consideration during the design and development process of the significant environmental aspects of a product in all life cycle stages.

Key elements of life cycle thinking are as follows:

- a) having an objective to minimize the overall adverse environmental impact of the product;
- b) identifying, qualifying and where feasible, quantifying the significant environmental aspects of the product;
- c) considering the trade-offs between environmental aspects and life cycle stages.

The above shall be initiated as early as possible in the design and development process, when most opportunities exist to make changes and improvements to the product affecting its overall environmental performance throughout its life cycle.

- NOTE 1 As a first step in LCT, the intended function of the product should be determined. In subsequent design and development stages the influence of any applied business model should be recognized.
- NOTE 2 The life cycle stages of any product under control of the organization usually include the processing of materials, manufacturing, distribution, use, maintenance and end-of-life management (including reuse, recycling, recovery and final disposal).
- NOTE 3 When a product is part of a system, the environmental performance of one product during one or more life cycle stages can be altered by other products in that system.
- NOTE 4 ECD requires collaboration and contributions of all stakeholders along the supply chain.

4.3 Regulatory and stakeholders' requirements

Environmentally conscious design is performed within the boundaries set by regulatory and stakeholders' requirements. Such requirements shall be regularly reviewed so that relevant changes are understood by the organization undertaking the ECD.

Regulatory and stakeholder's requirements may include:

- a) restrictions and obligations resulting from national and international regulations;
- b) technical standards and voluntary agreements;
- c) market or customers' needs, trends and expectations;
- d) societal and investors' expectations, e.g. advances in technology.

4.4 Integration into management system

Environmentally conscious design and its objective of minimizing the overall adverse impact of the product shall be reflected in the policies and strategies of the organization. If an organization has a management system which includes the product design and development function, the ECD process shall be an integral part of that documented system.

Environmental considerations could be one element of the overall risk management process of the organization.

NOTE 1 "Risk management" is defined in **ISO Guide 73**.

In line with the procedures of the management system of the organization, the ECD process shall be reviewed when required and at planned intervals to ensure its continuing suitability, adequacy and effectiveness. This review shall include assessing opportunities for improvement and the need for changes to the ECD process and the related policies and strategies of the organization.

NOTE 2 The iterative process of continual improvement in product design and development can also be described by the PDCA (Plan, Do, Check, Act) cycle. This approach also provides means for managing the changing legal, technological, organizational, economic and environmental requirements.

NOTE 3 Communication regarding the ECD process and its objectives is performed within an organization so that the affected departments understand the rationale for the initiative, leading to their cooperation and collaboration.

NOTE 4 Management systems are described, for example, in **JIS Q 9001**, and **JIS Q 14001**.

5 Environmentally conscious design process (ECD process)

NOTE : More detailed information relating to clause 5 is provided in Annex B.

5.1 General

Organizations performing environmentally conscious design (ECD) shall establish, document, implement and maintain an ECD process as an integral part of the product design and development process. This ECD process includes the following steps, which are further described in 5.2 to 5.5;

- a) analysis of the regulatory and stakeholders' environmental requirements;
- b) identification and evaluation of environmental aspects and corresponding impacts;
- c) design and development;
- d) review and continual improvement.

The organization shall, while following the above steps, document the relevant results and the subsequent conclusions and responsibilities assigned.

NOTE : The above process a) to d) corresponds to the PDCA cycle as follows:

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

5.2 Analysis of regulatory and stakeholders' environmental requirements

As an initial step of ECD, to be carried out in conjunction with the identification of environmental aspects (see 5.3), the organization shall understand the relevant regulatory and stakeholders' requirements, both at horizontal and sector specific level. These requirements set the basis framework within which a product is developed.

The organization shall ensure, as appropriate, that:

- a) relevant environmental requirements from applicable regulatory authorities and stakeholders are identified, covering
 - relevant product functions,
 - relevant life cycle stages,
 - relevant environmental aspects of the product,
 - geographical scope of the intended market, and
 - related activities of the organization;
- b) both current and new requirements are regularly reviewed and identified;