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TECHNICAL REPORT

colour inside

Guidance on material efficiency considerations in environmentally conscious design of electrical and electronic products

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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GUIDANCE ON MATERIAL EFFICIENCY CONSIDERATIONS IN ENVIRONMENTALLY CONSCIOUS DESIGN OF ELECTRICAL AND ELECTRONIC PRODUCTS

FOREWORD

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IEC TR 62824, which is a Technical Report, has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
111/391/DTR	111/411/RVC

Full information on the voting for the approval of this Technical Report 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.

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

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The natural resources of our planet are being depleted by the rapid growth of industry including the production and use of electrical and electronic products. Materials are consumed both directly and indirectly and lead to other environmental impacts, such as climate change. As a consequence, there are an increasing number of policies and regulations being considered or enacted at regional or national level to promote sustainable production while minimizing environmental impacts. To meet these challenges, this Technical Report provides information on how material efficiency considerations can be integrated into the environmentally conscious design (ECD).

Material efficiency relates to the efficient use of materials over a product's lifetime, including its fabrication, distribution, use and disposal. Within this document, the following material aspects are considered: material type, material quantity, material substitutability, use of renewable material, material recyclability, material recoverability, and durability of product.

This document is intended to support ECD, but focuses on the efficient use of material within products. Its aim is to facilitate the use of materials in an optimal way and thereby promote the sustainability of natural resources.

GUIDANCE ON MATERIAL EFFICIENCY CONSIDERATIONS IN ENVIRONMENTALLY CONSCIOUS DESIGN OF ELECTRICAL AND ELECTRONIC PRODUCTS

1 Scope

IEC 62824 which is a Technical Report provides information on selection and efficient use of materials in electrical and electronic products. Environmentally conscious design (ECD) can then proceed in such a way that aspects, including material type, material quantity, material substitutability, renewable material, material recyclability, material recoverability, and durability of product are taken into account during the design phase.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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
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

[SOURCE: IEC 62430:2009, 3.6]

3.2
material
substance or mixture within a product or product part

[SOURCE: IEC 62474:2012, 3.4]

3.3
material efficiency
comparative indicator of material used for a product to provide a particular function

Note 1 to entry: Material efficiency can be assessed by considering aspects such as: material type, material quantity, material substitutability, use of renewable material, material recyclability, material recoverability, and durability of product.

Note 2 to entry: Material efficiency is a constituent of resource efficiency. Resource efficiency includes all aspects of material efficiency and, in addition, the use of energy, water, air, land, etc.

3.4
material recoverability
property of a product's design that determines the ease with which a particular material can be separated from other materials at the end of life stage

Note 1 to entry: Separation includes mechanical, chemical or thermal processes.

Note 2 to entry: This definition is specific to product design.

3.5
material recyclability
ability of waste materials to be processed for the original purpose or for other purposes, excluding energy recovery

[SOURCE: IEC 62542:2013, 6.9, modified — word “material” has been added to the term]

3.6
material substitutability
ability of a material to be substituted in a product with another material

Note 1 to entry: Material substitutability does not only depend on the material, but also on the product. Depending on how the material is used and which of its characteristics are exploited, the same material may be substitutable or not.

3.7
mixture
preparation
mixture or solution composed of two or more substances in which they do not react

Note 1 to entry: An alloy is treated as a mixture.

Note 2 to entry: Definition is taken from the Globally Harmonized System of Classification and Labelling of Chemicals (GHS): 2015, Chapter 1.2, Definitions and Abbreviations.

[SOURCE: IEC 62474:2012, 3.6, modified — Note 2 to entry has been added]

3.8
durability
ability to perform as required, under given conditions of use and maintenance, until the end of useful life

[SOURCE: IEC 60050-192:2015, 192-01-21]

3.9
substance
chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition

Note 1 to entry: Definition is taken from the Globally Harmonized System of Classification and Labelling of Chemicals (GHS): 2015, Chapter 1.2, Definitions and Abbreviations.

[SOURCE: IEC 62474:2012, 3.13, modified — Note 1 to entry has been added]

3.10
renewable material
material, the source of which is replenished and will not become depleted at the rate of use

4 Relationship between material efficiency and ECD

ECD standards in general cover all environmental aspects of a product’s life cycle.

Integration of material efficiency considerations to the ECD process can be achieved by implementing the following: