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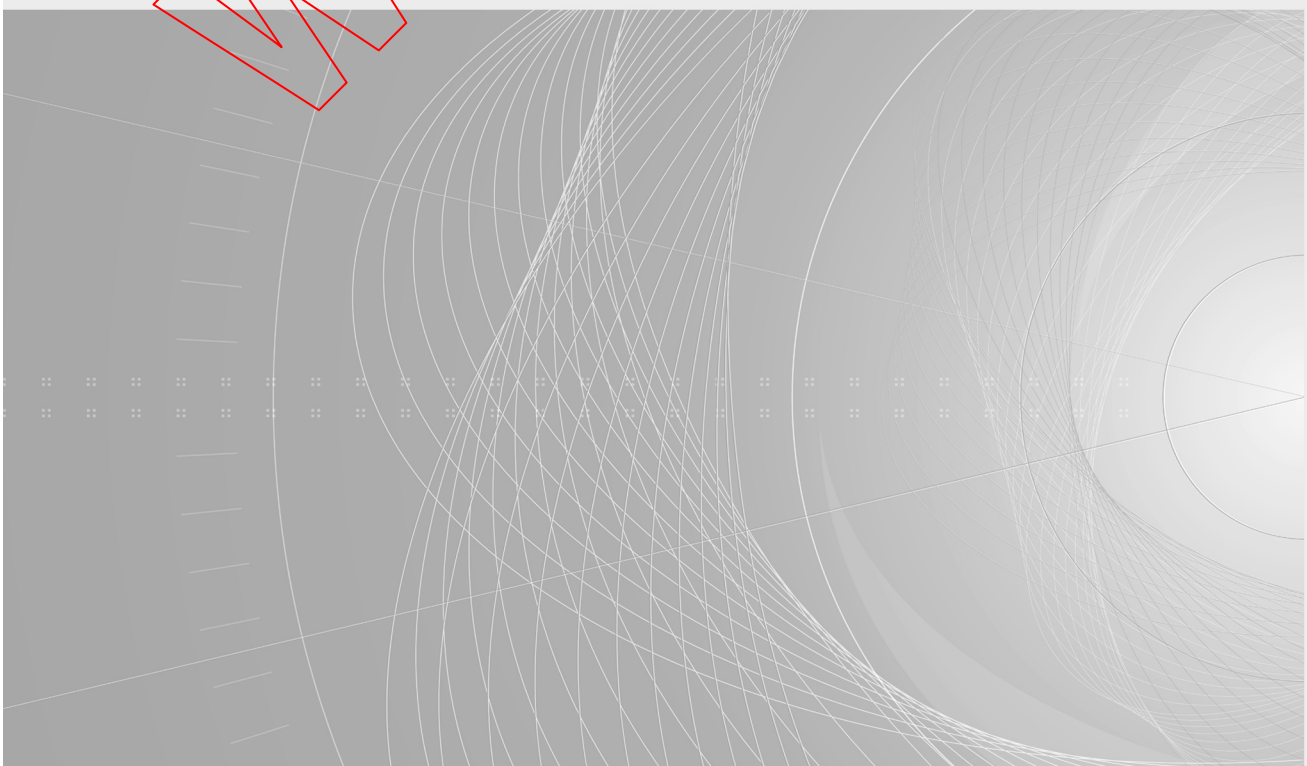
INTERNATIONAL STANDARD

NORME INTERNATIONALE

Audio/video, information and communication technology equipment – Environmentally conscious design

Equipements relatifs aux technologies de l'audio/vidéo, de l'information et de la communication – Conception éco-environnementale



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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUDIO/VIDEO, INFORMATION AND COMMUNICATION TECHNOLOGY EQUIPMENT – ENVIRONMENTALLY CONSCIOUS DESIGN

FOREWORD

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International Standard IEC 62075 has been prepared by IEC technical committee TC108: Safety of electronic equipment within the field of audio/video, information technology and communication technology.

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

FDIS	Report on voting
108/266/FDIS	108/284/RVD

Full information on the voting for the approval of this standard 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.

NOTE The following print types are used:

– requirements: in roman type;

– *test specifications: in italic type;*

– notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site 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- withdrawn,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.

INTRODUCTION

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, and disposal. These effects may range from low to significant; they may be short-term or long-term; and they may occur at the local, regional or global level (or a combination thereof).

The interest of customers, users, developers and other stakeholders in **environmental aspects** and effects of **products** is increasing.

Anticipating or identifying the **environmental aspects** of a **product** throughout its **life cycle** may be complex. The **environmental aspects** of a **product** have to be balanced against other factors, such as its intended use, performance, safety and health, cost, marketability, quality and regulatory requirements. It is important to consider the **product** functionality within the context of the system where it will be used.

The process of integrating **environmental aspects** into **product** design and development has to be continuous and flexible, promoting creativity and maximizing innovation and opportunities for environmental improvement. Environmental issues should be addressed in the policies and strategies of the **organization** involved.

Early identification and planning enable **organizations** to make effective decisions about **environmental aspects** that they control. This provides a better understanding of how their decisions will affect **environmental aspects** controlled by others, for example, at the raw-material and **parts** acquisition or **end of life** stages.

The purpose of this document is to help **designers** of **products** in the field of audio/video, information technology and communication technology to appropriately manage related environmental issues within the design process.

This sector specific document takes into account the publication of the first edition of IEC Guide 114 (2005), the publication of the second edition of ECMA-341 (2004), recent engineering best practices as well as current market and regulatory environmental **product** requirements.

AUDIO/VIDEO, INFORMATION AND COMMUNICATION TECHNOLOGY EQUIPMENT – ENVIRONMENTALLY CONSCIOUS DESIGN

1 Scope

This International Standard applies to all audio/video, information and communication technology equipment marketed as final **products**, hereafter referred to as **products**.

Although this standard does not explicitly apply to individual components and subassemblies to be incorporated into final **products**, component **manufacturers** also need to consider this standard, to enable **manufacturers** using such components to meet the requirements herein.

Only the intended use of **products** as defined by the **manufacturer** is within the scope of this standard.

This standard specifies requirements and recommendations for the design of environmentally sound **products** regarding

- **life cycle** thinking aspects,
- material efficiency,
- **energy efficiency,**
- **consumables** and batteries,
- chemical and noise emissions,
- extension of **product** lifetime,
- **end of life,**
- **hazardous substances/preparations**, and
- **product** packaging.

This standard covers only criteria directly related to the environmental performance of the **product**. Criteria such as safety, ergonomics and electromagnetic compatibility (EMC) are outside the scope of this standard and covered by other standards.

2 Normative references

The following referenced documents are indispensable for the application of this document. The latest edition of the referenced document (including any amendments) applies.

ISO 3741, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Precision methods for reverberation rooms*

ISO 3744, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane*

ISO 3745, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Precision methods for anechoic and hemi-anechoic rooms*

ISO 7779, *Acoustics – Measurement of airborne noise emitted by information technology and telecommunications equipment*

ISO 9296, *Acoustics – Declared noise emission values of computer and business equipment*

ISO 11201, *Acoustics – Noise emitted by machinery and equipment – Measurement of emission sound pressure levels at a work station and at other specified positions – Engineering method in an essentially free field over a reflecting plane*

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

3 Terms and definitions

For the purpose of this document the following terms and definitions apply.

3.1
chemical emissions
chemical **substances** and particulate matter emitted from a **product** into the air

3.2
consumable
user-replaceable **part** or piece of equipment that **manufacturers** place on the market for direct sale for use in equipment

[IEC Guide 114, definition 3.1]

NOTE **Consumables** include, for example, printer cartridges and photographic film, and not **parts** required for repairs or **product** upgrades.

3.3
designer
person responsible for the design and development of a product under the supervision of the manufacturer

NOTE See 3.12 for context with **manufacturer**.

3.4
end of life
life cycle stage of a **product** starting when it is removed from a **use stage**

3.5
energy efficiency
rational use of energy to achieve an intended application performance

More technically, it is the minimum quantity of energy required to deliver a functional output from a device.

NOTE A more precise definition is not applicable in this context as the output performance largely depends on the specific device.

EXAMPLE For power supplies the **energy efficiency** is defined as the percentage of output power per input power.

3.6
environment
surroundings in which an **organization** operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation

[ISO 14001:2004, definition 3.5]

3.7
environmental aspect
element of an **organization's** activities, **products** or services that can interact with the **environment**

[ISO 14001: 2004, definition 3.6]

NOTE A significant **environmental aspect** is one that has or can have a significant **environmental impact** (ISO 14001:2004, definition 3.7).

3.8
environmental impact
any change to the **environment**, whether adverse or beneficial, wholly or partially resulting from an **organization's environmental aspects**

[ISO 14001:2004, definition 3.7]

3.9
environmental management system
part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedure, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy

[ISO 14001:2004, definition 3.8, modified]

3.10
hazardous substances and preparations
substance or **preparation** that can adversely impact the **environment** with immediate or retarded effect

[IEC Guide 109:2003, definition 3.6, modified]

3.11
life cycle
consecutive and interlinked stages of a **product** system, from raw material acquisition or generation of natural resources to the final disposal

[ISO 14040:2006, definition 3.1]

3.12
manufacturer
organization responsible for the design, development and manufacture of a **product** in view of its being placed on the market, regardless of whether these operations are carried out by that **organization** itself or on its behalf

3.13
module
assembly of **parts** of a **product** with a function in itself (for example, a power supply) including those separately put on the market as a **product**

3.14
organization
company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

[ISO 14001:2004, definition 3.16]

3.15
part
any piece or object of, or included with, a **product**

3.16
preparations
mixtures or solutions composed of two or more **substances**

EXAMPLE Tin is a **substance** and solder is a preparation (an alloy) that may contain tin.

3.17
product
audio/video, information and communication technology equipment

3.18
recycling
reprocessing of **products, modules** or **parts** thereof for **reuse** or other purposes during their **end of life** stage

3.19
renewable material
organic material not based upon fossil carbon sources

3.20
reuse
recycling of **products**, **modules** or **parts** by entering in a subsequent **product use stage**

3.21
skilled person
person with relevant education or experience to enable him or her to avoid dangers and to reduce the likelihood of risks that may be created by the equipment

[IEV 826-18-01, modified]

3.22
substance
matter with an individual molecular identity

3.23
upgrading
process to enhance the functionality or capacity of a **product**

3.24
use stage
period of the **product's** life from placing it into service until it enters its **end of life** stage

4 Life cycle thinking (LCT) aspects

Within the limits of the **designer's** responsibility, the **designer** shall consider **life cycle** thinking (LCT). LCT means integration of the **environmental impact** caused by a **product** throughout all **life cycle** stages as early as possible in the **product** design and development process when opportunities exist to make decisions to improve the environmental performance of the **product**.

Basic considerations require that:

– a goal to minimize the overall adverse **environmental impact** be defined by the **manufacturer**/**organization**;
– the significant **environmental aspects** of the **product** be identified and
– trade-offs associated with both **environmental aspects** and **life cycle** stages be considered.

Balanced compromises associated with both **environmental aspects** and the **life cycle** stages shall be considered. Any decision should be balanced with technical features and economic viability and shall not compromise health and safety.

NOTE The goal of integrating **environmental aspects** into **product** design and development is the reduction of adverse **environmental impacts** of the **product** throughout its entire **life cycle**. The **life cycle** of any **product** includes the extraction and processing of raw materials, manufacturing, transportation, use and **end of life** management (including **reuse**, **recycling** and final disposal). Each of these **life cycle** stages consumes resources and generates **environmental impacts** in air, water or soil.

It is not the **designer's** sole responsibility to deal with attributes not directly dependent on the **product** design. First, the **designer** should ensure that **products** comply with all relevant regulations governing **product** design. Then, the **designer** should take into account the **environmental impact** of the **product** throughout its life to identify the significant impacts that can be reduced by alternative design solutions.

General **environmental aspects** of **life cycle** stages such as extraction/processing of raw materials, manufacturing and transportation should be considered within existing environmental and procurement policies and guidelines of the **organization**. **Designers** should follow the design relevant aspects of those policies and guidelines.

Any emphasis on a single stage of a **product's life cycle** may alter another stage and therefore the overall **environmental impact**. The **designer's** responsibility is limited by the possibilities within the requested functionalities and market requirements. Balanced compromises will occur in optimizing **environmental impact** across the **product life cycle**.

5 Design requirements and recommendations

5.1 General considerations

The following requirements have been compiled for use when designing and developing **products** as defined in the scope of this standard, as far as they can be practically influenced by the **designer**.

The **designer**

– shall identify the latest environmental related legal and market requirements (from customers, government, environmental groups, industrial associations, etc.);

– should do benchmarking addressing the comparison of **energy efficiency**, material efficiency, and the use of **hazardous substances and preparations**;

– should gather and evaluate experience from the subsequent manufacturing, sales, **product** usage, maintenance and disposal stages;

to continually improve the process of environmentally conscious **product** design.

The entire environmental performance of the **product** should be evaluated, while the considerations should give priority to those factors that can be substantially influenced through **product** design and are identified as major **environmental impacts** (for example, very often energy consumption). The evaluation should take into consideration the functions and normal usage of the **product** as well as the technical and economical feasibility.

As a minimum, the **designer** shall document decisions by some means, such as by maintaining a design checklist covering **environmental aspects** (an example for such a checklist is provided in Annex A).

This standard requires certain **product** environmental characteristics to be made available in a form the **manufacturer** deems appropriate.

Further applicable information may be made available in an environmental **product** declaration (for example, ECMA-370).

5.2 Material efficiency

Material selection has an impact on the **environment**. When specifying materials, the **designer** should consider design alternatives that:

– reduce the variety of materials used;
– reduce the amount of material used and consequently the weight of the **product**;
– use materials that are considered to have lower adverse **environmental impact**;
– seek to use materials that can be easily **recycled**.

Material-related **end of life** aspects are covered in 5.7. For replacing materials containing **hazardous substances and preparations**, see 5.8.

5.3 Energy efficiency

5.3.1 General

To focus efforts on increasing **energy efficiency**, the **designer** shall be aware in which stage of the **product life cycle** the **product** will consume the most energy.

The intended use patterns of the **product**, including where relevant its typical system interactions, shall be considered. Where possible, the **organization** should strive for improving the overall system performance in respect to **energy efficiency**.

Energy consumption information shall be made available (see 5.3.5 d) and 5.3.7).

5.3.2 Energy modes and related energy efficiency measures

Energy mode definitions and applied terms vary depending on the **product** group. Therefore, rather than providing precise definitions of energy modes in this standard, modes are described in generic terms as defined in 5.3.3 to 5.3.6 and illustrated in Figure 1. The intent is to balance the technical complexity with the simplicity needed for ease of communication and use.

NOTE Due to the high diversity of **products** covered by this standard, examples are intended to clarify the energy modes and to guide the **designer**.

The **designer** shall identify specific energy modes that apply to the **product** under development.

The **designer** shall consider **energy efficiency** measures for the identified energy modes (described in more detail in the following subclauses).

Designers shall also identify where energy is consumed with the **product** and take steps to reduce the overall energy consumption.

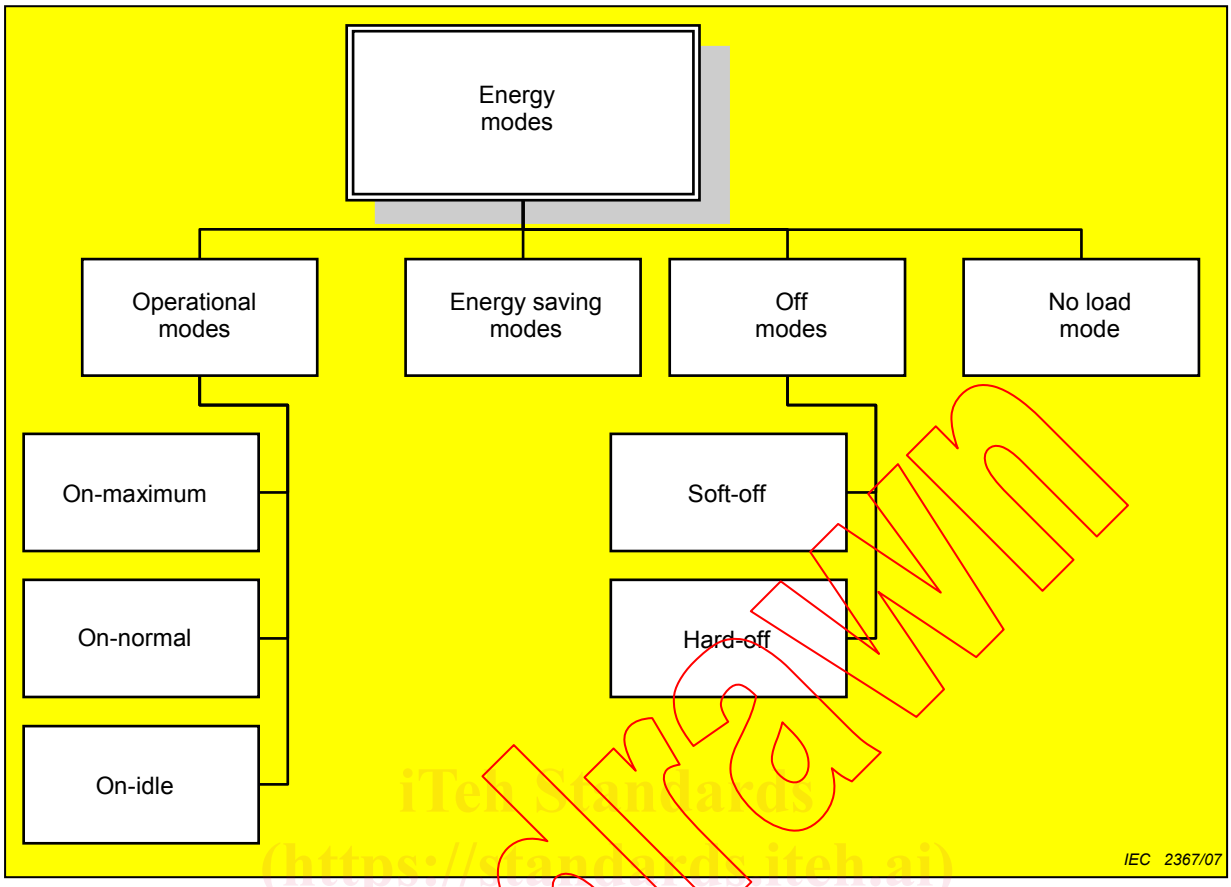

Figure 1 – Energy mode classification

5.3.3 Operational modes

Products perform their intended functions in the on-maximum, on-normal and on-idle operational modes.

– On-maximum: Operation with all options in use.

EXAMPLE 1 A television with maximum contrast, brightness and sound, or a personal computer with all slots and bays populated and operating.

– On-normal: Operation with default/standard configuration.

EXAMPLE 2 The factory setting of a computer display or a printer in active/run mode.

– On-idle: Operation with minimum system load by user and ready to operate without delay.

EXAMPLE 3 A personal computer running with no user initiated task consuming significant computing resources, or a printer in ready mode.

The **designer** shall consider:

– using low power components and/or design options as well as efficient power supply components to reduce the energy consumption in the on modes.

NOTE 1 The reason for the above is that less efficient designs result in higher heat dissipation in the system, which leads to increased cooling requirements. By improving the **energy efficiency** of these designs in the on-mode, it may become possible to apply passive cooling thereby avoiding the use of fans and the resulting additional energy consumption.

NOTE 2 **Energy efficiency** improvements typically reduce costs and noise and improve serviceability.