Standard ECMA-341

ECMA International

Standardizing Information and Communication Systems

Environmental design considerations for electronic products

Phone: +41 22 849.60.00 - **Fax:** +41 22 849.60.01 - **URL:** http://www.ecma.ch - **Internet:** helpdesk@ecma.ch

Standard ECMA-341

ECMA International

Standardizing Information and Communication Systems

Environmental design considerations for electronic products

Phone: +41 22 849.60.00 - **Fax:** +41 22 849.60.01 - **URL:** http://www.ecma.ch - **Internet:** helpdesk@ecma.ch

LL ecma-341.doc 18-12-02 14,02

Brief History

The increased interest of public, institutional and government sectors and customers in product environmental information stimulated the setting up of an ECMA Technical Committee to work on the definition of product-related environmental attributes. ECMA TC38 was established formally by the ECMA General Assembly in December 1995. It includes experts from information technology, telecommunications and consumer electronics companies and organisations.

Following ECMA TR/70 (Product-related environmental attributes), this Standard establishes a set of requirements and recommendations for the design of information and communication technology and consumer electronic products, with reduced environmental impact.

This ECMA Standard has been adopted by the ECMA General Assembly of 19th December 2002

Table of contents

1 Scope

This ECMA Standard identifies design practices for information and communication technology and consumer electronic products with a rated voltage not exceeding 1 000 V r.m.s., intended for domestic or commercial use that could reduce the environmental impact of the product. This standard specifies requirements and recommendations for the design of commercially viable, environmentally conscious products.

Specifically, the standard covers the following environmental aspects:

- Energy consumption;
- Resource consumption;
- Material content (and selection);
- Extendibility of product life;
- End of life.

Annex A presents an example design checklist that could be used to evaluate and record environmental design features of an electrical and electronic equipment product.

This ECMA Standard applies product design principles contained in international technical report ISO TR 14062. However, ISO TR 14062 contains process considerations, which are outside the scope of this ECMA Standard.

This ECMA Standard is applicable to the final electrical and electronic product, not individual components. Component manufacturers, however, will need to consider applicable provisions of this Standard in their product designs in order to enable their customers to meet the standard.

This ECMA Standard does not cover criteria, which are not directly related to the environmental performance of the product. Criteria such as safety, ergonomics, EMC, and noise emissions, although equally important, fall outside the scope of this Standard.

Health and safety in all stages of the product life must not be compromised.

2 Conformance

Conformance to this ECMA standard is satisfied by all of the following:

- Meeting all of the applicable “shall” statements in clauses 6 and 7;
- Completing a design checklist for the product (or for a given family of products);
- Stating compliance through a supplier’s declaration.

3 References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the edition indicated was valid. All standards are subjected to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent edition of the standards listed below.

ECMA

- ECMA-328 — Detection and measurement of chemical emissions from electronic equipment (June 2001)
- ECMA TR/70 — Product-related Environmental Attributes, 2nd edition (June 1999)

ISO

- ISO 11469:2000 — Plastics - Generic identification and marking of plastics products
- ISO 14050:1998 — Environmental Management - Vocabulary
- ISO TR 14062:2002 — Environmental Management – Integrating environmental aspects into product design and development

4 Definitions

For the purpose of this Standard the following definitions and those in ISO 14050 apply.

4.1 Chemical emissions

Release of gases, vapours or particulate matters from point or diffuse sources.

4.2 Component

See 4.13 - Part

4.3 Consumables

User-replaceable parts or pieces of electrical or electronic equipment which are placed on the market for direct sale to consumers for normal use in electrical or electronic equipment.

4.4 Electrical and electronic equipment (EEE)

Equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1 000 V for alternating current and 1 500 V for direct current.

4.5 End of life

State of a product when it is finally removed from use.

4.6 Environmental aspect

Element of an organisations activities, products or services that can interact with the environment.

NOTE
A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact. (ISO 14050)

4.7 Environmental impact

Any change to the environment whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services. (ISO 14050)

4.8 Environmental management system

Part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedure, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy. (ISO 14050)

4.9 Final product

Final product refers to electrical and electronic equipment that is put onto the market either by the manufacturer or the supplier where such equipment is sold to the end customer. This applies equally to business-to-business as well as business to consumer.

4.10 Hazardous substances/preparations

Substances or preparations which are explosive, oxidising, extremely flammable, highly flammable, flammable, very toxic, toxic, harmful, corrosive, irritant, carcinogenic, mutagenic, toxic to reproduction, sensitising or dangerous to the environment (as governed by existing national, regional and international legislation).

4.11 Manufacturer

The natural or legal person with responsibility for the design, development and manufacture of a product in view of its being placed on the market under their own name, regardless of whether these operations are carried out by that person themselves or on their behalf.

4.12 Module

Item of a product consisting of several parts with a function in itself (e.g. power supply unit).

4.13 Part

Any piece or object within or included with a product.

4.14 Recycling

The reprocessing of EEE at end of life, or its constituent materials for re-use or for other purposes.

4.15 Reuse

Any operation by which electrical and electronic equipment or their components, having reached their end of life, are used for the same purpose for which they were conceived. “Re-use” includes the continued use of electrical and electronic equipment, which is returned to collection points, distributors, recyclers or manufacturers, as well as re-use of equipment following refurbishment.

4.16 Use phase

The time of a products life between placing into service and end of life.

4.17 Waste

Any electrical or electronic equipment which the holder discards or intends or is required to discard.

5 Acronyms and abbreviations

CE	Consumer Electronics	PBBs	Polybrominated biphenyls
CFCs	Chlorofluorocarbons	PBDEs	Polybrominated diphenyl ethers
EEE	Electrical and Electronic Equipment	PBTs	Polybrominated terphenyls
EICTA	European Information & Communications Technology Industry Association	PCBs	Polychlorinated biphenyls
ICT	Information and Communication Technology	PCTs	Polychlorinated terphenyls
HCFCs	Hydrochlorofluorocarbons	VOC	Volatile Organic Compounds
NiMH	Nickel Metal Hydride		

6 Design requirements and recommendations

The following requirements and recommendations have been compiled for use when designing and developing ICT and CE products as defined in the Scope, and as far as they can be practically influenced by the product designer.

Manufacturing, distribution and packaging also have an impact on the environment, but are outside the scope of this standard. Designers are encouraged to interact with those parts of the organisation in order to explore opportunities for reducing these environmental impacts.

6.1 Material efficiency

Material selection has an impact on the environment. When specifying construction materials, the product designer should choose 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 environmental impact;
- use recycled materials;
- use renewable materials.

For replacing materials containing hazardous substances and preparations, see 6.7.

6.2 Energy efficiency

The use phase of EEE typically represents the time when the most energy is consumed through the product life. It is for this reason that product design features that reduce / optimise energy consumption during use shall be considered.

Product designs should incorporate, where practical, power saving features such as:

- power off mode, with lowest (zero Watt if feasible) power consumption;
- automatic, low power mode(s);
- high efficiency power supplies;

- low power components.

The available features shall be recorded and documented in the design checklist.

To assist product users with the selection and operation of power saving features, the designer should consider ease of use to promote usage of this functionality.

Instructions on proper use of available energy saving controls and/or settings shall be provided to product users. Instructions may be included in product user documentation in either printed or electronic form.

Information on the power consumption in the different power modes shall be made available to the user.

Design engineers should consider the applicable voluntary agreements aimed at improving energy efficiency of EEE e.g. EICTA voluntary agreement on standby power consumption of audio equipment, EU Code of Conduct for external power supplies.

Products belonging to product categories, which are covered by the international ENERGY STAR® program, should be compliant to the program requirements. In case this cannot be achieved, the reasons for non-compliance should be recorded in the design checklist.

6.3 Consumables and batteries

6.3.1 Consumables

Many products use ”consumables” (such as printer cartridges and photographic film).

EEE products should be designed such that the use of consumables can be optimised relative to the functionality of the product.

Information on the proper use of the relevant product features shall be provided to the user.

The designer shall consider avoidance of hazardous substances and preparations in consumables as described in 6.7.

6.3.2 Batteries

The following design principles shall be applied:

- Batteries and accumulators shall comply with all applicable restrictions on hazardous substances and preparations and all labelling requirements contained in the relevant national, regional and international legislation.
- Batteries and accumulators shall be easily identifiable and removable. In some designs, an EEE product may prevent easy removal by the user because the battery(ies) is/are not to be removed until the end of life stage. In this case the product documentation shall identify the type and location of the battery(ies).
- Where possible, batteries with reduced environmental impact, such as Li-Ion, Li-Polymer and NiMH shall be considered. In cases where batteries containing materials regarded as being detrimental to the environment cannot be avoided, they shall be identified and a reason why this material cannot be avoided shall be recorded in the design checklist.
- Information on batteries in the product shall be made available. This information shall include proper procedures for removal and safe handling of the batteries and shall be included in product user documentation in either printed or electronic form.

Battery management features that will help prolong the life time of batteries and accumulators should be considered.

6.4 Chemical emissions

Products shall comply with all relevant regulations governing chemical emissions from products.

Products should be designed such that chemical emissions during use are reduced wherever possible.

Chemical emissions (Ozone and VOC) and dust emissions shall be evaluated for all products based on the electrostatic process (e.g. printer, copier, fax). For the measurement method, Standard ECMA-328 shall be followed.

The results of the emission measurement shall be made available to the product users as deemed appropriate by the product manufacturer. One way of reporting this can be in a product declaration according to ECMA TR/70.

NOTE
Designers should consider emission requirements of voluntary programs.

6.5 Extension of Product lifetime

Where technically and economically feasible, products should be designed to have an extended useful life and be easy to repair. Designers should consider incorporating the following features:

- use of common mechanical packages (such as covers and chassis) or common parts or components that are used for multiple models in the product family or in multiple generations of the same product, allowing for the reuse of common parts (excluding screws or fasteners);
- use of industry standard parts that may be more easily replaced or repaired;
- use of modular components;
- reuse of components, parts and systems, whenever applicable. Parts, which may be targeted for refurbishment and reuse (e.g. in maintenance and spare parts applications) should be identified..

In order to encourage the extension of a product's useful life, information on available options for upgrading, expanding and repair of products shall be made available to product users as deemed appropriate by the product manufacturer.

NOTE 1
Specifics on design for upgradability may need to be identified based on product categories, and/or initial cost of product. There are categories of products for which upgradability features may not be applicable; examples are single use cameras and pocket calculators.

NOTE 2
Some of the guidelines provided in 6.6 will aid serviceability.

6.6 End of Life

Product design should facilitate reuse, recycling and proper disposal at end of life

The following design principles, where appropriate for the expected end of life processes, shall be applied:

- type of polymer, copolymer, polymer blends or alloys of plastic parts with a weight greater than 25 g shall be indicated through a marking in conformance with ISO 11469;
- incompatible materials (including electronic modules) connected to case/housing parts or chassis shall be easily separable;
- separation of parts containing hazardous substances and preparations shall be possible
- disassembly down to the module level (e.g. power supply, disk drive, circuit board) shall be possible using commonly available tools;
- all connections that require disassembly shall be accessible (i.e., not hidden from view and with adequate clearance for manual removal or use of tools).

NOTE 1
Safety and performance considerations may override some of the requirements mentioned above.

NOTE 2
There are categories of products for which dismantling may not be practical at end of life.

The following design principles should be considered, where appropriate for the expected end of life processes:

- Ideally, the same polymer should be used throughout the design of a product. If this is not practical, consideration should be given to limiting the number plastic types used in the product. The compatibility guidelines found in annex C should be used in selecting polymers. Combinations rated Excellent or Good should be used wherever practical.
- The product should be designed such that modules can be extracted for reuse
- Avoidance of non-recyclable composites and coatings.
- Avoidance of incompatible coatings on major plastic parts.

- Avoidance of adhesive backed stickers or foams on major plastic parts.
- Reduction of use of welds and adhesives.
- Usage of labels and other identification marks made from the same material as the body of the products or a compatible material.
- Reduction of variety and number of connections (e.g. fastener and screws).
- Limitation of the number of position changes that have to be made by the dismantler.
- Reduction of the number of steps necessary for disassembly.
- Minimise the number of tools required for disassembly.
- Avoidance of metal inserts in plastic parts.
- Use of snap fits for joining of plastic parts.
- Use of moulded-in colour and finish on plastic mechanical parts.

For large and complex products (e.g. rack mounted systems, servers, telephone switches etc.), product designer should consider development of a plan for the disassembly of the product into major modules or sub assemblies and make this plan available to dismantlers. The disassembly plan could include:

- documentation of disassembly information;
- identification of potentially valuable and/or re-usable parts;
- identification of parts containing hazardous substances and preparations;
- special handling and disposal precautions.

6.7 Substances and preparations needing special attention

6.7.1 Content in products

Reducing and/or eliminating potentially hazardous substances and preparations should be a priority in the design of electrical and electronic products. In particular designers are advised to be aware of international, regional and national prohibitions on the use of certain hazardous substances and preparations in products in order to ensure legal compliance for products sold in targeted countries. The product must comply with all applicable legislation.

Product designers should attempt to reduce the use of substances that require special handling or disposal during the product recycling process and make this information available to product users and/or recyclers.

In some cases, substances and preparations, which are noted as restricted in the clauses below, cannot be avoided (e.g. due to the absence of acceptable alternatives to perform a specific function). In these cases the substances and preparations shall be identified and an indication why they cannot be avoided shall be recorded in a design checklist.

Restrictions listed in the clauses below represent those generally accepted internationally as being inappropriate in product design. As such they do not represent an exhaustive list.

6.7.2 General limitations

The product shall not contain, intentionally added:

- asbestos;
- CFCs, HCFCs;
- PBTs, PCTs;
- PCBs;
- mercury – with the exception of discharge lamps that require mercury for proper operation

The product should not contain hexavalent chromium, with the exception of residual amounts contained in the surface treatment of metals.

6.7.3 Limitations on plastic mechanical parts and housings

In addition to the limitation of 6.7.2, plastic parts shall not contain, intentionally added:

- cadmium or cadmium compounds;
- short chain chloroparaffins;
- lead or lead compounds;
- PBB, PBDE

6.7.4 Limitations on paints, coatings or colouring agents

Paints, coatings or colouring agents shall not contain intentionally added:

- cadmium or cadmium compounds;
- hexavalent chromium compounds;
- lead or lead compounds.

6.7.5 Parts containing hazardous substances or preparations

Appropriate information on parts requiring special handling or disposal (such as batteries or mercury lamps) shall be made available to product users and recyclers. This information may be provided in electronic or printed form as deemed appropriate by the product manufacturer. The documentation shall include, where appropriate, the procedures for removal and safe handling of such parts.

7 Documentation

- Information for consumers/users on how to install, use maintain and, where applicable, dispose of the product shall be provided in an appropriate manner - especially as it pertains to the environmental characteristics of the product.
- Clause 6 of this standard requires certain product environmental characteristics to be made available to product users. It is recommended that such information be provided in a format according to ECMA TR70.

All information required to be provided by the manufacturer may be provided in printed or electronic format as deemed appropriate by the manufacturer.

8 Design checklist for designers

The design checklist is intended solely for use of the designer

The designer needs to evaluate a considerable number of environmental aspects.

Annex A provides guidance in the form of an example checklist, which may be used to evaluate and record the requirements and recommendations according to this standard during the design and/or redesign process. This is a generic checklist and not every item on the checklist is applicable to every product and/or product group.

It is recognised that there is a wide range of ICT and CE products. For this reason it is not possible to provide a unique checklist for every type of ICT and CE product or family (group) of products. Designers shall generate a design checklist based on the design requirements of this standard and through other reference material and technical reports that will accurately reflect their specific products or family of products.

Annex A
(informative)

Design Guidance and Design for Environment Checklist

Designing a product for optimum environmental performance requires the careful consideration of a number of different environmental aspects along with other product criteria such as functional performance, long-term reliability, safety, and cost competitiveness. In many instances, the product designer must evaluate complex tradeoffs among these various criteria to provide a product that is both useful to consumers and protective of the environment.

This informative annex provides a checklist of both environmental requirements and recommendations derived from clauses 6 and 7 of this Standard. The purpose of this checklist is to assist designers in the consideration of environmental aspects of their design and to help document, in a Design for Environment Checklist, the specific environmental design attributes that were incorporated into a given electrical and electronic product.

It is important to recognize that few products will be able to incorporate all of the design attributes discussed in this annex, or even included in a manufacturer's own design checklist. Due to the large number of different types of electrical and electronic equipment and their varying design characteristics, it is not possible to develop a single checklist that will be appropriate for all products. Consequently, manufacturers should develop checklists appropriate to their particular product types providing only those environmental characteristics applicable to their product(s). For this reason, this checklist is offered primarily as a template.

A.1 Material efficiency

The variety of materials used in the product has been reduced.

( ) Yes, describe briefly _____

( ) No

The amount of material used in the product has been reduced.

( ) Yes, describe briefly _____

( ) No

The product contains materials that are considered to have lower environmental impact.

( ) Yes, describe briefly _____

( ) No

The product contains recycled materials.

( ) Yes

( ) No

The product uses renewable materials.

( ) Yes describe briefly _____

( ) No

A.2 Energy efficiency

The product design incorporates energy efficiency or savings features (include hardware and software features).

( ) Yes, check all that apply.

[ ] Power OFF mode with lowest (0 watts if feasible) power consumption
[ ] Automatic low power mode. Describe all modes of operation.

_____

_____

[ ] High efficiency power supplies
[ ] Low power components. Describe all low power components

_____

_____

[ ] Other, Describe.

_____

_____

( ) No, state reason: _____

( ) Not applicable

Ease of use as related to the selection and operation of power saving features was considered and implemented.

( ) Yes, considered and implemented;

describe briefly: _____ _____

( ) Yes, considered but not implemented;

specify reason(s):_____

( ) Not applicable

( ) No

Information on proper use of available energy saving controls and/or settings are available to product users.

( ) Yes, list sources
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product or Packaging Labels
[ ] Product Packaging Insert
[ ] Internet. Provide URL. _____
[ ] Other. Describe. _____

( ) Not Applicable

( ) No

Information on power consumption in all standard power management modes has been made available to product users.

( ) Yes, list sources
[ ] Manufacturer Environmental Product Declaration
[ ] Product Specification Document
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Labels or Packaging
[ ] Product Packaging Insert
[ ] Internet. Provide URL _____
[ ] Other. Describe. _____

( ) Not applicable

( ) No

Applicable voluntary agreements aimed at improving energy efficiency of EEE products were considered and recommendations met.

( ) Yes, considered and recommendations met;

describe briefly: _____

( ) Yes, considered but recommendations not met;

specify reason(s):_____

( ) Not applicable

( ) No

The product is compliant to the requirements of the international ENERGY STAR® program.

( ) Yes

( ) Not applicable

( ) No; give reason(s) for non-compliance. _____

_____

A.3 Consumables and batteries

A.3.1 Consumables

The product has been designed such that the use of consumables associated with the product can be optimised relative to the functionality of the product.

( ) Yes

( ) Not Applicable (no consumables)

( ) No

Information on the proper use of consumables associated with the product has been provided to the user.

( ) Yes, list sources (all that apply):
[ ] Manufacturer Environmental Product Declaration
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Service Manual
[ ] Internet. Provide URL. _____
[ ] Other. Describe. _____

( ) Not Applicable (No consumables)

( ) No

The avoidance of hazardous substances and preparations in consumables has been considered.

( ) Yes

( ) Not Applicable (no consumables)

( ) No

A.3.2 Batteries

All batteries and accumulators in the product comply with applicable restrictions on hazardous substances and preparations contained in relevant national, regional and international legislation, depending on where the product will be sold.

( ) Yes

( ) Not Applicable (no batteries and/or accumulators)

( ) No

All batteries and accumulators in the product are labelled according to requirements of relevant regional, national or international legislation, depending on where the product is sold.

( ) Yes

( ) Not Applicable (no batteries and/or accumulators)

( ) No

All batteries, accumulators and assemblies containing batteries and accumulators are easily identified and removable.

( ) Yes

( ) Not Applicable (no batteries and/or accumulators)

( ) No; specify reason(s):
[ ] batteries are not intended to be removed until the end of life stage
[ ] other _____

Information on type and location of non-removable batteries (during product life) is available in the appropriate product documentation.

( ) Yes
[ ] type of battery _____
[ ] location _____

( ) Not Applicable (no non-removable batteries and/or accumulators)

( ) No

Consideration has been given to batteries with reduced environmental impact (see Section 6.3.2).

( ) Yes; specify type of batteries considered (check all that apply).
[ ] Li-Ion
[ ] Li-Polymer
[ ] NiMH
[ ] Other; describe _____

( ) Not Applicable (no batteries)

( ) No; specify reason(s) _____

The product has batteries containing materials regarded as detrimental to the environment that cannot be avoided.

( ) No

( ) Not Applicable (no batteries and/or accumulators)

( ) Yes
[ ] Identify batteries _____
[ ] Where reported _____
[ ] Reason(s) why material(s) cannot be avoided _____
_____

Information on proper procedures for removal and safe handling of batteries is available in product user documentation.

( ) Yes, list sources
[ ] Manufacturer Environmental Product Declaration
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Service Manual
[ ] Product Labels
[ ] Internet. Provide URL _____
[ ] Other: describe. _____

( ) Not Applicable (no batteries and/or accumulators)

( ) No; give reason(s) _____

Battery management features that help to prolong battery and/or accumulator life have been considered and implemented.

( ) Yes, considered and implemented

( ) Yes, considered but not implemented

( ) Not Applicable (no batteries and/or accumulators)

( ) No; give reason(s) _____

A.4 Chemical Emissions

Product complies with all relevant regulations governing chemical emissions from products.

( ) Yes

( ) Not Applicable (product does not consume supplies)

( ) No

Product has been designed such that chemical emissions are reduced wherever possible.

( ) Yes

( ) Not Applicable (product is not based on electrostatic process}

( ) No

For a product based on the electrostatic process, chemical emissions (Ozone and VOC) and dust emissions have been evaluated.

( ) Yes

( ) Not Applicable (product is not based on electrostatic process)

( ) No

For a product based on the electrostatic process, emissions measurements have been completed in accordance with Standard ECMA-328.

( ) Yes

( ) Not Applicable (product does not consume supplies)

( ) No

Results of the emissions measurement(s) have been made available to product users.

( ) Yes, list sources
[ ] Manufacturer Environmental Product Declaration
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Service Manual
[ ] Internet. Provide URL _____
[ ] Other: describe. _____

( ) Not Applicable (product does not consume supplies)

( ) No; give reason(s) _____

Applicable voluntary programs regarding emission requirements were considered and met.

( ) Yes, considered and met;

describe briefly: _____

( ) Yes, considered but not met;

specify reason(s):_____ _____

( ) Not applicable

( ) No

A.5 Extension of Product Lifetime

The product contains common mechanical packages (such as covers and chassis) or common parts or components that are used for multiple models in the product family or in multiple generations of the same product.

( ) Yes, describe. _____

( ) Not applicable

( ) No

The product contains industry standard parts.

( ) Yes, list _____

( ) No

( ) Not applicable

The product contains modular components.

( ) Yes, list. _____

( ) Not applicable

( ) No

The product contains reused components and/or parts.

( ) Yes, list. _____

( ) Not applicable

( ) No

The product contains parts targeted for refurbishment and reuse in maintenance and spare parts applications.

( ) Yes, list. _____

( ) Not applicable

( ) No

The use of recycled content plastics for the product was considered.

( ) Yes, and parts with recycled content resins were used

list parts_____

( ) Not applicable

( ) No

The product contains features that promote upgradablility and expandability.

( ) Yes, describe :

[ ] Memory up to _____ MB
[ ] Microprocessor
[ ] Card slots (total/free) _____/_____
[ ] Bays (total/free) _____/_____
[ ] HDD up to _____ GB
[ ] CD-ROM up to _____ x
[ ] Other _____

( ) Not applicable

( ) No

The product contains features, which promote ease of repair and/or longer product life.

( ) Yes (check all that apply)

[ ] Ease of access for repair
[ ] Use of long life components and parts
[ ] Easily replaced Field Replaceable Units (FRU)
[ ] Other _____

( ) Not applicable

( ) No

Information is available to the product user for upgrading, expansion, modularity features, function and/or performance enhancements, and repair of the product.

( ) Yes, list available source(s)

[ ] Product User Manual (hardcopy)
[ ] Product User Manual (softcopy)
[ ] Product Service Manual
[ ] Product Labels or Packaging
[ ] Product Packaging Insert
[ ] Internet. Provide URL. _____
[ ] Other. Describe. _____

( ) Not applicable

( ) No

A.6 End of Life

All plastic parts with weight greater than 25 g are marked with the type of polymer, copolymer, polymer blends or alloys in conformance with ISO 11469.

( ) Yes

( ) No

( ) Not applicable

Incompatible materials (including electronic modules) connected to case/housing parts or chassis are easily separable.

( ) Yes

( ) No

( ) Not applicable

Separation of parts containing hazardous substances and preparations is possible.

( ) Yes

( ) No

( ) Not applicable

The product can be disassembled down to the module level using commonly available tools.

( ) Yes

( ) No, list all special tools required for disassembly.

_____

_____

All connections that require disassembly are accessible (i.e., not hidden from view and with adequate clearance for manual removal or tools).

( ) Yes

( ) No

( ) Not applicable

Consideration is given to limiting the number plastic types used in the product.

( ) Yes

( ) No

( ) Not applicable

The compatibility guidelines (see annex C) are used in selecting the polymers.

( ) Yes, and combinations rated Excellent or Good are used.

( ) Yes, but combinations rated Excellent or Good are not used.

( ) No

( ) Not applicable, specify why: _____

The product is designed such that modules can be extracted for reuse

( ) Yes

( ) No

( ) Not applicable

List all additional design product features that promote ease of disassembly or recycling of plastic parts in the product. (Check all that apply).

[ ] Non-recyclable composites and coatings have been avoided .
[ ] Incompatible coatings on major plastic parts have been avoided.
[ ] Adhesive backed labels or foams on major plastic parts have been avoided .
[ ] Use of welds and adhesives has been reduced.
[ ] Label[s] and other identification marks are made from the same or compatible material as the body of the product.
[ ] Variety and number of connections [e.g.fasteners, screws, nuts/bolts] have been reduced.
[ ] The number of position changes that have to be made by the dismantler has been limited.
[ ] The number of steps necessary for disassembly has been reduced.
[ ] The number of tools required for disassembly has been minimized.
[ ] Metal inserts in plastic parts have been avoided
[ ] Snap fits for joining of plastic parts are used.
[ ] Moulded-in colour and finish on plastic mechanical parts are used.
[ ] Other; describe. _____

For large and complex products, a plan for the disassembly of the product into major modules or sub-assemblies has been developed.

( ) Yes

( ) Not Applicable

( ) No

For large and complex products, information on a disassembly plan is being made available to dismantlers.

( ) Yes, check all that apply.
[ ] Disassembly information is documented.
[ ] Potentially valuable and/or re-useable parts are identified.
[ ] Parts containing hazardous substances and preparations are identified.
[ ] Special handling and disposal precaution information has been included.

( ) Not Applicable

( ) No

A.7 Substances and preparations needing special attention

A.7.1 Content in products

The product complies with the applicable international, regional and national prohibitions on the use of certain hazardous substances and preparations.

( ) Yes, list _____

( ) Not applicable

( ) No

Use of substances that require special handling or disposal during the recycling process have been reduced or eliminated.

( ) Yes, eliminated;

( ) Yes, reduced; list _____

( ) Not applicable

( ) No

A.7.2 General limitations

The product does NOT/ does contain (intentionally added) the following substances:

( ) Does not contain	( ) Does contain	Asbestos
( ) Does not contain	( ) Does contain	CFCs, HCFCs
( ) Does not contain	( ) Does contain	PBTs, PCTs
( ) Does not contain	( ) Does contain	PCBs
( ) Does not contain	( ) Does contain	Mercury (exception: discharge lamps)
( ) Does not contain	( ) Does contain	Hexavalent chromium compounds (exception: residual amounts contained in the corrosion surface treatment of metals)

A.7.3 Limitations on plastic parts, mechanical parts and housings

The plastic parts for the product do NOT/ do contain (intentionally added) the following substances:

( ) Do not contain	( ) Do contain	Cadmium or cadmium compounds
( ) Do not contain	( ) Do contain	Short chain Chloroparaffins
( ) Do not contain	( ) Do contain	Lead or lead compounds
( ) Do not contain	( ) Do contain	PBB, PBDE

A.7.4 Limitations on paints, coatings or colouring agents

The paints, coatings or colouring agents for the product do NOT / do contain (intentionally added) the following substances:

( ) Do not contain	( ) Do contain	Cadmium or cadmium compounds
( ) Do not contain	( ) Do contain	Hexavalent chromium compounds
( ) Do not contain	( ) Do contain	Lead or lead compounds

Substances recorded to be restricted in the clauses above are present in the product

( ) No

( ) Yes;

provide reason(s) why material(s) cannot be avoided:_____

_____

A.7.5 Parts containing hazardous substances or preparations

Information on parts requiring special handling or disposal is being made available to product users and recyclers.

( ) Yes, list sources
- [ ] Product Specification Document
- [ ] Manufacturer Environmental Product Declaration
- [ ] Product User Manual (Hard Copy)
- [ ] Product User Manual (Soft Copy)
- [ ] Product Labels or Packaging
- [ ] Product Packaging Insert
- [ ] Internet. Provide URL._____
- [ ] Other. Describe._____

( ) No

Procedures for removal and safe handling of parts requiring special handling or disposal is included in user information documentation.

( ) Yes, list sources
[ ] Product Specification Document
[ ] Manufacturer Environmental Product Declaration
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Labels or Packaging
[ ] Product Packaging Insert
[ ] Internet. Provide URL._____
[ ] Other. Describe._____ _____

( ) Not applicable

( ) No, state reason(s); _____

A.8 Documentation

Instructions for consumers/users on how to install, use, maintain and, where applicable, dispose of the product is provided – especially as it pertains to the environmental characteristics of the product.

( ) Yes, list sources
[ ] Product Specification Document
[ ] Manufacturer Environmental Product Declaration
[ ] Product User Manual (Hard Copy)
[ ] Product User Manual (Soft Copy)
[ ] Product Labels or Packaging
[ ] Product Packaging Insert
[ ] Internet. Provide URL._____
[ ] Other. Describe._____

( ) No

All applicable product environmental information to be made available to product users is provided according to ECMA TR70.

( ) Yes

( ) No

Annex B
(informative)

Bibliography

The following information is provided as an initial source of documents, related to this Standard. It cannot be regarded as a complete list of legislation related to the content of this Standard.

B.1 General

ISO

- ISO Guide 64 — Guide for the inclusion of environmental aspects in product standards
- ISO 14001 — Environmental management systems - Specification with guidance for use

IEC

- IEC Guide 109 — Environmental aspects - Inclusion in electro technical product standards: Annex C - Guidance on Design for Environment (DFE) principles for electro technical industry.

EU

- EU Directive 76/769/EEC — Restrictions on the marketing and use of certain dangerous substances and preparations and its 30 amendment Directives.
- EU Directive 67/548/EEC — Classification, packaging and labelling of dangerous substances.
- EU Directive 88/379/EEC — Classification, packaging and labelling of dangerous preparations.

B.2 Selected references to legislation and other environmental programs, which impose bans and restrictions on the use of certain substances in products.

Clause	Substance/ preparation	References	Note
6.4 Chemical emissions	Dust, ozone and Volatile Organic Compounds (VOC) Formaldehyde, CAS number 50-00-0, coated or uncoated wood	ECO label restrictions German Chemikalienverbotsverord-nung, version 19, dated 26.06.2000). Test methods: German Federal Institute for Material Research & Testing.	(e)
6.7.2 General	Asbestos	83/478/EEC 5th amendment, 85/610/EEC 7th amendment, 87/217/EEC, 91/659/EEC, 99/77/EEC	(a)
	Mercury (except lamps)	SE SFS 1998:944,	(b) (h)
	CFCs& HCFCs	94/48/EC, 2037/2000/EEC	(a)
	PCB & PCT	82/828/EEC, 3rd amendment, 85/467/EEC 6th amendment, 91/339/EEC	(a)
	Chromium and chromium compounds hexavalent chromium, Cr VI	ECO label restrictions	(f) (h)
6.7.3 plastic parts	Cadmium	91/338/EEC, 10th amendment, 99/51/EEC	(a) (h)
	Short chain chlorinated paraffins (SCCP)	NL: Decree 478 / 1999.12.31, NO: MVD nr 1544 / 2001.01.01, 2002/45/EC	(c) (d) (a)
	Lead or lead compounds	ECO label restrictions,	(e) (h)
	PBB, PBDE	Pentabromodiphenyl ether, EU 75/769, 24th amendment, regulated from January 1st 2003 ECO label restrictions	(a) (g) (h)
6.7.4 paints, coating, colorants	Cadmium	91/338/EEC, 10th amendment, 99/51/EEC	(a) (h)
	Chromium and chromium compounds hexavalent chromium, Cr VI	ECO label restrictions	(f) (h)
	Lead or lead compounds	89/677/EEC 8th amendment,	(a) (h)
6.5.2 Batteries	Labelling	93/86/EEC and 91/157/EEC	(a)
	Mercury restrictions	98/101/EC	(a)
	Hazardous definitions	91/157/EEC and 98/101/EC	(a)

NOTE 2
For the source, the first edition and the last amendment are given.

Explanations and notes

(a) EU references, see: http://europa.eu.int/abc/eur-lex/index_en.htm.

(b) SE = Swedish regulation.

(c) NL = Dutch regulation.

(d) NO = Norwegian regulation.

(e) Restricted in German Blue Angel, Nordic Swan, Swedish TCO.

(f) Chromium VI restricted in German Blue Angel for copiers and printers in ink and toner. Chromium restricted in Swedish TCO for copiers and printers in surfaces of product controls.

(g) Restricted in the EU Flower ECO label with the following CAS-numbers:

Decabromodiphenyl 13654-09-6	Monobromodiphenyl ether 101-55-3
Dibromodiphenyl ether 2050-47-7	Tribromodiphenyl ether 49690-94-0
Tetrabromodiphenyl ether 40088-47-9	Pentabromodiphenyl ether 32534-81-9
Hexabromodiphenyl ether 36483-60-0	Heptabromodiphenyl ether 68928-80-3
Octabromodiphenyl ether 32536-52-0	Nonabromodiphenyl ether 63936-56-1
Decabromodiphenyl ether 1163-19-5	

(h) From January 1st 2007, the EU Draft RoHS Directive, 500PC0347(02) has restrictions on lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium, Cr VI and polybrominated biphenyls (PBB), and/or polybrominated diphenyl ethers (PBDE).
The reader is advised to check the latest version of these restrictions at:
http://europa.eu.int/abc/eur-lex/index_en.htm to understand the applicability, labeling requirements, entry into force and exemptions.

Annex C
(informative)

Plastics compatibility guide

	LLPE	LLPDE	ULPDE/ VLPDE	Ethylene Copolymers	HDPE	PP	EPM/ EPDM	ABS	SAN	PA	PBT	PC	PET	SBS	PS	PVC	SAN	PMMA
LLPE	%																	
LLPDE	%	%																
ULPDE/ VLPDE	%	%	%															
Ethylene Copolymers	%	%	%	%														
HDPE	%	%	%	%	%													
PP	!	♣	%*	♣	!	%												
EPM/ EPDM	!	!	%*	∀	!	%	%											
ABS	!	!	!	!	!	!	!	%										
SAN	!	!	!	!	!	!	!	%	%									
PA	!	!	!	%*	!	!	%*	!	!	%								
PBT	!	!	!	♣*	!	!	!	!	!	!	%							
PC	!	!	!	!	!	!	!	♣	!	!	%	%						
PET	!	!	!	∀*	!	!	!	!	!	∀	∀	%	%					
SBS	!	!	!	!	!	!	!	♣	∀	∀	!	!	!	%				
PS	!	!	!	!	!	!	!	!	!	!	!	!	!	%[2]	%			
PVC	!	!	!	♣*	!	!	!	∀	!	!	!	!	!	∀	!	%		
SAN	!	!	!	!	!	!	!	!	!	!	!	♣	!	!	!	♣	%	
PMMA	!	!	!	∀	!	!	!	♣	♣	!	!	♣	!	!	!	♣	!	%

% Excellent
♣ Good
∀ Fair
! Incompatible
* depending on composition
[2] general purpose, high impact

Free printed copies can be ordered from:

ECMA

114 Rue du Rhône

CH-1204 Geneva

Switzerland

Fax: +41 22 849.60.01
Email: documents@ecma.ch

Files of this Standard can be freely downloaded from the ECMA web site (www.ecma.ch). This site gives full information on ECMA, ECMA activities, ECMA Standards and Technical Reports.

ECMA
114 Rue du Rhône
CH-1204 Geneva
Switzerland
See inside cover page for obtaining further soft or hard copies.