We integrate outstanding performance in environmental protection, maximum occupational safety and innovative concepts to promote health in business processes.

http://intranet.siemens.com/ehs
1 Objective and purpose

This Standard specifies requirements and procedures for the design of legally compliant and environmentally compatible products and systems. The Standard refers to chapter 6.4 of the EP Guideline (Part B: Product-related Environmental Protection). In addition, it specifies requirements concerning:

- Procurement and placing on the market of products that contain substances which are legally restricted or subject to declaration demands.
- Procurement and placing on the market of products with incorporated or enclosed batteries.
- Design and selection of packaging, packaging materials and packaging aids.

Purpose of this Standard is to provide guidance for the processes that result in best possible environmental compatibility of products and systems in balance with the economic and technical parameters and in consideration of the entire life cycle.

The Standard takes the international standards IEC 62430 (environmentally conscious design for electrical and electronic products) and IEC 62474 (material declaration) into account.

2 Scope

The scope of application of this Standard is the same as for the EHS Principles. This Standard particularly addresses the CEOs and Heads of organizational units which are responsible for planning and development of products or for planning and installation of systems including the procurement of materials, components and external products contained therein.

The Standard becomes effective upon release. Actions to implement the requirements contained therein shall be started immediately. The requirements shall be implemented within 18 months.
### Terms and definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Life cycle</td>
<td>Consecutive and interlinked stages of a product or system, from raw material acquisition or generation from natural resources to final disposal [ISO 14040:2006, modified].</td>
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</table>
| Categories of possible environmental impacts | Categories of possible environmental impacts (impact categories) are e.g.:  
- Global warming  
- Depletion of stratospheric ozone (ozone hole)  
- Photochemical oxidant formation (summer smog)  
- Eutrophication (over-fertilization of water and soil)  
- Acidification (of air, water and soil)  
- Resource depletion (e.g. of raw materials and fossil energy sources)  
- Damage to human health (human toxicity)  
- Damage to ecosystems (ecotoxity)  
- Land use |
| Environmental aspect          | Element of an organization's activities or products or services that can interact with the environment [ISO 14001:2004]. Examples are: energy use, raw material use, emissions to air, releases to water, waste generation. |
| Battery                       | Source of electrical energy generated by direct conversion of chemical energy and consisting of one or more primary battery cells (non-rechargeable) or secondary cells (rechargeable). |

### Requirements and procedures

#### 4.1 General requirements

Products and systems are the more environmentally compatible the smaller the sum of their adverse environmental impacts throughout their entire life cycle is. Based on this, the following principles shall be taken into account for the environmentally compatible design of products and systems:

- Consideration of the entire life cycle
- Consideration of all categories of possible environmental impacts

The following activities on environmentally compatible product and system design shall be incorporated in the business processes of each organizational unit responsible for planning and development of products or for planning and installation of systems.

According to chapter 6.6 of the EP Guidelines (Part B: Product-related Environmental Protection) the environmental targets and measures shall be documented in the requirement specification and functional specification and shall be checked in the milestones.
## 1. Activities on environmentally compatible product design

### Planning and development aspects

1. Identifying, documenting and implementing regulatory and normative requirements as well as of requirements that are given by customers and other stakeholders.

2. Determining, evaluating and documenting the relevant environmental aspects throughout the entire product life cycle, bearing potential competitive advantages in mind.

3. Assessing and if necessary developing a documented concept for the end of life treatment of the product (reuse, recycling, disposal), with estimated costs.

4. Deriving environment-related design objectives based on the previous steps 1 to 3, establishing these design objectives in the design specification and tracking the achievement of these objectives.

### Procurement and manufacturing aspects

5. Minimizing product weight, variety of materials as well as number and variety of product parts (components). Applying recyclable materials as far as possible.


7. Taking into account of environmental and dangerous goods aspects in the selection and procurement of materials, semi-finished products, components and external products, such as:
   - Legal requirements
   - Avoidance and declaration requirements
   - Requirements regarding battery-containing products
   - Dangerous goods aspects
   Demandig information from suppliers in this regard.

8. Investigating the application of alternative materials (e.g. recycled polymers, materials from renewable resources).

### Sales and service aspects

9. Optimizing the environmental compatibility of the packaging in relation to amount, selection of material and logistics considerations (e.g. returnable packaging) in due consideration of dangerous goods aspects.

10. Providing environment-related information for customers (e.g. environmental product declaration) and relevant dangerous goods information.

11. Informing internal sales and service organizations and customers about the environmentally compatible disposal of packaging, consumables (e.g. batteries) and used products. Providing information about resource (e.g. energy, water) saving operational modes of the product.

12. Facilitating resource saving service procedures.

### Product usage aspects

13. Designing products to have a long useful life and to be easy to repair and upgrade.

14. Minimizing resource consumption (e.g. energy, water, consumables) in all operational modes. Ensuring resource saving product use by technical provisions (e.g. software).

15. Avoiding the possibility of harm to the environment or health caused by substances, noise and radiation during product use.

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1. See chapter 4.2
2. See chapter 4.3
3. See SF Standard Transport of Dangerous Goods
4. See chapter 4.4
5. See EP Standard Environmental Product Declaration (in preparation)
## Specifications on environmentally compatible product and system design

### Disassembly and disposal aspects

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>16</td>
<td>Providing disassembly and disposal instructions including information on the type and allocation of product parts that contain substances listed in List of Declarable Substances as well as of product parts that are to be treated selectively for disposal (e.g. according to the European WEEE Directive). Thereby dangerous goods aspects are to be considered.</td>
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<tr>
<td>17</td>
<td>Designing product components containing materials cited in activity 16 (see above) in such a way that they can be removed easily and without their destruction.</td>
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| 18 | Enabling easy dismantling by appropriate product design:  
- Low number and variety of connecting elements  
- Connections that require dismantling are readily identifiable and accessible  
- Connections are easily and – if reasonable – nondestructively to dismantle  
- Minimal number of steps necessary for disassembly  
- Facilitating the use of standard tools with few changes of position |
| 19 | Enabling the reuse or further use of products or components, e.g. by standardization of products and facilitating easy dismantling. |
| 20 | Enabling recycling of materials by:  
- Facilitating easy separation of materials, e.g. by avoiding composite materials and coatings  
- Marking of recyclable plastic parts according to ISO 11469 |

### Activities on environmentally compatible system design

#### Planning and development aspects

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| 1 | Identifying, documenting and implementing regulatory and normative requirements as well as requirements that are given by customers and other stakeholders.  
Recording environment-related stakeholder requirements:  
- Customer requirements  
- Regionally important factors (e.g. politics, investors, environmental organizations, permission issues) |
| 2 | Determining, evaluating and documenting the relevant environmental aspects throughout the entire life cycle. Therefore recording significant inputs and outputs for the installation, operation and dismantling. |
| 3 | Deriving environment-related design objectives based on the previous steps, establishing these design objectives in the specifications and tracking the achievement of these objectives. |
| 4 | Investigating with which environment-related performance characteristics a competitive advantage is achievable. Demonstrating respective economic customer benefit. |

#### Procurement and manufacturing aspects

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| 5 | Incorporating and documenting environmental aspects (see activity 1) when procuring or manufacturing system components and operating materials:  
- Preferentially selecting components that are produced in accordance with the environmentally compatible product design.  
- Taking account of local/regional legal bans and restrictions as well as the List of Declarable Substances in the selection of materials and components.  
- Optimizing the environmental compatibility of the means of packaging and transportation with respect to material selection and logistics. Thereby dangerous goods aspects are to be considered. |

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6 These activities may not be applicable in all cases. They need to be checked and as a result may be selected or modified according to the technical requirements.
7 See chapter 4.2
8 See chapter 4.4
## Specifications on environmentally compatible product and system design

### Installation aspects

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<td><strong>6</strong></td>
<td>Developing and implementing an EHS concept for the installation of the system.</td>
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### Operation aspects

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| **7** | Designing the system retrofittable and upgradable:  
- Taking retrofit into account  
- Facilitating upgrades and modifications |
| **8** | Ensuring energy efficient operation throughout all operation modes by technical measures and system optimization. |
| **9** | Reducing the consumption of operating materials by technical measures and system optimization. |
| **10** | Minimizing emissions (substances, noise, radiation) during operation of the system. |
| **11** | Providing instruction on environmentally sound operation modes (energy, water, operating materials, maintenance, etc.) in the instruction manual and developing a training concept if necessary. |
| **12** | Developing a concept for the environmentally compatible recovery or disposal of unavoidable wastes. |

### Dismantling aspects

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<td><strong>13</strong></td>
<td>Assessing and if applicable developing a concept for the end-of-life treatment of systems (reuse of system/components, recovery, and disposal) with estimation of costs.</td>
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### 4.2 Recording and declaration of substances

The List of Declarable Substances (LoDS\(^\text{9}\), see Appendix) contains substances which are subject to restrictions or declaration demands in regard to distribution in electro-technical and electronic products. The use of substances listed in the LoDS should be avoided in Siemens products and systems worldwide to the extent possible.

Each organizational unit responsible for planning and development of products or for planning and installation of systems shall adopt or establish a procedure that:

- Allows tracing of quantity (weight percentage) and allocation (e.g. part no., drawing no., consignment no.) of the contained LoDS substances per product placed on the market.
- Ensures declaration of LoDS substances from the supplier of materials, components, product parts or external products.
- Defines approval processes for the use of LoDS substances in case that avoidance is not technically or economically feasible.

### 4.3 Requirements regarding battery-containing products

The Siemens Battery Type Classification List (see Appendix) covers the different battery reporting requirements in the EEA (European Economic Area) member states and is the basis of the battery data fields in the Product Master Data (PMD).

Each organizational unit responsible for planning and development of products or for planning and installation of systems shall adopt or establish a procedure that:

- Allows tracing of type, quantity and weight of incorporated or enclosed batteries according to the Siemens Battery Type Classification List per product placed on the market.
- Ensures declaration of incorporated or enclosed batteries from the supplier of components, product parts or external products according to the Siemens Battery Type Classification List.
- Ensures that the necessary data are made available via PMD or comparable IT systems to sales and distribution functions in countries with battery reporting requirements.

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\(^9\) See CHR Circular No. 45/2011, also distributed as C SCM Circular No. 03/2011
4.4 Requirements regarding packaging

Packaging should be reused and shall be made from materials which are environmentally compatible so that they can be recycled or disposed of without difficulty if the packaging cannot be reused. When designing packages and selecting packaging materials and packaging aids the following principles shall be considered:

- Volume and weight are kept to the minimum required to protect the packed goods.
- Reuse or recycling of packaging is possible, and the environmental impact of recycling or disposal of packaging wastes are minimized.
- The use of substances listed in the LoDS is avoided or kept to a minimum.
- Reusable packaging is given priority when economical and ecological requirements are satisfied.
- Materials derived from renewable resources are checked for their suitability and used if appropriate (e.g. fibers as filler or padding).
- The physical properties and characteristics of the packaging material enable recycling for several times under normal condition.
- Single material packaging is always preferable. This also means that the outside and inside of the packaging should be made of the same material (e.g. corrugated cardboard, cardboard and paper, polyethylene and polyethylene foam).
- Composite packaging (solid materials composed of two or more substances, e.g. foam plastic with corrugated cardboard) is avoided. If composite packaging cannot be avoided, the various materials are easily separable.
- Adhesive tape, labels, material tags, printing ink, etc., do not interfere with the reusability or recyclability of the carrier material. If possible adhesive materials should match the carrier material or at least should be compatible with it.
- Plastic parts are marked according to ISO 11469 and specific regional regulations for the marking of recyclable packaging and packaging parts are implemented.

The materials in the “List of Preferable Packaging Materials and Packaging Aids” (see Appendix) are best suited to fulfil the requirements for environmentally compatible recycling and disposal of packaging. These materials should be preferably used. The materials contained in the “List of Packaging Materials and Packaging Aids to be Avoided” (see Appendix) should not be used.

5 Other applicable documents

6 Appendix

CHR EHS Intranet:

- List of Declarable Substances (LoDS) (also in Siemens Internet)
- Siemens Battery Type Classification List
- List of Preferable Packaging Materials and Packaging Aids
- List of Packaging Materials and Packaging Aids to be Avoided

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<tr>
<th>Name</th>
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<tr>
<td>Approved</td>
<td>Dr. R. Franke</td>
<td>CHR EHS</td>
<td>June 08, 2012</td>
</tr>
<tr>
<td>Approved</td>
<td>W. Oppermann</td>
<td>CHR EHS EP PE</td>
<td>June 08, 2012</td>
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