



Basic Concepts on Ecodesign

Unit 9: Ecodesign in the Environmental Management

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On completion of this unit a learner will:

- Identify the ISO standard 14006.
- Identify the different stages of the ecodesign process according to the ISO standard 14006 to implement an ecodesign environmental management system



9.1 Introduction

In 2000 companies demanded a certifiable standard for the environmental management of design by independent bodies to guarantee the implementation of environmental criteria to the design of products/services. The interested parties then started to work in a standard to encompass the environmental management variable of design and the development of products.

AENOR (the Spanish Standards and Certification Association) promoted the development of the standard UNE 150301¹ “Environmental management of design and development process. Design for Environment”. A workgroup was established headed by IHOBE (a Public Company dependant on the Office of the Deputy Adviser on Environment of the Basque Government) and composed by the interested parties (companies, representatives of the administration, universities, technological centres, design engineering, environmental consultants, etc.). In 2003 the standard UNE 150301 was approved and published.

A few years later, AENOR suggested the development of an international standard for Ecodesign Management to the International Organization for Standardization (ISO) motivated by the increasing demand of companies to certify ecodesign. In 2008 the workgroup “ISO/TC 207/SC 1/WG 4” was formed to achieve that purpose, headed by the BSI (British Standards Institution) and with AENOR at the secretariat of the group. The Spanish UNE 150301 was regarded as a reference for the development of the standard ISO. Finally, in 2011 the standard ISO 14006 was approved and published.

- ISO 14006:2011. Environmental Management Systems – Guidelines for Incorporating Ecodesign.

In short, the essential objectives of the standard ISO 14006, assisting tool for the Environmental Management of Design, are:

Summary of Objectives of the international ISO standard 14006:

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- Establishing a systematic methodology to guarantee the continual environmental improvement in the design process and the development of products/services.
 - An approach based on the all stages of the life cycle of the product/service, environmental aspects and impacts related to each one of them.
 - Facilitate communication for companies to show their environmental performance through an issued certificate accrediting the compliance of the requirements demanded.
 - Raise awareness in the market and society on the environmental impact that

¹ UNE 150301:2003. Environmental Management of Design and Development Process. Design for Environment.



products/services generate.

9.2 Requirements of Standard ISO 14006:2011

9.2.1 Structure of Standard ISO 14006

The structure of the standard ISO 14006 is based on the quality management system (ISO 9001:2008²) and environmental management system (ISO 14001:2004³) standards. The standard was posed this way to ease the incorporation of this standard in the mentioned management systems.

Current incorporation of the standard ISO 14006 in other management systems: currently, the standard ISO 14006:2001 matches no more the versions in force for the standards ISO 9001:2015 and ISO 14001:2015, since they present now the so called “high level structure” (mentioned on Unit 8 of this course). Numerous clauses match their designation and content, but their distribution has changed. To incorporate the requirements of ISO 14006, correlation tables of clauses from the in force standard with the annulled ones can be considered.

Clauses of the standard ISO 14006:2011	
1. SCOPE	
2. NORMATIVE REFERENCES	
3. TERMS AND DEFINITIONS	
4. ROLE OF TOP MANAGEMENT IN ECODSIGN	
4.1 Benefits of conducting ecodesign.	
4.2 Tasks for ecodesign.	
5. GUIDELINES FOR INCORPORATING ECODSIGN INTO AN EMS	
5.1 General guidelines	
5.2 Environmental policy	
5.3 Planning	
5.4 Implementation and operation	
5.5 Checking	
5.6 Management review	
6. ECODSIGN ACTIVITIES IN PRODUCT DESIGN AND DEVELOPMENT	
6.1 General	
6.2 Life cycle thinking	
6.3 Ecodesign process	
6.4 Environmental assessment of products	
6.5 Analysis of interested parties' environmental requirements	
6.6 Ecodesign review	
6.7 Value chain involvement	

² ISO 9001:2008. Quality Management Systems

³ ISO 14001:2004. Environmental Management Systems. Requirements with guidance for use.



The clauses that offer guidance to the manager of the environmental management system are: 4, 5 y 6, and will be further addressed in the following section, 9.2.2 Key Requirements of ISO 14006.

9.2.2 Key Requirements of ISO 14006

The approach of this standard is fundamentally based on the following concepts:

- **Continual improvement:** “PDCA Cycle or Deming Cycle”, consists in planning, doing, checking and acting to continuously improve the implemented management system, pursuing the improvement of environmental impacts generated by products and services. In the video “Continuous Improvement in Management Systems” of Unit 8 of this course, data is further developed on this matter.
- **Life cycle:** consider environmental aspects related to each stage of the life cycle of a product/cycle, not only from the manufacturing stage.
- **Prevention:** prevent impacts from a product or service, promoting its minimisation since the design stage.

The key requirements of the standard are displayed below to understand what kind of environmental data is required to comply with the same.

Clause 4. Role of top management in ecodesign

In this clause, the potential benefits of ecodesign are explained and the strategic issues for the business and management are considered.

Keys to Clause 4:

BENEFITS OF ECODESIGN:

- Economic: competitiveness increase, costs reduction and funding/investment raising.
 - Innovation and creativity promotion, identification of new business models.
 - Legal responsibility reduction.
 - Improvement of the public image of the organisation and/or brand.
 - Increase of the workforce motivation.
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Top management comprises two kind of tasks to secure that ecodesign is implemented in the organisation: to consider the “strategic aspects of ecodesign” and “management of internal processes”, once the ecodesign strategy and approach are established.



Keys to Clause 4:

<i>STRATEGIC ASPECTS OF ECODESIGN refers to:</i>	<i>MANAGEMENT OF INTERNAL PROCESSES includes:</i>
<ul style="list-style-type: none">○ Incorporating ecodesign into all operations of the organisation.○ Allocation of resources (human, technical and financing).○ Establishing objectives for environmental performance.○ Promoting innovation and new business models.	<ul style="list-style-type: none">○ Incorporation and implementation of the chosen strategy into all relevant procedures, programmes and planning.○ Securing a multidisciplinary approach.○ Involving the entire value chain (suppliers, after-sales, service providers, recyclers).○ Promoting communication in two directions, in the internal and external value chain.

Clause 5. Guidelines for incorporating ecodesign into an EMS

This clause requires the treatment of ecodesign as an integral part of an Environmental Management System (EMS) according to the requirements of the standard ISO 14001. The designed process and product development are required to be included in the EMS scope.

Keys to Clause 5:

ENVIRONMENTAL POLICY: is important that the policy is in alignment with the nature, scale and significant environmental impacts of the products throughout the life cycle (LC), and include a commitment to comply with applicable legal requirements and with other requirements to which the organisation subscribes relating to the environmental aspects of its products, continual improvement of the ecodesign process, environmental performance and provide the framework for setting and reviewing product-related environmental objectives and targets.

ENVIRONMENTAL ASPECTS AND ITS ASSESSMENT: identify and evaluate environmental aspects should explicitly include the life cycle of the product, that may have a significant impact on the environment, that can be controlled or influenced by the organisation. Significant aspects must be considered in setting its environmental objectives.

LEGAL AND OTHER REQUIREMENTS AND ITS ASSESSMENT: identify legal and other requirements related to the environmental aspects of its products throughout its LC. These requirements should be taken into account in the product design and development process. Compliance with legal and other requirements must be periodically checked and records on the results must be kept.

OBJECTIVES, TARGETS AND PROGRAMMES: objectives should be focused on the improvement of the environmental impact of the products throughout their life cycle. Objectives can be “horizontal” (applicable to all types of products of an organisation), “product-specific” and “related to the ecodesign process”. Other objectives of design need to be given consideration: function, accessibility and maintenance, to ensure that regulatory requirements are not compromised.



Keys to Clause 5: (continuation).

IMPLEMENTATION AND OPERATION:

- **Resources, roles, responsibility and authority:** to define all of them involved in a product design and development process, including also other functions of the organisation that could collaborate in the improvement of the environmental performance of the product.
- **Competence, training and awareness:** the organisation should ensure that any persons are aware of, and have knowledge of, environmental aspects and impacts related to products throughout their life cycle. Alongside other areas, people should have, or should have access to, competence in applying methodologies and tools for the identification and evaluation of environmental aspects of products and for the identification of environmental improvement strategies.
- **Communication:** external and internal communication. Internal, information related to environmental performance. External, analysis of relevant environmental aspects covering the life cycle to develop solutions to minimise environmental impacts. The different parties involved in the product life cycle of the necessary actions to improve environmental performance beyond the production stage, for example, guidance on use, maintenance and end-of-life.
- **Documentation and control:** this shall include documents, including records, necessary to ensure the effective planning, operation and control of processes that relate to its significant environmental aspects, environmental policy, objectives and targets, the scope of the EMS, interaction and reference of main elements to related documents. Documents must be approved prior to issue, update, changes and revision status. Available at points of use, identifiable and distribution controlled.
- **Operational control:**
 - **General:** There are different ways of setting up a product design and development process and this standard follows the method described in ISO 9001:2008⁴. Procedures must be documented to incorporate ecodesign and communicate applicable procedures and requirements to suppliers, including contractors to ensure consistency with internal procedures.
 - **Stages of design and development:**
 - **Design and development planning:** Ecodesign should be an integral part of design and development planning. Specifically, the organisation should determine how environmental considerations are integrated in the design and development stages, which environmental criteria will be used in the review, verification and validation stages, and environmentally related responsibilities and authorities for design and development.
 - **Design and development inputs:** environmental requirements that respond to the horizontal objectives and targets, and other design requirements that respond to legal and other requirements for the product to be designed or redesigned.
 - **Design and development outputs:** The outputs should be provided in a form suitable for verification against development inputs, address the environmental objectives and targets for the product and the key information for improving environmental performance throughout its life cycle.

⁴ ISO 9001:2008. Sistemas de gestión de la calidad. Requisitos.



Keys to Clause 5: (continuation).

- **Design and development review:** The review should verify that there is no shift of adverse environmental impact from one stage of the life cycle to another, or from one type to another, and that the product design and development process has not generated new significant environmental aspects in comparison to the initial environmental aspects unless it results in a net reduction of negative environmental impacts throughout the life cycle. The identification and evaluation of the product's environmental aspects should be updated.
 - **Design and development verification:** Verification should be done by checking the detailed design, sometimes a prototype, against the environmental objectives/targets that are set by the design specification and the environmental product performance data.
 - **Design and development validation:** Validation should be done through evaluating the behaviour of the final product against the environmental product specification in normal use conditions.
 - **Control of design and development changes:** Design and development changes shall be identified and records maintained. Evaluation of the effect of the changes on constituent parts and products already delivered.
- **Emergency and preparedness and response:** To identify potential emergency situations and potential accidents that can have an impact(s) on the environment and how to respond to them. They must be periodically reviewed and, when necessary, modified.

CHECKING:

- **Monitoring and measurement:** should include information needed to assess conformity with the objectives and targets related to the ecodesign process and with the environmental impact of its products throughout their life cycle.
- **Nonconformity, corrective action and preventive action:** identify and correct nonconformity(ies) and taking action(s) to mitigate their environmental impacts. Record of the results of information, corrective action(s) and preventive action(s) taken.
- **Control of records:** established, implemented and maintained procedure(s) for identification, storage, protection, retrieval, retention and disposal of records.
- **Internal audit:** of the EMS are conducted at planned intervals to determine whether the EMS conforms to planned arrangements and the standard. To address the responsibilities and requirements for planning and conducting audits, reporting results and retaining associated records.

MANAGEMENT REVIEW:

Top management shall review the organisation's EMS, at planned intervals to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the system, including the policy, objectives and targets. Records of the management reviews shall be retained with any decisions and actions related to reviewed issues.



Clause 6. Ecodesign activities in product design and development

This clause addresses ecodesign considered in product design and development.

Keys to Clause 6:

- **THINKING:** Key elements of the life cycle thinking are having an objective to minimise the overall adverse environmental impact of the product; identifying, qualifying and, where feasible, quantifying the significant environmental aspects of the product, and considering the trade-offs between environmental aspects and between different life cycle stages.
 - **ECODESIGN PROCESS:** the following steps should be carried out, to specify the functions of the product, to define significant environmental parameters from the analysis of interested parties' environmental requirements, inputs and the evaluation of the environmental aspects. To identify relevant environmental improvement strategies for the product, to develop environmental objectives/targets based on the improvement strategies, to establish a product specification, to develop technical solutions to meet the environmental objectives/targets, while taking into account other design considerations.
 - **ENVIRONMENTAL ASSESSMENT OF PRODUCTS:** There are various analysis methods and tools available, the choice depends on the organisation's strategy, type of product, expertise, time and budget.
 - **ANALYSIS OF INTERESTED PARTIES' ENVIRONMENTAL REQUIREMENTS:** As an initial step in ecodesign, the relevant legal and other interested parties' requirements should be understood. These requirements help set the basic framework within a product is developed.
 - **ECODESIGN REVIEW:** Environmental considerations should be integrated into the design review. The organisation should conduct the review to evaluate whether the product has met the targets defined in the environmental product specification whenever a major design phase is completed. When the product's environmental targets are not met, improvement actions should be assigned. Records of the design reviews should be maintained. The organisation may conduct further product reviews after market launch to consider feedback from users and other interested parties, as well as additional environment-related knowledge. The results will then be incorporated into ecodesign (continual improvement).
 - **VALUE CHAIN INVOLVEMENT:** Organisations in the value chain should cooperate and communicate information on their product or product category to achieve ecodesign objectives.
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9.2.3 ISO 14006 Standard Certification

Once the EMS has been implemented, the organisation is in position to certify the system.

To this end, the organisation will contact an accredited verification body (e.g. AENOR, BVQi, etc.) to perform the certification audit and check that the requirements of ISO 14006 are met.

If the result is satisfying, the verification body will issue the corresponding “ISO 14006 Certification”.



The organisation may disseminate the same and communicate it to the interested parties (customers, suppliers, society, etc.).

