



# SLOVENSKI STANDARD

## oSIST prEN 16524:2019

01-september-2019

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**Proizvodi strojne in kovinskopredelovalne industrije - Metodologija za zmanjšanje vplivov na okolje pri načrtovanju in razvoju proizvodov**

Mechanical products - Methodology for reduction of environmental impacts in product design and development

Mechanische Produkte - Methodik zur Verminderung der Umweltauswirkungen bei Produktgestaltung und Entwicklung

Produits mécaniques - Méthodologie de réduction des impacts environnementaux à la conception et au développement des produits

<https://standards.iteh.ai/catalog/standards/sist/bafbac5f-dbec-43e6-bfa7-f0567444c641/sist-en-16524-2021>

**Ta slovenski standard je istoveten z: prEN 16524**

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**ICS:**

13.020.10	Ravnanje z okoljem	Environmental management
21.020	Značilnosti in načrtovanje strojev, aparatov, opreme	Characteristics and design of machines, apparatus, equipment

**oSIST prEN 16524:2019**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 16524**

June 2019

ICS 13.020.10

Will supersede CEN/TS 16524:2013

English Version

## Mechanical products - Methodology for reduction of environmental impacts in product design and development

Produits mécaniques - Méthodologie de réduction des impacts environnementaux à la conception et au développement des produits

Mechanische Produkte - Methodik zur Verminderung der Umweltauswirkungen bei Produktgestaltung und Entwicklung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 406.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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## European foreword

This document (prEN 16524:2019) has been prepared by Technical Committee CEN/TC 406 “Mechanical products - Ecodesign methodology”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 16524:2013.

The main changes compared to CEN/TS 16524:2013 are as follows:

- the document is to be converted into a European standard;
- the link with ISO 14001 has been strengthened for users willing to comply with that international standard;
- Clause 5 has been added to detail the preliminary step before implementing the methodology, which consists of an overview of the framework and the methodology;
- life cycle analysis (LCA) is only referred to as an example of existing data on the product, when available; and
- the purpose of the Annex F on the possible use of life cycle assessment for determining the score of each environmental aspects has been clarified.

(standards.iteh.ai)

SIST EN 16524:2021

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## Introduction

Ecodesign methodologies can be divided into three types, depending on whether their purpose is the environmental assessment of products, the environmental improvement of products or to enable the two phases to be carried out during the same ecodesign project.

The environmental assessment phase of products in the ecodesign process can be an impediment for companies (owing to need for expertise, time and resources). Therefore, the methodology discussed in this document has been developed with the aim of helping designers to identify ways of improving the environmental performance of a product without carrying out a complete environmental assessment of the product (in terms of LCA).

The approach, therefore, consists of restricting the scope of analysis to the area defined by the constraints of the product-enterprise pair, which takes into account the technical factors of the product, economic constraints, the practices of a company and its development strategies. Secondly, it consists of exploring the potential for environmental improvement within this restricted field.

This document is intended to give companies, in particular SMEs, a pragmatic methodology to consider environmental aspects during their product design. It allows them to:

- Identify the environmental aspects of a product, including but not limited to energy aspects;
- Be able to make progress in product design (for environmental impact reduction), taking into account capabilities of the company;
- Promote to clients and public authorities the environmental improvement approach on a mechanical product with this methodology (environmental claim).

The improvement of the environmental impact implies that the intended performance of the product (fitness for use, durability, etc.) is maintained.

To implement this methodology, the company staff will have sufficient knowledge and expertise in environmental issues; if not, external expertise could be addressed. When applying this methodology, management of the company can enter a learning process with the aim of defining and/or confirming its strategy for ecodesign, modifying its design process to enable the environmental issue to be taken into account, and creating new knowledge.

The aim of this document is not to measure the actual environmental performance of a product, nor to conduct a full life cycle assessment according to ISO 14040. Nevertheless, suitable data coming from more detailed studies e.g. LCA, carbon footprint, etc. can be used as inputs for this methodology (see an example in Annex F).

Figure 1 shows the relationship between this document and existing documents from ISO.

Objective of the approach	Generic ISO documents	Documents for mechanical products
<b>To assess</b> <i>implement actions which contribute to improve the environmental performance of the product</i>	<b>ISO 14040</b> <b>ISO 14044</b>	
<b>To communicate</b> <i>advertise, label, declare an eco-design approach or an environmental performance of a product according to a common reference</i>	<b>ISO 14020</b> <b>ISO 14021</b> <b>ISO 14025</b>	
<b>To improve</b> <i>measure the environmental performance of a product and identify the environmental aspects</i>	<b>ISO/TR 14062</b>	<b>CEN/TS 16524</b>
<b>To manage</b> <i>have a life cycle thinking in relationship with the product design</i>	<b>ISO 14001</b> <b>ISO 14006</b>	

NOTE More specific methodologies might exist for specific mechanical products.

**Figure 1 — Relationship between this document and existing ISO documents**

This document can assist the company to comply with the requirement of EN ISO 14001 and the recommendations of EN ISO 14006, to establish, implement and maintain a procedure to identify the environmental aspects of its products.

This document is not intended to support or to demonstrate compliance with any specific implementing measures of Framework Directive 2009/125/EC (Energy-related Products). It can provide methodologies for identifying the more relevant environmental aspects in order to propose alternative design options to improve the environmental performance of the product.

This document is not intended for calculation of environmental footprint.

## prEN 16524:2019 (E)

### 1 Scope

This document describes a methodology for reducing the overall environmental impact through product design and development that is tailored to mechanical products as defined in 3.1.

This methodology is particularly well suited to the redesign of an existing product; it can also be applied for the design of a new product provided the necessary assumptions regarding a (virtual) reference product are taken.

It addresses companies which have decided to integrate an ecodesign approach to optimize environmental impacts within the product life cycle, in relation to the other product aspects, such as functionality, quality, costs, etc.

It also helps to meet some requirements of ISO 14001:2015 on the integration of environmental aspects in the design of products.

**NOTE 1** This document targets persons who are directly involved in the design and development of mechanical products, as well as managers responsible for defining corporate policies, and decision-makers. The proposed methodology is intended to kick-start ecodesign initiatives within companies as part of a teaching and continuous improvement approach.

This document also includes a template that companies can use as part of the communication on their environmental approach.

This document is neither intended nor suitable to compare products (even similar) of different suppliers.

This document is neither intended nor suitable for product certification purposes.

**NOTE 2** An example of implementation of the methodology is given in Annex D; the basic principles for the establishment of this method are given in Annex E.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **mechanical product**

product manufactured by companies from mechanical engineering and metalworking industry, such as capital goods (machinery, production systems, components), tools, household goods, optical parts, measuring instruments

#### 3.2

##### **reference product**

existing product of the company to be re-designed, with the same intended use

**Note 1 to entry:** It can be also a similar product existing on the market, or the Technical Specification of a product.



### 3.3 environmental aspect

#### EA

element of an organisation's activities or products or services that interacts or can interact with the environment

Note 1 to entry: For this document, environmental aspects are categorized into Raw Materials acquisition, Manufacturing, Use, Product End-of-life, Hazardous substances, Transport and distribution, Packaging.

[SOURCE: ISO 14001:2015, 3.2.2]

### 3.4 (environmental) design option

#### DO

measure intended to improve a specific environmental aspect within the product life cycle, in relation to the other product aspects, such as functionality, quality, costs, etc

### 3.5 scoring of environmental aspects

#### SEA

representation of the relative importance of the product's environmental aspects over its life cycle

Note 1 to entry: This SEA does not express the environmental performance of the product.

### 3.6 design option indicator

#### DO indicator

qualitative or quantitative indicator representative of a given design option, used to track this option during the design phase

### 3.7 environmental aspect indicator

#### EA indicator

qualitative or quantitative indicator associated with a particular environmental aspect, as representative as possible of this environmental aspect, used to keep a multi-criteria view of the environmental performance of the product during its development

Note 1 to entry: "Multi-criteria view" means the consideration of all environmental aspects to avoid a shift of impact (e.g. change of material can result in lower recyclability coefficient).

### 3.8 recoverability

ability of component parts, materials or both that can be diverted from an end-of-life stream to be recovered (see Figure 2)

[SOURCE: ISO 22628:2002, 3.9]

### 3.9 recyclability

ability of component parts, materials or both that can be diverted from an end-of-life stream to be recycled (see Figure 2)

[SOURCE: ISO 22628:2002, 3.7]

**prEN 16524:2019 (E)****3.10  
material recyclability coefficient*****r***

percentage by mass (mass fraction in percent) of a material potentially able to be recycled

[SOURCE: ISO 22628:2002, 3.8 modified – vehicle has been replaced by material]

**3.11  
reusability**

ability of component parts that can be diverted from an end-of-life stream to be reused (see Figure 2)

	Recovery		Undefined residue
(Component parts) <b>Re-use</b>	(Materials) <b>Recycling</b>	(Materials) <b>Energy recovery</b>	(Materials)
Recyclability rate			
Recoverability rate			
Product mass			

**Figure 2 — Overview of key terms****3.12  
ecodesign**

integration of environmental aspects into product design with the aim of improving the environmental performance of the product throughout its whole life cycle

[SOURCE: Directive 2009/125/EC]

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## 4 Abbreviated terms

The abbreviated terms necessary for the understanding of this document are the following:

BOM	Bill Of Materials or equivalent technical description of the product
DO	Design Option
EA	Environmental Aspect
EoL	End-of-Life
ErP	Energy related Products (European Directive)
ELV	End-of-Life Vehicles (European Directive)
M	Manufacturing aspect
Pkg	Packaging aspect
PEL	Product End-of-Life aspect
RM	Raw Material aspect
S	Hazardous Substances aspect
SEA	Scoring of Environmental Aspect
T	Transport and distribution aspect
U	Use aspect
RoHS	Restriction on Hazardous Substances (European Directive)
WEEE	Waste Electrical and Electronic Equipment (European Directive)

## 5 Overview of the framework and the methodology (Preparatory step or step 0: strategic analysis)

### 5.1 General

The methodology described in this document shall be applied by a multidisciplinary project team with recognized environmental competencies, supported by management, and involving all corporate functions likely to be impacted (e.g. R&D, Design Office, Purchasing, Manufacture, Logistics, Marketing, etc.).

Management of the company shall be involved at the key steps of the methodology, especially when ranking the design options and the development of associated technical solutions that require defining the main actors, the needed time, and the available resources.

**NOTE** The team concept is used with the purpose of combining different competencies and functions, and does not necessarily require different physical persons.

Figure 3 gives preliminary considerations and an overview of the methodology, noting that the first step is intended to allow the user to get a framework and raise the relevant questions related to strategy and evaluation of products that will lead to the implementation of the methodology. It advises the user of this document for its application, especially by supporting the company to evaluate the benefits of an ecodesign approach and to decide to apply it or not and to extend it or not. There are two main go/no go points:

- The first after the general strategic and product analysis for the company,
- The second after the conclusion of the case study to extend the use of the methodology for other products of the company.

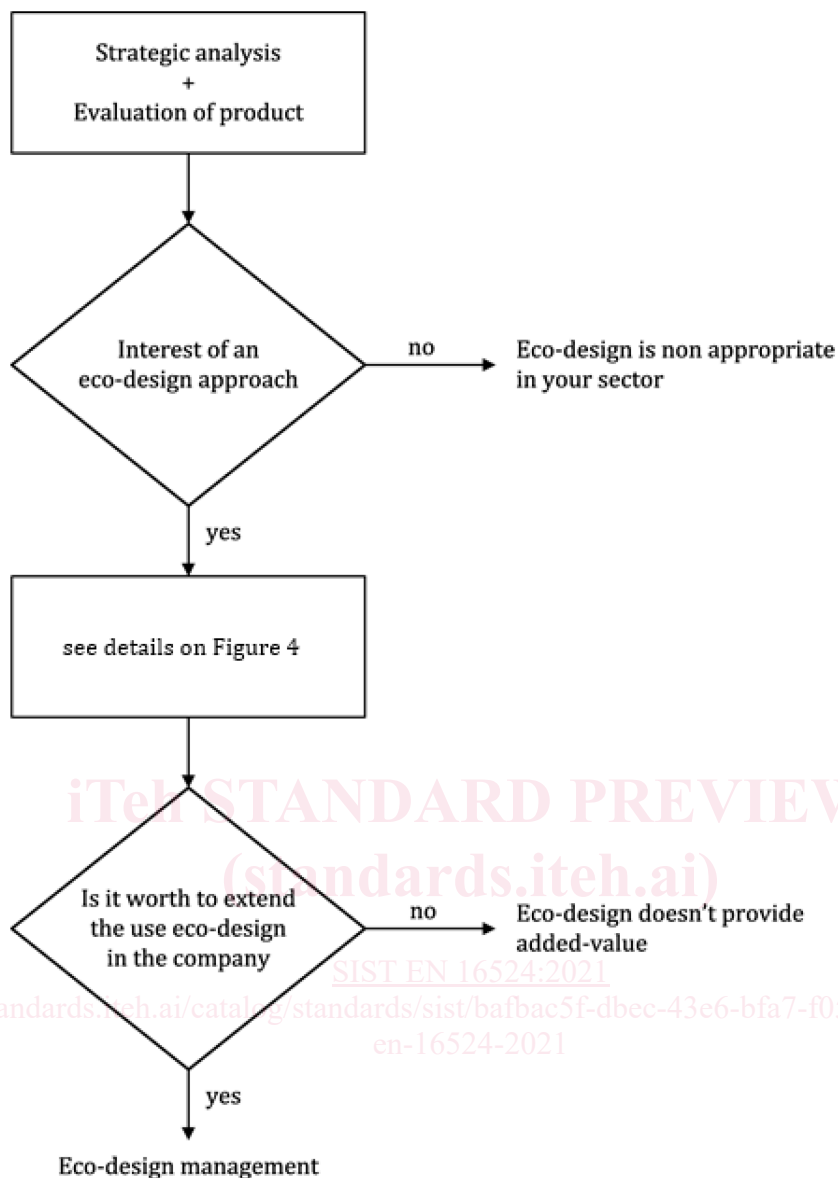


Figure 3 — Framework to apply the methodology

## 5.2 Details of preliminary step: strategic analysis at company level

### 5.2.1 Objective

Before starting an ecodesign approach, it is worthwhile to better understand the context of the company and the project, in terms of:

- Legal applicable requirements Market needs or requirements (specifications),
- Customers' unexpressed needs (their own legal requirements or constraints),
- Feedbacks in the company or in the group (case studies, green procurement, existing practices for environment, etc.),
- Available standards, ecolabels, practices in the sector,
- Competitors' behaviours or practices (their communication on environmental issues, certification, etc.),

- Possible Suppliers' contributions.

### 5.2.2 Procedure

Do a benchmark on the various points enumerated above.

The information gathered will be helpful during step 2 for the choice of design options. For instance, if a competitor already communicates on energy efficiency, it could be relevant to think about this topic.

Based on the results of the strategic analysis combined with an economic analysis (which costs, which gains, etc.), top management will have sufficient data to determine if ecodesign can serve the company's strategy and if it is relevant to launch an ecodesign project. The SWOT tool could be interesting to have a final decision.

### 5.2.3 Documentation of the preliminary step

- Report on strategic analysis, gathering all information mentioned above,
- Formal commitment of the top management supporting the ecodesign project.

## 6 Description of the methodology

### 6.1 General

After the preliminary step (step 0: strategic analysis, see Clause 5), the methodology described in this document is based on five steps set out below, which are also part of the design and development process (see Figures 4 and 5), and which shall be applied successively:

- Step 1: determination of the scoring of the environmental aspects of the reference product,
- Step 2: selection/ranking of design options,
- Step 3: choice of suitable DO and EA indicators related to the reference product,
- Step 4: evaluation of the redesign using DO and EA indicators,
- Step 5: final assessment and consideration for future activities.

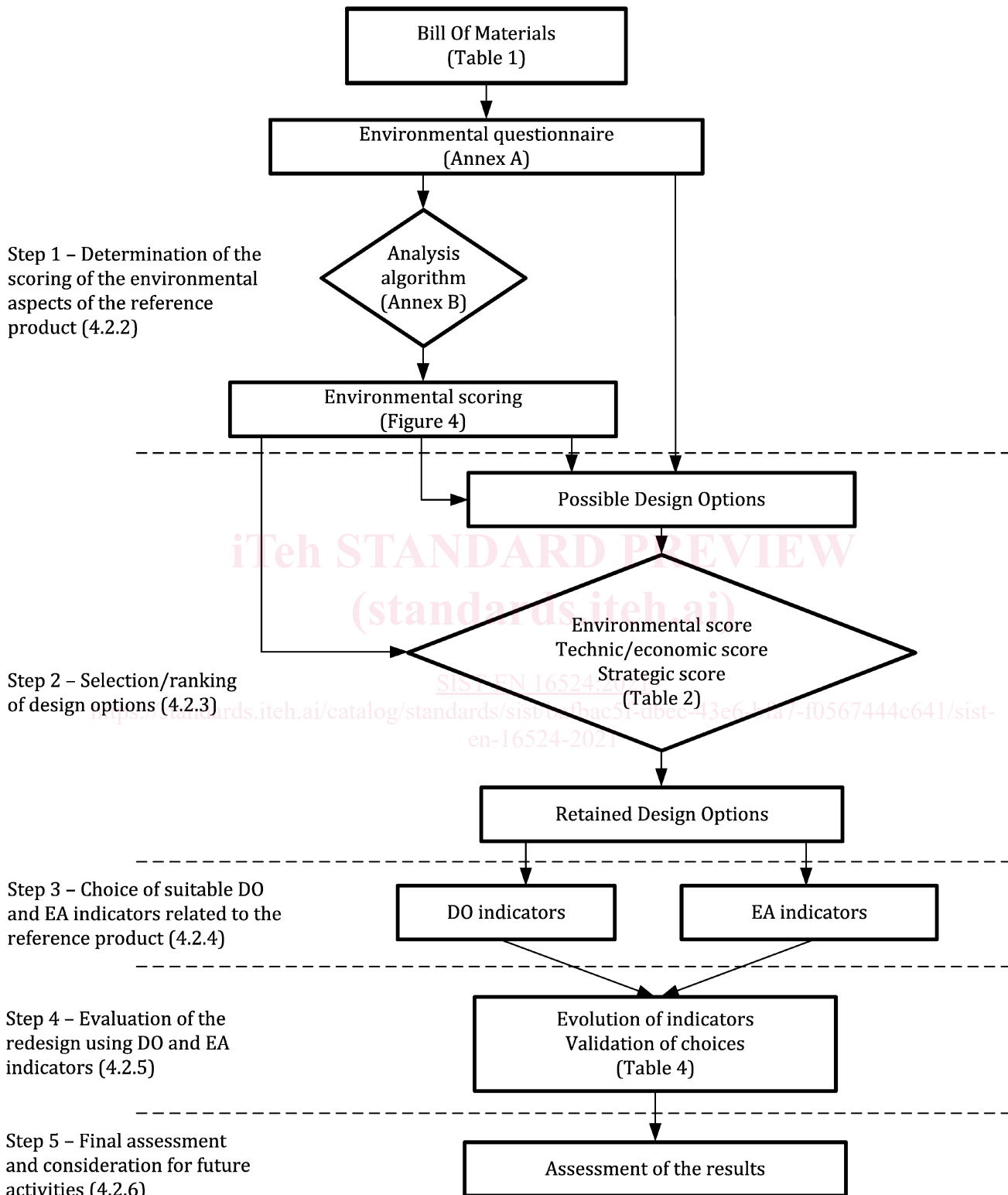
The objective of each step is described in 6.1 to 6.6, where the procedure which shall be followed is stated (written as direct instructions).

The output documents of each step are input for the next step and shall be validated by the project team before going to this next step.

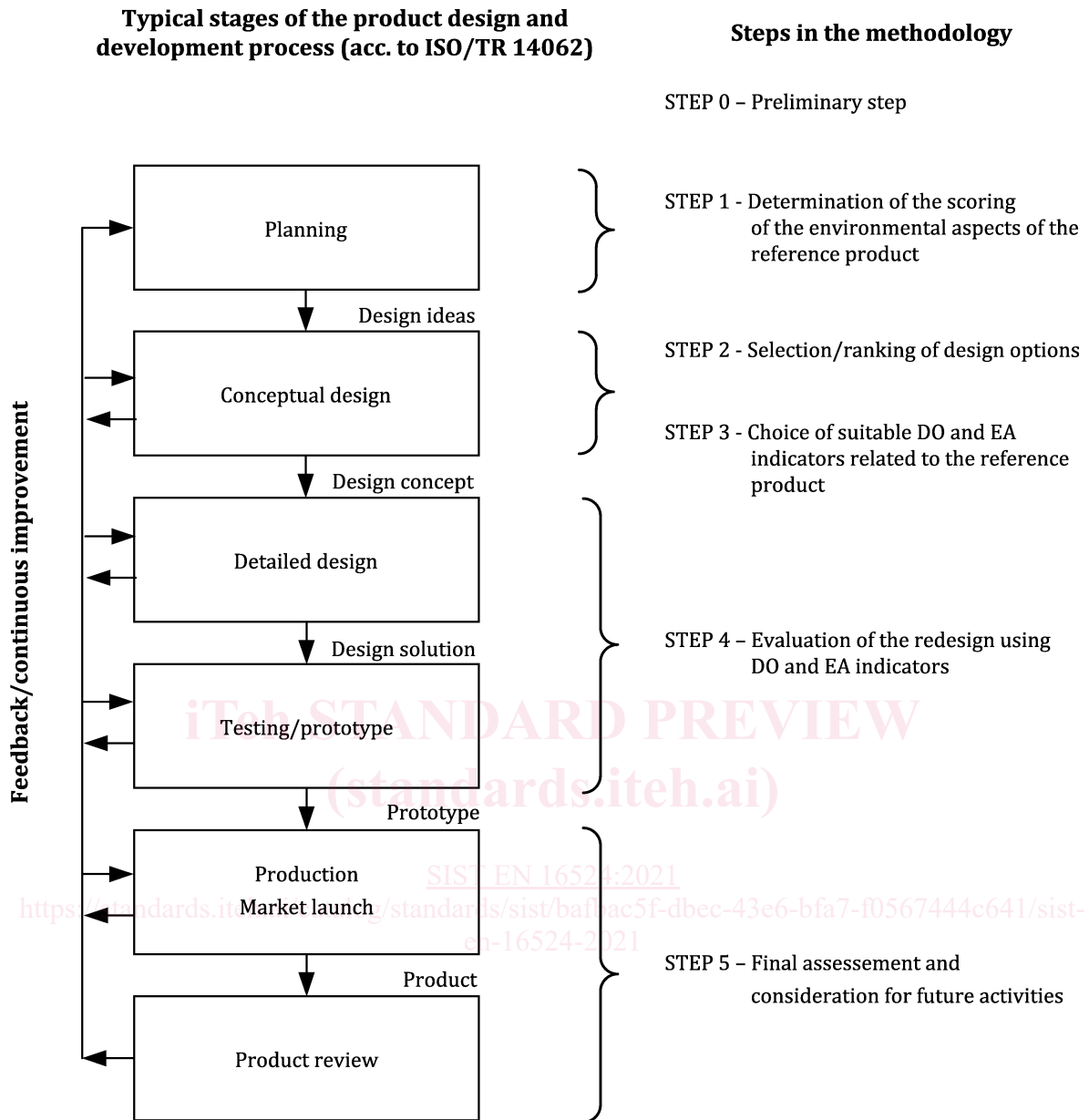
NOTE This document, "methodology" is used for the overall approach of reducing environmental impacts; "method" is used for specific tasks, such as indicator calculation.

## prEN 16524:2019 (E)

## Step 0 – Strategic analysis



**Figure 4 — Interrelation of the methodology with the design and development process**



**Figure 5 — Schematic illustration of the methodology**