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**Environmental management—
Life cycle assessment—
Principles and framework**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

This Standard, together with **JIS Q 14044:2010**, cancels and replaces **JIS Q 14040:1997**, **JIS Q 14041:1999**, **JIS Q 14042:2002** and **JIS Q 14043:2002**, which have been technically revised.

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Environmental management— Life cycle assessment— Principles and framework

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 14040** published in 2006 without modifying the technical contents.

The portions underlined with dots are the matters not stated in the original International Standard.

The increased awareness of the importance of environmental protection, and the possible impacts associated with products, both manufactured and consumed, has increased interest in the development of methods to better understand and address these impacts. One of the techniques being developed for this purpose is life cycle assessment (hereafter referred to as “LCA”).

NOTE 1 In this Standard, the term “product” includes services.

LCA can assist in

- identifying opportunities to improve the environmental performance of products at various points in their life cycle,
- informing decision-makers in industry, government or non-government organizations (e.g. for the purpose of strategic planning, priority setting, product or process design or redesign),
- the selection of relevant indicators of environmental performance, including measurement techniques, and
- marketing (e.g. implementing an ecolabelling scheme, making an environmental claim, or producing an environmental product declaration).

For practitioners of LCA, **JIS Q 14044** details the requirements for conducting an LCA.

LCA addresses the environmental aspects and potential environmental impacts (e.g. use of resources and the environmental consequences of releases) throughout a product’s life cycle from raw material acquisition through production, use, end-of-life treatment, recycling and final disposal (i.e. cradle-to-grave).

NOTE 2 The “potential environmental impacts” are relative expressions, as they are related to the functional unit of a product system.

There are four phases in an LCA study:

- a) the goal and scope definition phase,
- b) the inventory analysis phase,
- c) the impact assessment phase, and
- d) the interpretation phase.

The scope, including the system boundary and level of detail, of an LCA depends on the subject and the intended use of the study. The depth and the breadth of LCA can differ considerably depending on the goal of a particular LCA.

The life cycle inventory analysis phase (hereafter referred to as “LCI”) is the second phase of LCA. It is an inventory of input/output data with regard to the system being studied. It involves collection of the data necessary to meet the goals of the defined study

The life cycle impact assessment phase (hereafter referred to as “LCIA”) is the third phase of the LCA. The purpose of LCIA is to provide additional information to help assess a product system’s LCI results so as to better understand their environmental significance.

Life cycle interpretation is the final phase of the LCA procedure, in which the results of an LCI or an LCIA, or both, are summarized and discussed as a basis for conclusions, recommendations and decision-making in accordance with the goal and scope definition.

There are cases where the goal of an LCA can be satisfied by performing only an inventory analysis and an interpretation. This is usually referred to as an LCI study.

This Standard covers two types of studies: LCA studies and LCI studies. LCI studies are similar to LCA studies but exclude the LCIA phase. LCI studies are not to be confused with the LCI phase of an LCA study.

Generally, the information developed in an LCA or LCI study can be used as part of a much more comprehensive decision process. Comparing the results of different LCA or LCI studies is only possible if the assumptions and context of each study are equivalent. Therefore this Standard contains several requirements and recommendations to ensure transparency on these issues.

LCA is one of several environmental management techniques (e.g. risk assessment, environmental performance evaluation, environmental auditing, and environmental impact assessment) and might not be the most appropriate technique to use in all situations. LCA typically does not address the economic or social aspects of a product, but the life cycle approach and methodologies described in this Standard can be applied to these other aspects.

This Standard, like other Standards, is not intended to be used to create non-tariff trade barriers or to increase or change an organization’s legal obligations.

1 Scope

This Standard describes the principles and framework for life cycle assessment (LCA) including

- a) the goal and scope definition of the LCA,
- b) the LCI phase,
- c) the LCIA phase,
- d) the life cycle interpretation phase,
- e) reporting and critical review of the LCA,
- f) limitations of the LCA,

- g) relationship between the LCA phases, and
- h) conditions for use of value choices and optional elements.

This Standard covers LCA studies and LCI studies, it does not describe the LCA technique in detail, nor does it specify methodologies for the individual phases of the LCA.

The intended application of LCA or LCI results is considered during the goal and scope definition, but the application itself is outside the scope of this Standard.

This Standard is not intended for contractual or regulatory purposes or registration and certification.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

ISO 14040:2006 *Environmental management—Life cycle assessment—Principles and framework* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitutes provisions of this Standard. The most recent edition of the standard (including amendments) indicated below shall be applied.

JIS Q 14044 *Environmental management—Life cycle assessment—Requirements and guidelines*

NOTE : Corresponding International Standard: ISO 14044 *Environmental management—Life cycle assessment—Requirements and guidelines* (IDT)

3 Terms and definitions

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

3.1 life cycle

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

3.2 life cycle assessment, LCA

compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

3.3 life cycle inventory analysis, LCI

phase of LCA involving the compilation and quantification of inputs and outputs for a product throughout its life cycle

3.4 life cycle impact assessment, LCIA

phase of LCA aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts for a product system throughout the life cycle of the product

3.5 life cycle interpretation

phase of LCA in which the findings of either the inventory analysis or the impact assessment, or both, are evaluated in relation to the defined goal and scope in order to reach conclusions and recommendations

3.6 comparative assertion

environmental claim regarding the superiority or equivalence of one product versus a competing product that performs the same function

3.7 transparency

open, comprehensive and understandable presentation of information

3.8 environmental aspect

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

[JIS Q 14001:2004, 3.6]

3.9 product

any goods or service

NOTE 1 The product can be categorized as follows:

- services (e.g. transport);
- software (e.g. computer program, dictionary);
- hardware (e.g. engine mechanical part);
- processed materials (e.g. lubricant),

NOTE 2 Services have tangible and intangible elements. Provision of a service can involve, for example, the following:

- an activity performed on a customer-supplied tangible product (e.g. automobile to be repaired);
- an activity performed on a customer-supplied intangible product (e.g. the income statement needed to prepare a tax return);
- the delivery of an intangible product (e.g. the delivery of information in the context of knowledge transmission);
- the creation of ambience for the customer (e.g. in hotels and restaurants).

Software consists of information and is generally intangible and can be in the form of approaches, transactions or procedures.

Hardware is generally tangible and its amount is a countable characteristic. Processed materials are generally tangible and their amount is a continuous characteristic.

NOTE 3 Adapted from **JIS Q 14021:2000** and **JIS Q 9000:2006**.

3.10 co-product

any of two or more products coming from the same unit process or product system

3.11 process

set of interrelated or interacting activities that transforms inputs into outputs

[JIS Q 9000:2005, 3.4.1 (without notes)]

3.12 elementary flow

material or energy entering the system being studied that has been drawn from the environment without previous human transformation, or material or energy leaving the system being studied that is released into the environment without subsequent human transformation

3.13 energy flow

input to or output from a unit process or product system, quantified in energy units

NOTE : Energy flow that is an input can be called an energy input; energy flow that is an output can be called an energy output.

3.14 feedstock energy

heat of combustion of a raw material input that is not used as an energy source to a product system, expressed in terms of higher heating value or lower heating value

NOTE : Care is necessary to ensure that the energy content of raw materials is not counted twice.

3.15 raw material

primary or secondary material that is used to produce a product

NOTE : Secondary material includes recycled material.

3.16 ancillary input

material input that is used by the unit process producing the product, but which does not constitute part of the product

3.17 allocation

partitioning the input or output flows of a process or a product system between the product system under study and one or more other product systems

3.18 cut-off criteria

specification of the amount of material or energy flow or the level of environmental significance associated with unit processes or product system to be excluded from a study

3.19 data quality

characteristics of data that relate to their ability to satisfy stated requirements

3.20 functional unit

quantified performance of a product system for use as a reference unit

3.21 input

product, material or energy flow that enters a unit process

NOTE : Products and materials include raw materials, intermediate products and co-products.