## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 17, *Sustainability in buildings and civil engineering works*.

This second edition cancels and replaces the first edition (ISO 21930:2007), which has been technically revised with the following changes:

- updated to apply as the core set of product category rules (PCR) for environmental product declarations (EPDs) of any construction product or service used in any type of construction works;
- updated to apply to all construction products and services used in any type of construction works;
- guidance on PCR for sub-categories of construction products has been added;
- specific requirements on how to define system boundaries, allocation principles and activities to be included in information modules has been revised;
- framework for documentation of technical data and guidance for defining scenarios has been added;
- an option to provide supplementary environmental information (module D), which contains supplementary LCA-based information that describes potential environmental aspects (benefits and loads) if the primary product is reused, recycled or recovered for energy at the end-of-life has been added;
- process on how to develop an average EPD for product groups has been added;
- data requirements and data quality have been specified;
- accounting and reporting of biogenic carbon during the life cycle has been added;
- accounting and reporting of delayed emissions of biogenic carbon – biogenic carbon sinks has been added;
- accounting and reporting of carbonation has been added;
- mandatory reporting of radioactive waste has been added;
- optional impact category abiotic depletion potentials ($ADP_{elements}$) and the mandatory inventory indicator abiotic depletion potential ($ADP_{fossil}$) have been added;
- an informative annex discussing possible approaches for reporting product volatile organic compound (VOC) emissions to indoor air and gamma radiation emitted during the use stage of the life cycle has been added;
- information on methods for reporting product emissions to air, soil and water during the use stage of the life cycle has been added.

## Introduction

Designers, manufacturers, users, owners and other stakeholders in the building and construction sector are increasingly demanding information that enables them to make decisions to address environmental impacts of construction works. These demands are currently addressed only through various national initiatives applying a variety of approaches.

It is essential that there is uniformity in the means and methods of expressing environmental product declarations (EPDs) using a modular approach, which enables consistent assessment at the construction works level. This includes a consistent outline and process for developing the parts of the EPD that are based on basic life cycle inventory data, as well as additional information not based on life cycle assessment (LCA). The different interested parties expect non-biased information that is consistent with the current best practice and understanding.

Type III environmental declarations (see ISO 14025) are EPDs providing quantified environmental data using predetermined parameters that are based on ISO 14040 and ISO 14044 and, where relevant, additional environmental information.

This document is one in a suite of documents dealing with sustainability in construction works that includes the following:

a) ISO 15392;

b) ISO 16745-1;

c) ISO 16745-2;

d) ISO 21929-1;

e) ISO 21931-1;

f) ISO/TS 12720;

g) ISO/TS 21929-2;

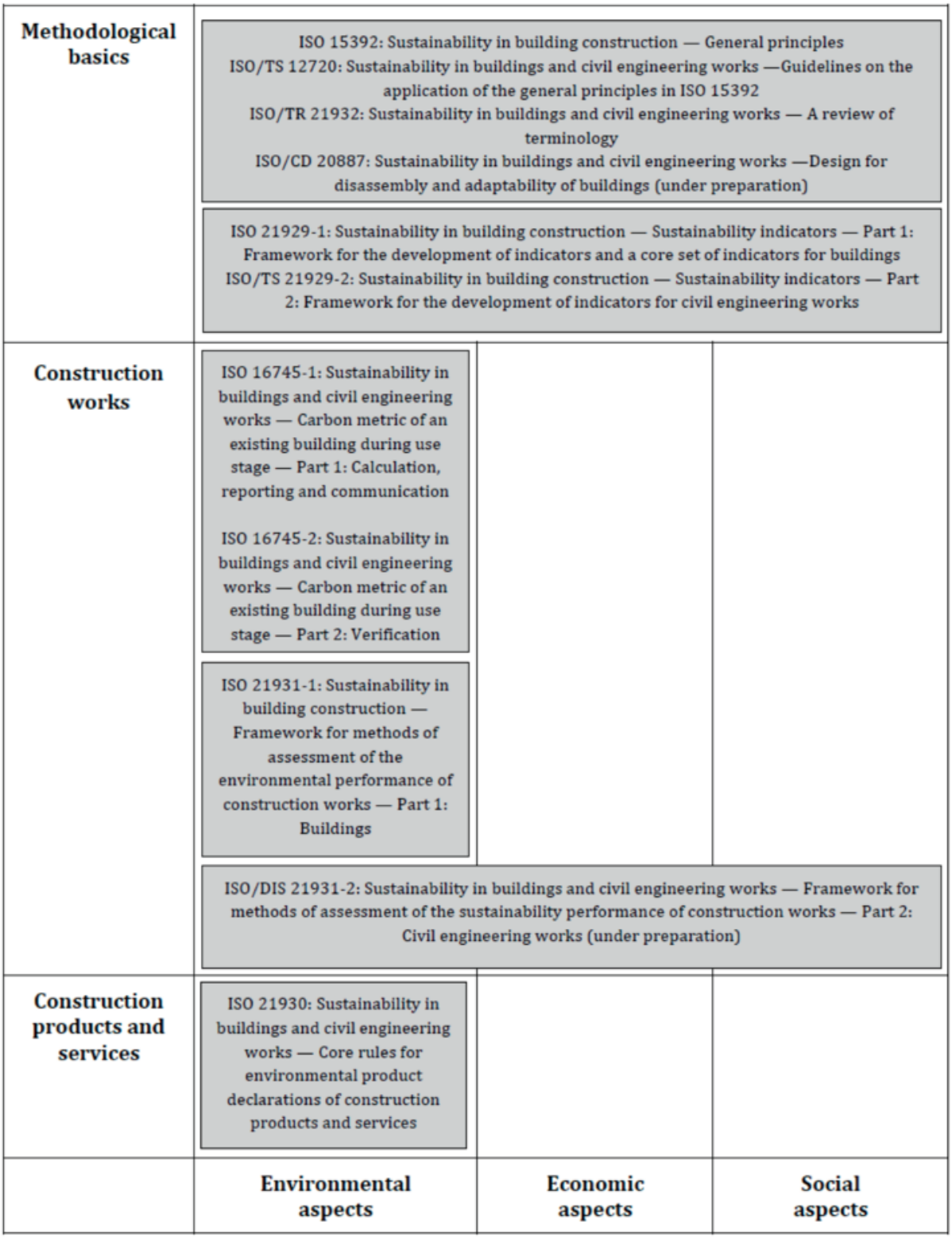
h) ISO/TR 21932;

i) ISO/CD 20887;[1]

j) ISO/DIS 21931-2.[1)]

This document deals only with environmental impacts and aspects and excludes consideration of the social and economic aspects of sustainability. The relationship among the documents is elaborated in Figure 1.

**Figure 1 — Suite of related documents for sustainability in buildings and civil engineering works**



## 1 Scope

This document provides the principles, specifications and requirements to develop an environmental product declaration (EPD) for construction products and services, construction elements and integrated technical systems used in any type of construction works.

This document complements ISO 14025 by providing specific requirements for the EPD of construction products and services.

This document establishes a core set of requirements to be considered as core product category rules (PCR) to develop an EPD for any construction product or service.

In addition, this document, as the core PCR document for construction products, construction elements and integrated technical systems:

a) includes the rules for calculating the life cycle inventory analysis (LCI), the predetermined environmental indicators and the life cycle impact assessment (LCIA) results that are reported in the EPD;

b) describes which life cycle stages are considered in a particular type of EPD, which processes are to be included in the life cycle stages and how the stages are subdivided into information modules;

c) defines rules for the development of scenarios;

d) includes the rules for reporting relevant environmental and technical information that are not covered by LCA;

e) defines the core elements to be included in an EPD;

f) establishes the structure of a project report;

g) defines the conditions under which construction products can be compared, based on the information provided by an EPD;

h) provides requirements and guidelines on PCR for sub-categories of construction products;

i) includes mandatory and unalterable requirements for any PCR based on this document.

EPDs for construction products, as described in this document, are primarily intended for use in B2B communication, but their use in B2C communication under certain conditions is not precluded. For EPDs intended for B2C communication, refer to ISO 14025 (see 5.4).

The assessment of social and economic impacts at the product level is not covered by this document.

NOTE 1 In this document, unless otherwise designated, the term construction product is used for any good(s) or service(s) related to construction works.

NOTE 2 Construction assemblies, construction elements and integrated technical systems, incorporated within construction works, can be considered construction products.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6707-1, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

ISO 14020:2000, *Environmental labels and declarations — General principles*

ISO 14025:2006, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*

ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO 14046:2014, *Environmental management — Water footprint — Principles, requirements and guidelines*

ISO 14050:2009, *Environmental management — Vocabulary*

ISO 15392:2008, *Sustainability in building construction — General principles*

ISO 15686-1:2011, *Buildings and constructed assets — Service life planning — Part 1: General principles and framework*

ISO 15686-2, *Buildings and constructed assets — Service life planning — Part 2: Service life prediction procedures*

ISO 15686-7, *Buildings and constructed assets — Service life planning — Part 7: Performance evaluation for feedback of service life data from practice*

ISO 15686-8, *Buildings and constructed assets — Service-life planning — Part 8: Reference service life and service-life estimation*

ISO 21931-1:2010, *Sustainability in building construction — Framework for methods of assessment of the environmental performance of construction works — Part 1: Buildings*

ISO/TR 21932, *Sustainability in buildings and civil engineering works — A review of terminology*

EN 15804, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 14050, ISO/TR 21932 and the following 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 Terms relating to environmental labelling and declarations

**3.1.1**
**environmental product declaration**
**EPD**
**Type III environmental declaration**
*environmental declaration* (ISO 14025:2006, 3.1) providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information

Note 1 to entry: The predetermined parameters are based on ISO 14040 and ISO 14044.

Note 2 to entry: The additional environmental information can be quantitative or qualitative.

Note 3 to entry: The shorter initialism, EPD, is used as the primary preferred term in this document.

[SOURCE: ISO 14025:2006, 3.2, modified — Two new preferred terms and Note 3 to entry have been added.]

**3.1.2**
**programme operator**
body or bodies that conduct an *EPD programme* (ISO 14025:2006, 3.3)

Note 1 to entry: A programme operator can be a company or a group of companies, industrial sector or trade association, public authority or agency, or an independent scientific body or other organization.

Note 2 to entry: The responsibilities of a programme operator are summarized in ISO 14025:2006, 6.3.

[SOURCE: ISO 14025:2006, 3.4, modified — Note 2 to entry has been added.]

**3.1.3**
**product category**
group of **construction products** (3.2.2), **construction elements** (3.2.3) or **integrated technical systems** (3.2.4) that can fulfil equivalent functions

Note 1 to entry: Where the function of the construction product is not otherwise described, the product category can be established on the basis of using the same rules when assessing the **environmental performance** (3.2.9) within an **EPD** (3.1.1). An example of this would be a product category for solid *wood* (ISO 6707-1:2004, 6.3.1), where EPDs based on the same **PCR** (3.1.3) are published for a number of different *timber* (ISO 6707-1:2004, 6.3.2) construction products, e.g. softwood *plywood* (ISO 6707-1:2004, 6.3.29), *sawn timber* (sawn wood) (ISO 6707-1:2004, 6.3.18), *oriented strandboard* (ISO 16894:2009, 3.1.1), etc.

Note 2 to entry: This definition reflects and allows for current practice, in that it provides the ability for a product category to be established and not include the necessity of common functionality within such a product category.

[SOURCE: ISO 14025:2006, 3.12, modified — Notes 1 and 2 to entry have been added to allow for the establishment of the product category and basis for assessment to be either equivalent function or equivalent PCR.]

**3.1.4**
**product category rules**
**PCR**
set of specific rules, requirements and guidelines for developing **EPDs** (3.1.1) for one or more **product categories** (3.1.3)

Note 1 to entry: The shorter initialism, PCR, is used as the primary preferred term in this document.

[SOURCE: ISO 14025:2006, 3.5, modified — Note 1 to entry has been added.]

**3.1.5**
**sub-category PCR**
set of specific rules, requirements and guidelines, which provide additional, consistent requirements to the core **PCR** (3.1.4), for developing **EPDs** (3.1.1) for sub-categories of the overall **product category** (3.1.3) of **construction products** (3.2.2)

Note 1 to entry: A sub-category PCR is meant to be used together with this document.

**3.1.6**
**PCR review**
process whereby a **third party** (3.1.7) panel verifies the **PCR** (3.1.4)

[SOURCE: ISO 14025:2006, 3.6]

**3.1.7**
**third party**
person or body that is recognized as being independent of the parties involved concerning the issues in question

Note 1 to entry: “Parties involved” are usually the *supplier* (ISO 6707-1:2004, 8.6) or *manufacturer* (ISO 6707-1:2004, 8.5) (“first party”), the LCA practitioner conducting the **LCA** (3.3.2) and/or developing the **EPD** (3.1.1) (“second party”) and the *verifier* (ISO 14050:2009, 5.3) (“third party”).

[SOURCE: ISO 14024:1999, 3.7, modified— Note 1 to entry has been revised.]

**3.1.8**
**scenario**
collection of assumptions and information relevant to possible future events

[SOURCE: EN 15804:2012 +A1:2013, 3.27, modified — Reference to “concerning an expected sequence” has been removed.]

**3.1.9**

**information module**
compilation of data to be used as a basis for an **EPD** (3.1.1), covering a **unit process** (3.4.1) or a combination of unit processes that are part of the *life cycle* (ISO 14040:2006, 3.1) of a *product* (ISO 14050:2009, 3.2)

[SOURCE: ISO 14025:2006, 3.13]

**3.1.10**
**additional technical information**
*information* (ISO 6707-1:2004, 7.2.1) that forms part of the **EPD** (3.1.1) by providing a basis for the development of **scenarios** (3.1.8)

[SOURCE: EN 15804:2012 +A1:2013, 3.1]

**3.1.11**
**declared unit**
quantity of a **construction product** (3.2.2) for use as a reference unit in an **EPD** (3.1.1) based on **LCA** (3.3.2), for the expression of environmental information needed in **information modules** (3.1.9)

EXAMPLE:
Mass (kilogram or metric tonne), volume (cubic metre).

Note 1 to entry: The declared unit is used where the *function* (ISO 15686-10:2010, 3.10) and the reference **scenario** (3.1.8) for the whole **life cycle** (3.3.1), on the **construction works** (3.2.1) level, cannot be stated.

**3.1.12**
**average EPD**
**EPD** (3.1.1) based on **average data** (3.5.6)

### 3.2 Terms relating to construction works and construction products

**3.2.1**
**construction works**
everything that is constructed or results from construction operations

Note 1 to entry: Construction works covers all *buildings* (ISO 6707-1:2004, 3.1.3) and *civil engineering works* (ISO 6707-1:2004, 3.1.2).

[SOURCE: ISO 6707-1:2004, 3.1.1, modified — Note 1 to entry has been added.]

**3.2.2**
**construction product**
item manufactured or processed for incorporation in **construction works** (3.2.1)

Note 1 to entry: Construction products are items supplied by a single responsible body.

Note 2 to entry: In this document, unless otherwise designated, the term construction product is used for any good(s) or service(s) related to construction works.

Note 3 to entry: *Construction assemblies* (ISO 6707-1:2004, 5.5.5), **construction elements** (3.2.3) and **integrated technical systems**(3.2.4), incorporated within construction works, can be considered construction products.

[SOURCE: ISO 6707-1:2004, 6.1.2, modified — “Construction product” has been indicated as the primary preferred term used to designate this concept and Notes to entry have been added.]

**3.2.3**
**construction element**
part of a *construction* (ISO 6707-1:2004, 5.5.6) containing a defined combination of **construction products** (3.2.2)

[SOURCE: EN 15804:2012 +A1:2013, 3.9]

**3.2.4**
**integrated technical systems**
installed technical equipment to support the operation of **construction works** (3.2.1)

Note 1 to entry: This includes technical equipment for heating, cooling, ventilation, domestic hot water, lighting and electricity production and other systems for sanitation, security, fire safety and internal transport.

Note 2 to entry: This can include technical systems that are integrated into **construction products** (3.2.2), such as interfaces for electronic controls.

Note 3 to entry: Derived from the definition of “technical building systems” in ISO 16818:2008, 3.225.

**3.2.5**
**product group**
group of **construction products** (3.2.2), **construction elements** (3.2.3) or **integrated technical systems** (3.2.4) that can fulfil equivalent functions for a specific **sub-category PCR** (3.1.5)

Note 1 to entry: The product group can be made by the same *manufacturer* (ISO 6707-1:2004, 8.5) or made by different manufacturers.

**3.2.6**
**construction service**
activity that supports the **construction works** (3.2.1) or subsequent *maintenance* (ISO 6707-1:2004, 7.1.40)

[SOURCE: EN 15804:2012 +A1:2013, 3.6, modified — Reference to construction works has been inserted.]

**3.2.7**
**performance**
ability of a **construction product** (3.2.2) or **construction service** (3.2.6) to fulfil required functions under intended use conditions

[SOURCE: ISO 6707-1:2004, 9.1.1, modified — Specific reference to construction product and construction service have been added and the second intension, “behaviour in use”, has been removed.]

**3.2.8**
**functional equivalent**
quantified functional requirements and/or technical requirements for a **construction works** (3.2.1) or a *construction* (ISO 6707-1: 2004, 5.5.6) (part of works) for use as a basis for comparison

[SOURCE: ISO 21931-1:2010, 3.7, modified — References have been added to expand concept to apply to all construction works and also indicate that a construction (part of the works) can also be assigned a functional equivalent.]

**3.2.9**
**environmental performance**
**performance** (3.2.7) related to *environmental impacts* (ISO 15392:2008, 3.13.2) and *environmental aspects* (ISO 15392:2008, 3.10)

[SOURCE: ISO 15392:2008, 3.12]

**3.2.10**
**construction site**
area where *construction work* (ISO 6707-1:2004, 7.1.1) is undertaken or **construction services** (3.2.6) are provided

[SOURCE: ISO 6707-1:2004, 3.1.6, modified — To indicate “construction site” as the preferred term, generalize the concept to an “area”, and to include construction services and exclude other development.]

**3.2.11**
**service life**
period of time after installation during which a **construction works** (3.2.1) or its parts meet or exceed the *performance requirement(s)* (ISO 6707-1:2004, 9.1.16)

[SOURCE: ISO 6707-1:2004, 9.3.84, modified — Reference to building has been changed to construction works.]

**3.2.12**
**reference service life**
**RSL**
**service life** (3.2.11) of a **construction product** (3.2.2) which is known to be expected under a set of **reference in-use conditions**(3.2.16) and which can form the basis for estimating the service life under other **in-use conditions** (3.2.15)

Note 1 to entry: The RSL is described as part of the **functional unit** (3.4.5) and considered in the calculation of replacements at both the construction product level and **construction works** (3.2.1) level (B4) and *refurbishment* (ISO 6707-1:2004, 7.19) (B5) (see 7.1.7.4).

Note 2 to entry: The shorter initialism, RSL, is used as the primary preferred term in this document.

[SOURCE: ISO 15686-1:2011, 3.22, modified — Reference to construction product has been inserted to capture broad group and Notes to entry have been added.]

**3.2.13**
**estimated service life**
**ESL**
**service life** (3.2.11) that part(s) of a **construction works** (3.2.1) would be expected to have in a set of specific **in-use conditions**(3.2.15), determined from **RSL data** (3.2.17) after taking into account any differences from the **reference in-use conditions** (3.2.16)

Note 1 to entry: The ESL is considered in the calculation of replacements at both the **construction product** (3.2.2) level and **construction works** (3.2.1) level (B4) and *refurbishment* (ISO 6707-1:2004, 7.19) (B5) (see 7.1.7.4).

Note 2 to entry: The shortened term, ESL, is used as the primary preferred term in this document.

[SOURCE: ISO 15686-1:2011, 3.7, modified — Specific reference has been made to (a) part(s) of a construction works and Notes to entry have been added.]

**3.2.14**
**required service life**
**service life** (3.2.11) required by the client or through regulations

Note 1 to entry: The required service life is considered in the calculation of replacements at both the **construction product** (3.2.2) level and **construction works** (3.2.1) level (B4) and *refurbishment* (ISO 6707-1:2004, 7.19) (B5) (see 7.1.7.4).

**3.2.15**
**in-use condition**
any circumstance that can impact on the **performance** (3.2.7) of a **construction works** (3.2.1) or a *constructed asset* (ISO 15686-1:2011, 3.1.15), or a part thereof, under normal use

Note 1 to entry: See ISO 15686-8 for further discussion.

[SOURCE: ISO 15686-1:2011, 3.10, modified — Reference to building has been changed to construction works and Note 1 to entry has been revised.]

**3.2.16**
**reference in-use condition**
**in-use condition** (3.2.15) under which the reference**RSL data** (3.2.17) are valid

Note 1 to entry: See ISO 15686-8 for further discussion.

Note 2 to entry: The reference in-use conditions can be based upon information gathered through testing or from recorded **performance** (3.2.7) and actual **service life** (3.2.11) data of a *component* (ISO 6707-1:2004, 6.1.3).

[SOURCE: ISO 15686-1:2011, 3.21, modified — Note 1 to entry has been revised.]

**3.2.17**
**reference service life data**
**RSL data**
information that includes the **RSL** (3.2.12) and any qualitative or quantitative data describing the validity of the RSL

Note 1 to entry: Typical data describing the validity of the RSL include the description of the *component* (ISO 6707-1:2004, 6.1.3) for which it applies, the **reference in-use conditions** (3.2.16) under which it applies and its *quality* (ISO 6707-1:2004, 9.1.12).

Note 2 to entry: The shortened term, RSL data, is used as the primary preferred term in this document.

[SOURCE: ISO 15686-1:2011, 3.23, modified — Note 1 entry has been replaced by Note 2 to entry and a new Note 2 to entry has been added.]

### 3.3 Terms relating to life cycle assessment

**3.3.1**
**life cycle**
all consecutive and interlinked stages in the life of the object under consideration

Note 1 to entry: For consideration of *environmental impacts* (ISO 21931-1:2010, 3.4) and *environmental aspects* (ISO 15392:2008, 3.10), the life cycle comprises all stages, from *raw material* (ISO 14040:2006, 3.15) acquisition or generation from natural resources to end-of-life.

Note 2 to entry: Adapted from the definition of “life cycle” in ISO 14040:2006, 3.1.

**3.3.2**
**life cycle assessment**
**LCA**
compilation and evaluation of the *inputs* (ISO 14040:2006, 3.21), *outputs* (ISO 14040:2006, 3.25) and the potential *environmental impacts* (ISO 21931-1:2010, 3.4) of a *product system* (ISO 14040:2006, 3.28) throughout its *life cycle* (ISO 14040:2006, 3.1)

Note 1 to entry: The shorter initialism, LCA, is used as the primary preferred term in this document.

[SOURCE: ISO 14040:2006, 3.2, modified — Note 1 to entry has been added.]

**3.3.3**
**life cycle inventory analysis**
**LCI**
phase of **LCA** (3.3.2) involving the compilation and quantification of *inputs* (ISO 14040:2006, 3.21) and *outputs* (ISO 14040:2006, 3.25) for a *product* (ISO 14050:2009, 3.2) throughout its *life cycle* (ISO 14040:2006, 3.1)

Note 1 to entry: The shorter initialism, LCI, is used as the primary preferred term in this document.

[SOURCE: ISO 14040:2006, 3.3, modified — Note 1 to entry has been added.]

**3.3.4**
**life cycle inventory analysis result**
**LCI result**
outcome of a **LCI** (3.3.3) that catalogues the flows crossing the **system boundary** (3.4.4) and provides the starting point for **LCIA**(3.3.5)

[SOURCE: ISO 14040:2006, 3.24]

**3.3.5**
**life cycle impact assessment**
**LCIA**
phase of **LCA** (3.3.2) aimed at understanding and evaluating the magnitude and significance of the potential *environmental impacts*(ISO 21931-1:2010, 3.4) for a *product system* (ISO 14040:2006, 3.28) throughout the *life cycle* (ISO 14040:2006, 3.1) of the *product*(ISO 14050:2009, 3.2)

Note 1 to entry: The shorter initialism, LCIA, is used as the primary preferred term in this document.

[SOURCE: ISO 14040:2006, 3.4, modified — Note 1 to entry has been added.]

**3.3.6**
**characterization factor**
factor derived from a characterization model that is applied to convert an assigned **LCI result** (3.3.4) to the common unit of the *impact category indicator* (ISO 14040:2006, 3.40)

[SOURCE: ISO 14044:2006, 3.37, modified — Note 1 to entry has been removed.]

**3.3.7**
**$CO_2$e**
**carbon dioxide equivalent**
**$CO_2$equivalent**
unit for comparing the radiative forcing of a *greenhouse gas* (ISO 14064-1:2006, 3.1) to that of carbon dioxide

Note 1 to entry: Mass of a greenhouse gas is converted into $CO_2$e using *global warming potentials* (ISO 14050:2009, 9.3.4).

Note 2 to entry: The shortened term, $CO_2$e, is used as the primary preferred term in this document.

[SOURCE: ISO 14050:2009, 9.3.5, modified — Original Note 1 to entry has been clarified and Note 2 to entry has been added.]

**3.3.8**
**gate**

point at which the **construction product** (3.2.2) or *material* (ISO 6707-1:2004, 6.1.1) leaves the factory before it becomes an input into a subsequent manufacturing *process* (ISO 21931-1:2010, 3.11) or before it is transported to a distributor, another factory or a **construction site** (3.2.10)

[SOURCE: ISO 21931-1:2010, 3.8, modified — Building references have been revised to broaden concept to implicate all forms of construction works.]

**3.3.9**
**transparency**
open, comprehensive and understandable presentation of information

[SOURCE: ISO 14040:2006, 3.7]

**3.3.10**
**transparent**
open, comprehensive and understandable

Note 1 to entry: Derived from the definition of **transparency** (3.3.9).

**3.3.11**
**waste**
substances or objects which the holder intends or is required to dispose of

Note 1 to entry: The definition is taken from the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (22 March 1989) but is not confined in this document to hazardous waste.

[SOURCE: ISO 14040:2006, 3.35]

### 3.4 Terms relating to product systems

**3.4.1**
**unit process**
smallest element considered in the **LCI** (3.3.3) for which *input* (ISO 14040:2006, 3.21) and *output* (ISO 14040:2006, 3.25) data are quantified

[SOURCE: ISO 14040:2006, 3.34]

**3.4.2**
**upstream process**
*process* (ISO 21931-1:2010, 3.11) that is carried out before the designated process in the stream of relevant processes

[SOURCE: ISO 21931-1:2010, 3.15]

**3.4.3**
**downstream process**
*process* (ISO 21931-1:2010, 3.11) that is carried out after the designated process in the stream of relevant processes

[SOURCE: ISO 21931-1:2010, 3.2]

**3.4.4**
**system boundary**
boundary representing which **unit processes** (3.4.1) are part of a *product system* (ISO 14040:2006, 3.28)

Note 1 to entry: The term “system boundary” is not used in this document in relation to **LCIA** (3.3.5).

Note 2 to entry: The system boundary is established based on a set of criteria within the **LCA** (3.3.2) study or **PCR** (3.1.4).

[SOURCE: ISO 14040:2006, 3.32, modified — Indication of (a) boundary as the genus for the intentional definition and Note 2 to entry has been added.]

**3.4.5**
**functional unit**
quantified **performance** (3.2.7) of a *product system* (ISO 14040:2006, 3.28) for a **construction product** (3.2.2) or **construction service** (3.2.6) for use as a reference unit in an **EPD** (3.1.1) based on **LCA** (3.3.2) that includes all stages of the **life cycle** (3.3.1)

Note 1 to entry: The four stages of the life cycle are: production stage, construction stage, use stage and end-of-life stage.

[SOURCE: ISO 14040:2006, 3.20, modified — Reference to construction product or service has been inserted, the need for an LCA basis and Note 1 to entry has been added.]

**3.4.6**
**co-product**
any of one or more *products* (ISO 14050:2009, 3.2) from the same **unit process** (3.4.1), but which is not the object of the assessment

Note 1 to entry: Co-product and product have the same status and are used for identification of several distinguishable flows of products from the same unit process. Where one of two or more co-products is the object of assessment of the **EPD** (3.1.1), this is normally considered the product and the other *output(s)* (ISO 14040:2006, 3.25) as the co-product(s). Where one of the co-products is an *input* (ISO 14040:2006, 3.21) to a *process* (ISO 14040:2006, 3.11), this is normally considered as a product input. From co-product and product, **waste** (3.3.11) is the only output to be distinguished as a non-product.

[SOURCE: ISO 14040:2006, 3.10, modified — The definition has been clarified relative to the object of assessment and Note 1 to entry has been added.]

**3.4.7**
**by-product**
**co-product** (3.4.6) from a *process* (ISO 14040:2006, 3.11) that is incidental or not intentionally produced and which cannot be avoided

Note 1 to entry: **Wastes** (3.3.11) are not by-products.

**3.4.8**
**joint co-production process**
*process* (ISO 14040:2006, 3.11) of producing a *product* (ISO 14050:2009, 3.2) and one or more **co-products** (3.4.6) or **by-products**(3.4.7) where the proportion of outputs is not commonly changed or cannot be varied

### 3.5 Terms relating to data and data quality

**3.5.1**
**foreground data**
**primary data**
quantified value of a **unit process** (3.4.1) or an activity obtained from a direct measurement or a calculation based on direct measurements at its original source

[SOURCE: ISO/TS 14067:2013, 3.1.7.1, modified — An additional preferred term has been added as the primary term and Notes 1 and 2 to entry have been removed.]

**3.5.2**
**secondary data**
**background data**
indirectly measured, calculated or obtained quantified value of a **unit process** (3.4.1) or activity and related information within a *product system* (ISO 14040:2006, 3.28) or organization, not based on specific original source measurements

[SOURCE: ISO 16759:2013, 3.8.2, modified — An additional preferred term has been added and reference to company has been changed to organization.]

**3.5.3**
**specific data**
data representative of a **construction product** (3.2.2) or **construction service** (3.2.6), provided by one *supplier* (ISO 6707-1:2004, 8.6), either from multiple plants or based on multiple similar construction products of the supplier

[SOURCE: EN 15804:2012 +A1:2013, 3.30, modified — Reference to multiple plants or multiple similar products has been added.]

**3.5.4**
**generic data**
general data used if no system **specific data** (3.5.3) are available

Note 1 to entry: Data can be site specific or average.

**3.5.5**
**proxy data**
approximate data used if no system **specific data** (3.5.3) or **generic data** (3.5.4) are available

EXAMPLE:
Data for production of acetic acid used in lieu of data for production of formic acid or selection of a generic data set of electricity from one region to represent another region.

Note 1 to entry: Data can be site specific or average.

**3.5.6**
**average data**
data based on a fully representative sample for a **construction product** (3.2.2) or **construction service** (3.2.6), provided by one or more *suppliers* (ISO 6707-1:2004, 8.6), either from their multiple plants or based on multiple similar construction products of the supplier(s)

Note 1 to entry: The **product category** (3.1.3) or construction service can contain similar construction products or construction services.

[SOURCE: EN 15804:2012 +A1:2013, 3.3, modified — Focus has been shifted to focus on a construction product and product category instead of product group and data from a single supplier has been included.]

**3.5.7**
**data quality**
characteristics of data that relate to their ability to satisfy stated requirements

[SOURCE: ISO 14044:2006, 3.19]

### 3.6 Terms relating to resources and materials

**3.6.1**
**primary resources**
energy or material resources generated by, acquired from or extracted from the environment/nature (the geosphere or biosphere) within the **life cycle** (3.3.1) of the **construction product** (3.2.2)

Note 1 to entry: Primary resources can be **renewable resources** (3.6.2) or **non-renewable resources** (3.6.3) depending on the status of the material when it was originally extracted from the environment.

**3.6.2**
**renewable resource**
resource that is grown, naturally replenished or cleansed on a human time scale

EXAMPLE:
Trees in forests, grasses in grasslands and fertile soil, wind.

Note 1 to entry: A renewable resource is capable of being exhausted but can last indefinitely with proper stewardship.

Note 2 to entry: Activities that occur in the **technosphere** (3.8.4) such as recycling are not considered natural replenishment or cleansing.

Note 3 to entry: In this context, human time scale refers to the typical life time of a human rather than the time humans have been in existence.

[SOURCE: ISO 21931-1:2010, 3.12, modified — Notes 2 and 3 to entry have been added.]

**3.6.3**
**non-renewable resource**
resource that exists in a fixed amount that cannot be naturally replenished or cleansed on a human time scale

Note 1 to entry: Activities that occur in the **technosphere** (3.8.4) such as recycling are not considered natural replenishment or cleansing.

Note 2 to entry: In this context, human time scale refers to the typical life time of a human rather than the time humans have been in existence.

Note 3 to entry: Adapted from definitions for renewable resource and non-renewable resource in ISO/TR 21932.

**3.6.4**
**secondary material**
*material* (ISO 5659 2:2012, 3.6) recovered from previous use or recovered from **waste** (3.3.11) derived from another *product system*(ISO 14040:2006, 3.28) and used as an *input* (ISO 14040:2006, 3.21) in another product system

EXAMPLE:
Recycled scrap metal, crushed concrete, glass cullet, recycled wood chips, recycled plastic granulate.

Note 1 to entry: Secondary material is measured at the point [i.e., **system boundary** (3.4.4)] where the secondary material enters the product system from another product system.

[SOURCE: EN 15804:2012 +A1:2013, 3.29, modified — Reference to substituting primary materials has been removed, references to derivation from a previous product system and use as input have been added to replace Note 2 to entry and Note 3 to entry has been changed to examples.]

**3.6.5**
**secondary fuel**
fuel recovered from previous use or from **waste** (3.3.11), derived from a previous *product system* (ISO 14040:2006, 3.28) and used as an *input* (ISO 14040:2006, 3.21) in another product system

Note 1 to entry: *Processes* (ISO 14040:2006, 3.11) providing a secondary fuel are considered from the point [i.e., **system boundary**(3.4.4)] where the secondary fuel enters the product system from a previous product system.

Note 2 to entry: Secondary fuels can be recovered from previous use or from wastes such as solvents, *wood* (ISO 6707-1:2004, 6.3.1), tyres, oil, animal fats.

Note 3 to entry: Secondary fuels can be renewable or non-renewable, depending on the status of the material before it became waste.

[SOURCE: EN 15804:2012 +A1:2013, 3.28, modified —Substituting primary materials has been removed and references to derivation from a reference to previous product system and use as input have been added, original Notes 2, 3 and 4 to entry replaced by new Notes 2 and 3 to entry.]

**3.6.6**
**recovered energy**
energy recovered from a *process* (ISO 14040:2006, 3.11), including **waste** (3.3.11) treatment processes

Note 1 to entry: Recovered energy can be renewable or non-renewable, depending on the status of the resource originally used to generate the energy.

**3.6.7**
**water body**
entity of water with definite hydrological, hydrogeomorphological, physical, chemical and biological characteristics in a given geographical area

EXAMPLE:
Lakes, rivers, groundwaters, seas, icebergs, glaciers and reservoirs.

Note 1 to entry: In case of availability, the geographical resolution of a water body should be determined at the goal and scope stage: it may regroup different small water bodies.

[SOURCE: ISO 14046:2014, 3.1.7]

**3.6.8**
**drainage basin**
area from which direct surface runoff from precipitation drains by gravity into a stream or other **water body** (3.6.7)

Note 1 to entry: The terms “watershed”, “drainage area”, “catchment”, “catchment area” and “river basin” are sometimes used for the concept of “drainage basin”.

Note 2 to entry: Groundwater drainage basin does not necessarily correspond in area to surface drainage basin.

Note 3 to entry: The geographical resolution of a drainage basin should be determined at the goal and scope stage: it may regroup different sub-drainage basins.

[SOURCE: ISO 14046:2014, 3.1.8]

**3.6.9**
**freshwater**
water having a low concentration of dissolved solids

Note 1 to entry: Freshwater typically contains less than 1 000 mg/l of dissolved solids and is generally accepted as suitable for withdrawal and conventional treatment to produce potable water.

Note 2 to entry: The concentration of total dissolved solids can vary considerably over space and/or time.

[SOURCE: ISO 14046:2014, 3.1.1]

**3.6.10**
**consumption of freshwater**
net **freshwater** (3.6.9) entering the *product system* (ISO 14040:2006, 3.28) being studied that is not returned to the same **drainage basin** (3.6.8) from which it originated

### 3.7 Terms relating to biogenic material and land use

**3.7.1**
**biogenic**
produced in natural processes by living organisms but not fossilized or derived from fossil resources

[SOURCE: ISO 13833:2013, 3.1]

**3.7.2**
**biogenic carbon**
carbon derived from **biomass** (3.7.3)

[SOURCE: ISO/TS 14067:2013, 3.1.8.2]

**3.7.3**
**biomass**
material of biological origin excluding material embedded in geological formations or transformed to fossilized material and excluding peat

Note 1 to entry: Biomass includes organic material (both living and dead) from above and below ground, e.g. trees, crops, grasses, tree litter, algae, animals and **waste** (3.3.11) of biological origin, e.g. manure.

[SOURCE: ISO 14021:2016, 3.1.1]

**3.7.4**
**biobased**
derived from **biomass** (3.7.3)

[SOURCE: ISO 16559:2014, 4.23]

**3.7.5**
**land use change**
change in human use or management of land at the location of the production, use or disposal of raw *materials* (ISO 14050:2009, 6.12), *intermediate products* (ISO 14050:2009, 6.2.1) and final *products* (ISO 14050:2009, 3.2) or **wastes** (3.3.11) in the *product system*(ISO 14040:2006, 3.28) being assessed

[SOURCE: ISO/TS 14067:2013, 3.1.8.4, modified — Preferred term has been changed from “direct land use change” and the specific land locations implicated within the product system have been indicated.]

### 3.8 Miscellaneous terms

**3.8.1**
**carbonation**
carbon dioxide reaction with cementitious products to form calcium carbonate

**3.8.2**
**landfill**
**waste** (3.3.11) disposal site for the deposit of waste onto or into *land* (ISO 6707-1:2004, 10.1) under controlled or regulated conditions

[SOURCE: ISO 472:2013, 2.1694]

**3.8.3**
**landfill gas**
mixture of permanent gases (main components) dominated by methane and carbon dioxide, formed by the decomposition of degradable **wastes** (3.3.11) within a **landfill** (3.8.2)

Note 1 to entry: It can also include a large number of **VOCs** (3.8.5) (trace components).

[SOURCE: ISO 11074:2015, 6.1.10]

**3.8.4**
**technosphere**
sphere or realm of human technological activity which results in a technologically modified environment

Note 1 to entry: **Primary resources** (3.6.1) are acquired or extracted from the environment/nature (the geosphere or biosphere) into the technosphere and emissions to air, water or land are released from the technosphere into the environment.

**3.8.5**
**volatile organic compound**
**VOC**
any organic liquid and/or solid that evaporates spontaneously at the prevailing temperature and pressure of the atmosphere with which it is in contact

Note 1 to entry: The shortened term, VOC, is used as the primary preferred term in this document.

[SOURCE: ISO 12944-5:2007, 3.17, modified — Note 1 to entry has been added.]

## Bibliography


[1] ISO 472, *Plastics — Vocabulary*

[2] ISO 5659-2, *Plastics — Smoke generation — Part 2: Determination of optical density by a single-chamber test*

[3] ISO 10381-7:2005, *Soil quality — Sampling — Part 7: Guidance on sampling of soil gas*

[4] ISO 11074:2015, *Soil quality — Vocabulary*

[5] ISO/TS 12720, *Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392*

[6] ISO 12944-5, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems*

[7] ISO 13789, *Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method*

[8] ISO 13833, *Stationary source emissions — Determination of the ratio of biomass (biogenic) and fossil-derived carbon dioxide — Radiocarbon sampling and determination*

[9] ISO 14001, *Environmental management systems — Requirements with guidance for use*

[10] ISO 14021, *Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)*

[11] ISO 14024, *Environmental labels and declarations — Type I environmental labelling — Principles and procedures*

[12] ISO 14040:2006, *Environmental management — Life cycle assessment — Principles and framework*

[13] ISO/TR 14049:2012, *Environmental management — Life cycle assessment — Illustrative examples on how to apply ISO 14044 to goal and scope definition and inventory analysis*

[14] ISO/TS 14067, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification and communication*

[15] ISO/TS 14071, *Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006*

[16] ISO/TS 15686-9, *Buildings and constructed assets — Service-life planning — Part 9: Guidance on assessment of service-life data*

[17] ISO 15686-10, *Buildings and constructed assets — Service life planning — Part 10: When to assess functional performance*

[18] ISO 16000, *Indoor air*

[19] ISO 16559:2014, *Solid biofuels — Terminology, definitions and descriptions*

[20] ISO 16745-1, *Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 1: Calculation, reporting and communication*

[21] ISO 16745-1, *Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 1: Calculation, reporting and communication*

[22] ISO 16759, *Graphic technology — Quantification and communication for calculating the carbon footprint of print media products*

[23] ISO 16818:2008, *Building environment design — Energy efficiency — Terminology*

[24] ISO 16894, *Wood-based panels — Oriented strand board (OSB) — Definitions, classification and specifications*

[25] ISO 21929-1, *Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators and a core set of indicators for buildings*

[26] ISO/TS 21929-2, *Sustainability in building construction — Sustainability indicators — Part 2: Framework for the development of indicators for civil engineering works*

[27] CEN/TS 16516, *Construction products — Assessment of release of dangerous substances — Determination of emissions into indoor air*

[28] S. Kephalopoulos, O. Geiss, E. Annys, P. Carrer, R. Coutalides, D. Crump ECA report no. 29 on Harmonization framework for health-based evaluation of indoor emissions from construction products in the European Union using the EU-LCI concept. EUR 26168 EN. Luxembourg: Publications Office of the European Union, 2013. JRC83683

[29] J. Penman, M. Gytarsky, T. Hiraishi, T. Krug, D. Kruger, R. Pipatti Good Practice Guidance for Land Use, Land-Use Change and Forestry, IPCC National Greenhouse Gas Inventories Programme, Institute for Global Environmental Strategies. IGES, Kanagawa, 2003

[30] IPCC 2014. Climate Change 2013. *The Physical Science Basis*. Cambridge University Press. http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm

[31] R. Heijungs, J.B. Guinée, G. Huppes, R.M. Lankreijer, H.A. Udo de Haes, A. Wegener Sleeswijk Environmental *Life Cycle Assessment of Products*: *Guide and Backgrounds*. CML. Leiden University, Leiden, 1992

[32] M.Z. Hauschild, H. Wenzel Environmental Assessment of Products. Springer, US, Vol. 2, 1998

[33] L.F.C.M. van Oers, A. de Koning, J.B. Guinée, G. Huppes *Abiotic Resource Depletion in LCA: Improving Characterization Factors for Abiotic Depletion as Recommended in the New Dutch LCA Handbook*. Ministry of Transport, Public Works and Water Management, Delft, 2001

[34] WMO 1999. Scientific Assessment of Ozone Depletion: 1998, World Meteorological Organization Global Ozone Research and Monitoring Project – Report No. 44, WMO, Geneva

[35] B. Lagerblad Carbon dioxide uptake during concrete life cycle – State of the art. CBI report 2:2005

[36] R. Andersson, K. Fridh, H. Stripple, M. Häglund II Calculating $CO_2$ uptake for existing concrete structures during and after service life. Environ. Sci. Technol. 2013, 47 (20) pp. 11625–11633. DOI:10.1021/es401775w [Including Supporting Information]

[37] I. Galan, A. Carmen, M. Pedro, M.A. San Juan Sequestration of $CO_2$ by concrete carbonation. Environ. Sci. Technol. 2010, 44 (8) pp. 3181–3186

[38] M. Thiery, P. Dangl, P. Belin, G. Habert, N. Roussel Carbonation kinetics of a bed of recycled concrete aggregates: A laboratory study on model materials. Cement Concr. Res. 2013, 46 pp. 50–65

[39] C.J. Engelsen, H. Justnes $CO_2$-binding by concrete. Report nr. SBF2014A0019, SINTEF Building and Infrastructure, 2014

[40] D. Fitzpatrick, E. Nolan, M.G. Richardson Sequestration of carbon dioxide by concrete infrastructure: A preliminary investigation in Ireland. Journal of Sustainable Architecture and Civil Engineering. 2015, 1 (10) pp. 66–77

[41] M.E. Jenkin, G.D. Hayman Photochemical ozone creation potentials for oxygenated volatile organic compounds: sensitivity to variations in kinetic and mechanistic parameters. *Atmospheric Environment*. 1999, 33 (8) pp. 1275–1293