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**Date and time — Representations for  
information interchange —**

**Part 1:  
Basic rules**

*Date et heure — Représentations pour l'échange d'information —*

*Partie 1: Règles de base*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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](http://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](http://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 of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration*.

This first edition of ISO 8601-1, together with ISO 8601-2, cancels and replaces ISO 8601:2004, which has been technically revised.

The main changes compared to ISO 8601:2004 are as follows:

- conversion of the content as Part 1 with the Part title “Basic rules” due to the addition of another Part 2 “Extensions” of ISO 8601;
- replacement of the term “midnight” with “beginning of day”, disallowing the value “24” for hour;
- update of terms and definitions:
  - “time point” is now “time”;
  - “local time” is now “local time of day”;
  - added definition for “time of day” and “local time scale”;
  - updated definitions for “standard time of day”, “local time of day” and “UTC of day” to rely on “time of day”;
  - combined two “day” terms in different domains for consistency;
  - change of the representation of “leap seconds”;
- clarification of “calendar day” expressions intended to mean “calendar day of week” (etc.);
- amendment of the recurring time interval ([3.1.1.11](#)) to provide a link to ISO 8601-2:2019 which contains in Clause 5 the “repeat rules for recurring time intervals”.

A list of all parts in the ISO 8601 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

The purpose of this document is to provide a standard set of date and time format representations for information interchange, in order to minimize the risk of misinterpretation, confusion and their consequences.

This document specifies a set of date and time format representations utilizing numbers, alphabets and symbols defined in ISO/IEC 646. These representations are meant to be both human recognizable and machine readable.

This document retains the most commonly used expressions for date and time of day and their representations from earlier International Standards in the field, including earlier editions of ISO 8601 and its predecessors.

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# Date and time — Representations for information interchange —

## Part 1: Basic rules

### 1 Scope

This document specifies representations of dates of the Gregorian calendar and times based on the 24-hour clock, as well as composite elements of them, as character strings for use in information interchange. It is also applicable for representing times and time shifts based on Coordinated Universal Time (UTC).

This document excludes the representation of date elements from non-Gregorian calendars or times not from the 24-hour clock. This document does not address character encoding of representations specified in this document.

### 2 Normative references

There are no normative references in this document.

### 3 Terms, definitions and symbols

#### 3.1 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:

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

##### 3.1.1 Basic concepts

###### 3.1.1.1

###### date

*time* ([3.1.1.2](#)) on the *calendar* ([3.1.1.18](#)) *time scale* ([3.1.1.5](#))

Note 1 to entry: Common forms of date include *calendar date* ([3.1.2.7](#)), *ordinal date* ([3.1.2.8](#)) or *week date* ([3.1.2.9](#)).

###### 3.1.1.2

###### time

mark attributed to an *instant* ([3.1.1.3](#)) or a *time interval* ([3.1.1.6](#)) on a specified *time scale* ([3.1.1.5](#))

Note 1 to entry: The term “time” is often used in common language. However, it should only be used if the meaning is clearly visible from the context.

Note 2 to entry: On a time scale consisting of successive time intervals, such as a *clock* ([3.1.1.9](#)) or *calendar* ([3.1.1.18](#)), distinct instants may be expressed by the same time.

Note 3 to entry: This definition corresponds with the definition of the term “date” in IEC 60050-113:2011, 113-01-12.

### 3.1.1.3

#### **instant**

point on the *time axis* ([3.1.1.4](#))

Note 1 to entry: An instantaneous event occurs at a specific instant.

[SOURCE: IEC 60050-113:2011, 113-01-08]

### 3.1.1.4

#### **time axis**

mathematical representation of the succession in time according to the space-time model of instantaneous events along a unique axis

Note 1 to entry: According to the theory of special relativity, the time axis depends on the choice of a spatial reference frame.

Note 2 to entry: In IEC 60050-113:2011, 113-01-03, time according to the space-time model is defined to be the one-dimensional subspace of space-time, locally orthogonal to space.

[SOURCE: IEC 60050-113:2011, 113-01-07, modified — The words “according to the space-time” have been added; the phrase “special theory of relativity” has been changed to “theory of special relativity” for clarity; Note 2 to entry has been added.]

### 3.1.1.5

#### **time scale**

system of ordered marks which can be attributed to *instants* ([3.1.1.3](#)) on the *time axis* ([3.1.1.4](#)), one instant being chosen as the origin

Note 1 to entry: A time scale may amongst others be chosen as:

- continuous, e.g. international atomic time (TAI) (see IEC 60050-713:1998, 713-05-18);
- continuous with discontinuities, e.g. *UTC* ([3.1.1.12](#)) due to *leap seconds* ([3.1.1.24](#)), *standard time* ([3.1.1.14](#)) due to summer time and winter time;
- successive steps, e.g. *calendars* ([3.1.1.18](#)), where the *time axis* ([3.1.1.4](#)) is split up into a succession of consecutive *time intervals* ([3.1.1.6](#)) and the same mark is attributed to all instants of each time interval;
- discrete, e.g. in digital techniques.

[SOURCE: IEC 60050-113:2011, 113-01-11, modified — The words “amongst others” in Note 1 to entry have been added; NOTES 2 and 3 have been deleted.]

### 3.1.1.6

#### **time interval**

part of the *time axis* ([3.1.1.4](#)) limited by two *instants* ([3.1.1.3](#)) and, unless otherwise stated, the limiting instants themselves

[SOURCE: IEC 60050-113:2011, 113-01-10, modified — The words “and, unless otherwise stated, the limiting instants themselves” have been added; the NOTES have been deleted.]

### 3.1.1.7

#### **time scale unit**

unit of measurement of a *duration* ([3.1.1.8](#))

EXAMPLE 1 Calendar year, calendar month and calendar day are time scale units of the Gregorian calendar.

EXAMPLE 2 Clock hour, clock minutes and clock seconds are time scale units of the 24-hour clock.

### 3.1.1.8 duration

non-negative quantity of time equal to the difference between the final and initial *instants* (3.1.1.3) of a *time interval* (3.1.1.6)

Note 1 to entry: The duration is one of the base quantities in the International System of Quantities (ISQ) on which the International System of Units (SI) is based. The term “time” instead of “duration” is often used in this context and also for an infinitesimal duration.

Note 2 to entry: For the term “duration”, expressions such as “time” or “time interval” are often used, but the term “time” is not recommended in this sense and the term “time interval” is deprecated in this sense to avoid confusion with the concept of “time interval”.

Note 3 to entry: The exact duration of a *time scale unit* (3.1.1.7) depends on the *time scale* (3.1.1.5) used. For example, the durations of a year, month, week, day, hour or minute, may depend on when they occur [in a *Gregorian calendar* (3.1.1.19), a *calendar month* (3.1.2.19) can have a duration of 28, 29, 30, or 31 days; in a *24-hour clock* (3.1.1.10), a *clock minute* (3.1.2.4) can have a duration of 59, 60, or 61 seconds, etc.]. Therefore, the exact duration can only be evaluated if the exact duration of each is known.

Note 4 to entry: This definition is closely related to NOTE 1 of the terminological entry “duration” in IEC 60050-113:2011, 113-01-13.

### 3.1.1.9 clock

*time scale* (3.1.1.5) suited for intra-day time measurements

EXAMPLE The *24-hour clock* (3.1.1.10) is a type of clock.

Note 1 to entry: *clock second* (3.1.2.2), *clock minute* (3.1.2.4) and *clock hour* (3.1.2.6) are often *time scale units* (3.1.1.7) included in a clock.

### 3.1.1.10 24-hour clock

*clock* (3.1.1.9) that subdivides a *calendar day* (3.1.2.11) into 24 *clock hours* (3.1.2.6)

Note 1 to entry: *UTC* (3.1.1.12) forms the basis of today’s 24-hour clocks and is used in this document as a type of 24-hour clock, as described in 4.2.3.

### 3.1.1.11 recurring time interval

series of consecutive *time intervals* (3.1.1.6) of identical *duration* (3.1.1.8)

Note 1 to entry: If the duration of the time intervals is measured in *calendar* (3.1.1.18) entities, the duration of each time interval depends on the *calendar dates* (3.1.2.7) of its start and end.

Note 2 to entry: If the starting *instants* (3.1.1.3) of time intervals are repeated according to a set of rules, the “repeat rules for recurring time intervals” in ISO 8601-2:2019, Clause 5 apply.

### 3.1.1.12 UTC

#### Coordinated Universal Time

*time scale* (3.1.1.5) with the same rate as International Atomic Time (TAI), but differing from TAI only by an integral number of *seconds* (3.1.2.1)

Note 1 to entry: UTC is the time standard commonly used across the world from which local time is derived.

Note 2 to entry: UTC is produced by the Bureau International des Poids et Mesures (BIPM), i.e. the International Bureau of Weights and Measures.

Note 3 to entry: TAI is a continuous time scale produced by the BIPM based on the best realizations of the SI second. TAI is a realization of Terrestrial Time (TT) with the same rate as that of TT, as defined by the International Astronomical Union Resolution B1.9 (2000).

[SOURCE: BIPM Recommendation CCTF 3 (2017), modified — The definition of TAI has been included as Note 3 to entry.]

### 3.1.1.13

#### UTC of day

*time of day* ([3.1.1.16](#)) in *UTC* ([3.1.1.12](#))

### 3.1.1.14

#### standard time

*time scale* ([3.1.1.5](#)) derived from *UTC* ([3.1.1.12](#)), by a *time shift* ([3.1.1.25](#)) established in a given location by the competent authority

EXAMPLE 1 Some standard times do not vary within a year, such as US Eastern Standard Time (EST), US Eastern Daylight Time (EDT), Australia Western Standard Time (AWST), China Standard Time (CST), Hong Kong Standard Time (HKT), Korea Standard Time (KST) and Japanese Standard Time (JST).

EXAMPLE 2 Some standard times vary within a year, such as US Eastern Time (ET) and Australian Central Standard Time (ACST).

Note 1 to entry: The time shift of a standard time may vary in the course of a year, such as due to daylight savings.

[SOURCE: IEC 60050-113:2011, 113-01-17, modified — The original NOTE has been deleted; EXAMPLE 1 and 2 and Note 1 to entry has been added.]

### 3.1.1.15

#### local time scale

locally-applicable *time scale* ([3.1.1.5](#)) such as *standard time* ([3.1.1.14](#)) or a non-*UTC* ([3.1.1.12](#)) based time scale

### 3.1.1.16

#### time of day

*time* ([3.1.1.2](#)) occurring within a *calendar day* ([3.1.2.11](#))

Note 1 to entry: Generally, time of day relates to the *duration* ([3.1.1.8](#)) elapsed after the beginning of the day. However, this correlation breaks when changes occur in the *time scale* ([3.1.1.5](#)) that applies to the time of day, such as *time shifts* ([3.1.1.25](#)) and *leap seconds* ([3.1.1.24](#)).

Note 2 to entry: This definition corresponds closely with the definition of “clock time” given in IEC 60050-113:2011, 113-01-18, except that the concepts of duration and time scale are not used in this definition.

### 3.1.1.17

#### local time of day

*time of day* ([3.1.1.16](#)) in a *local time scale* ([3.1.1.15](#))

### 3.1.1.18

#### calendar

*time scale* ([3.1.1.5](#)) that uses the *time scale unit* ([3.1.1.7](#)) of *calendar day* ([3.1.2.11](#)) as its basic unit

EXAMPLE The *Gregorian calendar* ([3.1.1.19](#)) is a type of calendar.

Note 1 to entry: *calendar month* ([3.1.2.19](#)) and *calendar year* ([3.1.2.21](#)) are time scale units often included in a calendar.

### 3.1.1.19

#### Gregorian calendar

*calendar* ([3.1.1.18](#)) in general use that defines a *calendar year* ([3.1.2.21](#)) that closely approximates the tropical year

Note 1 to entry: In this document the term “Gregorian calendar” is used to refer to the *time scale* ([3.1.1.5](#)) described in [4.2.1](#).