



**International
Standard**

ISO 8601-2

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

**Part 2:
Extensions**

**AMENDMENT 1: Canonical
expressions, extensions to time scale
components and date time arithmetic**

**First edition
2019-02**

AMENDMENT 1

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Date and time — Representations for information interchange —

Part 2: Extensions

AMENDMENT 1: Canonical expressions, extensions to time scale components and date time arithmetic

3.1.2

Add the following terminological entries after 3.1.2.13:

3.1.2.14

canonical form

date and time expression where all its time scale components are *normalised* ([3.1.2.15](#))

Note 1 to entry: The canonical form of a date and time expression implies it contains minimal underflow and no overflow.

3.1.2.15

normalise

process to ensure time scale components have values in their defined inclusive ranges

3.1.2.16

normalised duration

duration whose time scale components have values that are *normalised* ([3.1.2.15](#))

Note 1 to entry: This also applies to negative durations.

3.1.2.17

overflow

state of a time scale component with a positive value when paired with a higher-order time scale component it is unequivocally convertible with, that holds a value representing a duration exceeding one unit of the higher-order time scale component

Note 1 to entry: A time scale component can only be in overflow when considered against a higher-order time scale component it is unequivocally convertible with.

Note 2 to entry: The state of overflow is considered resolved if the time scale component has a value representing a duration less than one unit of the higher-order time scale component.

EXAMPLE 1 A calendar day time scale component representing 10 calendar days is considered in overflow when the higher-order time scale component considered is a calendar week, as the calendar day and calendar week are an unequivocally convertible time scale component pair.

EXAMPLE 2 A calendar day time scale component representing 35 calendar days is not considered in overflow when the higher-order time scale component considered is a calendar month, as the calendar day and calendar month are not an unequivocally convertible time scale component pair.

3.1.2.18**underflow**

state of a time scale component with a negative value when paired with a higher-order time scale component it is unequivocally convertible with, where the result of combining the duration represented by the higher-order time scale component and the duration represented by the lower-order time scale component is larger than or equal to zero

Note 1 to entry: A time scale component can only be in underflow when considered against a higher-order time scale component it is unequivocally convertible with.

Note 2 to entry: In resolving time scale component underflows, the negative value of the lower-order time scale component can be expressed in a semantically equivalent form using a combination of the lower-order and higher-order time scale components with values for both larger than or equal to zero.

EXAMPLE 1 A calendar month time scale component representing –8 calendar months is considered in underflow when the higher-order time scale component considered is a calendar year with a value of 1 (which is equivalent to 12 calendar months), as the calendar month and calendar year are an unequivocally convertible time scale component pair.

EXAMPLE 2 A calendar day time scale component representing –60 calendar days is not considered in underflow when the higher-order time scale component considered is a calendar month, as the calendar day and calendar month are not an unequivocally convertible time scale component pair.

EXAMPLE 3 A calendar day time scale component representing –10 calendar days is considered in underflow when the higher-order time scale component considered is a calendar week with a value of 2, but it is not considered in underflow when the calendar week has a value of 1, since a calendar week is equivalent to 7 calendar days, which when combined with –10 calendar days results in a duration less than zero.

14.5

Add the following subclause after 14.4:

14.5 Time scale component overflow and underflow

Time scale components described in this document and in ISO 8601-1 are each defined to accept a range of values, some with a defined minimum or maximum value.

A date and time expression can contain time scale components with values outside the acceptable value ranges of those components.

- A date and time expression is considered to have a normalised duration only if it does not contain any time scale component in the state of overflow or underflow.
- A date and time expression is considered to have an “overflow” if it contains at least one time scale component in the state of overflow.

EXAMPLE 1 The expression '1H90M' contains an overflow in the clock minute time scale component, as the meaning of '90M' is equivalent to the expression '1H30M'.

EXAMPLE 2 The expression '1M90S' does not contain an overflow in the clock second time scale component, as the meaning of '90S' cannot be identically expressed in an alternative combination of these two time scale components, given that the clock minute and clock second are not an unequivocally convertible time scale component pair.

- A date and time expression is considered to have an “underflow” if it contains at least one time scale component in the state of underflow.