

INTERNATIONAL STANDARD



3307

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Information interchange — Representations of time of the day

Échange d'information — Représentations de l'heure

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3307 was drawn up by Technical Committee ISO/TC 97, *Computers and information processing*, and circulated to the Member Bodies in November 1973.

It has been approved by the Member Bodies of the following countries :

Australia	Hungary	Spain
Belgium	Italy	Sweden
Bulgaria	Japan	Switzerland
Czechoslovakia	Netherlands	Thailand
Egypt, Arab Rep. of	New Zealand	Turkey
Finland	Poland	United Kingdom
France	Romania	
Germany	South Africa, Rep. of	

The Member Body of the following country expressed disapproval of the document on technical grounds :

Canada

Information interchange — Representations of time of the day

1 SCOPE AND FIELD OF APPLICATION

This International Standard is designed to establish uniform time representations based upon the 24-hour timekeeping system. It provides a means for representing local time of the day and Universal Time in digital form for the purpose of interchanging information among data systems.

Specifically, it is intended to :

- a) reduce the time required to record and/or format the elements of local time-of-the-day expressions and transmit them;
- b) improve clarity and accuracy of interchange;
- c) minimize the amount of human intervention required for communicating local time-of-the-day expressions;
- d) reduce costs.

This International Standard does not prescribe file sequences, storage media, programming languages, or other features of information processing to be used in its implementation.

The use of this International Standard to represent local time-of-the-day expressions does not ensure that the value represented is accurate.

2 REPRESENTATION FOR LOCAL TIME OF THE DAY

Local time of the day is defined as clock time in public use at the point of origin. In the 24-hour timekeeping system, local time of the day may be expressed by the following combinations of the time elements hours, minutes, and seconds :

- a) hours;
- b) hours and decimal fraction of an hour;
- c) hours and minutes;
- d) hours, minutes and decimal fraction of a minute;
- e) hours, minutes and seconds;
- f) hours, minutes, seconds and decimal fraction of a second.

2.1 Sequencing of time elements

The sequencing of time elements shall be from high order to low order (left to right) : hours, minutes, seconds. When a decimal fraction of an element is specified, no lower-order elements shall be included in the expression. For example, an expression containing a decimal fraction of an hour cannot also include the element(s) minutes and/or seconds.

2.2 Use of separators

Separators other than the decimal comma and decimal period as described in 2.3, 2.4 and 2.5 are not required and consequently shall not be used when interchanging data among data processing systems. However, if required to facilitate visual human understanding, a colon (:) shall be used to separate hours, minutes, and seconds.

2.3 Representation of hours

In the 24-hour timekeeping system, the hour shall be represented by a two-digit decimal number ranging from 00 up to 23, beginning with 00, and continuing in series : 01, 02, . . . , 23. When a decimal fraction of an hour is specified, it shall be separated from the hour representation by a decimal comma or decimal period and expressed numerically to the precision (number of decimal places) desired.

2.4 Representation of minutes

In the 24-hour timekeeping system, the minute shall be represented by a two-digit decimal number ranging from 00 up to 59. When a decimal fraction of a minute is specified, it shall be separated from the minute representation by a decimal comma or decimal period and expressed numerically to the precision (number of decimal places) desired.

2.5 Representation of seconds

In the 24-hour timekeeping system, the second shall be represented by a two-digit decimal number ranging from 00 up to 59. When a decimal fraction of a second is specified, it shall be separated from the second representation by a decimal comma or decimal period and expressed numerically to the precision (number of decimal places) desired.

2.6 The instant of midnight

The instant of midnight in the 24-hour timekeeping system is represented in hours, minutes and seconds as "000000" (the beginning of a new day). The second previous to midnight is "235959" (the last second of the previous day).

3 REPRESENTATION OF UNIVERSAL TIME

To express time of the day in Co-ordinated Universal Time (or Greenwich Mean Time as disseminated by time signals), the time-zone designator, capital "Z", shall follow without separators the low-order (extreme right-hand) time-element in the expression. Other time-zone designators are not provided for in this International Standard. Those systems not having a capital "Z" should use a lower-case "z" when representing Universal Time.

4 EXAMPLES

4.1 The time of 12 minutes, 36 seconds past 14 hours locally is represented as follows :

Expression	Representation	
	With decimal sign as the only separator ¹⁾	With other separators
1) Hours	14	14
2) Hours and decimal fraction of an hour	14,21 or 14.21	14,21 or 14.21
3) Hours and minutes	1412	14:12
4) Hours, minutes and decimal fraction of a minute	1412,6 or 1412.6	14:12,6 or 14:12.6
5) Hours, minutes, and seconds	141236	14:12:36
6) Hours, minutes, seconds and decimal fraction of a second	141236,0 or 141236.0	14:12:36,0 or 14:12:36.0

4.2 Assuming that the point of origin in the example of 4.1 was New York City (5 hours behind Greenwich Mean Time), the local time converted and expressed in hours, minutes and seconds in Universal Time is "191236Z".

5 COMBINATIONS OF DATE AND TIME REPRESENTATIONS

This International Standard is designed to be used in combination with ISO/R 2014, *Writing of calendar dates in all-numeric form*. High-order to low-order sequence must be maintained; i.e. year, month, day, hour, minute, second. Separators are not required and consequently shall not be used to separate date and time for interchange among data processing systems. However, if separators are required to facilitate human understanding, a hyphen or a space may be used to separate the low-order element of date and high-order element of the time. The time representation "141236" combined with the calendar date "1972-04-01" is represented as "19720401141236", or with a hyphen separating the elements of date and time and colons separating hours, minutes and seconds as "1972-04-01-14:12:36".

6 APPLICATION

Depending upon the degree of specificity required by various applications in representing time, the number of time-elements used may vary. For example, some applications need the hour only, others need the hour and minute, others need the hour, minute and second, and others need the hour, minute, second and decimal fraction of a second. In addition, the number of characters used to represent decimal fractions of time-elements will vary depending on application requirements. Accordingly, there must be an understanding between the sender and recipient of time-representations as to the specific structure used. This is generally accomplished by adequate definition in format or record descriptions.

1) In accordance with the provisions of ISO 31/0, *General principles concerning quantities, units and symbols*, the decimal sign is usually represented as a comma except in the English language where a dot (period) may be used.