DR 12-0004 – SML: Decimal Precision of ISO 8601 Times

### Changes to §18.17.4 Dates and Times

Dates and times in cells in SpreadsheetML are stored as strings, using the ISO 8601 lexical formats defined below.

The earliest date permitted is 0001-01-01, 00:00. The latest date permitted is 9999-12-31, 23:59:59.999. The time midnight shall be expressed always with hour component 0 and not with hour component 24. Leap seconds are not permitted – the maximum number of seconds expressed in a minute shall be 60.

Values with only a date component shall be expressed using the Complete, Extended Format Calendar Date representation, as defined in ISO 8601, §B.1.1 and §B2.1.

[Example: The date 5 October 1975 is expressed in SpreadsheetML as:

1975-10-05

end example]

Values with only a time-of-day component shall be expressed using the Complete, Extended Format Time Of Day representation, as defined in ISO 8601, §B.1.2 and §B2.2. The decimal separator shall be a full stop (period), and fractional seconds should be expressed with no more than three decimal places.

[Rationale: There are significant differences among standards’ and systems’ support for fractional seconds in time values. Allowing implementations to choose a level of precision support that is most appropriate to each implementation provides the most flexibility for different usage scenarios. A recommended baseline precision sets a goal for support with the intention of improving interoperability. end rationale]

[Guidance: Implementations are encouraged to document their time precision support to enhance interoperability. end guidance]

[Example: The time-of-day 08:30 can be expressed in the following ways within SpreadsheetML:

08:30  
08:30:00  
08:30:00.000  
end example]

Values with both date and time-of-day components shall be expressed using the Complete, Extended Format Calendar Date and Time Of Day representation, as defined in ISO 8601, §B.1.3 and §B2.3. For the time component, only seconds may use a decimal separator, the decimal separator shall be a full stop (period) and fractional seconds should be expressed with no more than three decimal places.

[Example: The date 22 November 1976 at local time 08:30 can be expressed in the following ways within SpreadsheetML:

1976-11-22T08:30  
1976-11-22T08:30:00  
1976-11-22T08:30:00.000

The date 15 October 1582—the day the Gregorian calendar went into effect for some countries—can be expressed in the following ways:

1582-10-15  
1582-10-15T00:00  
1582-10-15T00:00:00  
1582-10-15T00:00:00.000

end example]

[*Note:* SpreadsheetML relates all dates to the proleptic Gregorian calendar of ISO 8601, treating time periods extending into the past and into the distant future as if the Gregorian calendar is in effect for all of those days. January 1 is always the first day of each year, ignoring historical changes to the period of the calendar year. The gaps and shifts introduced as part of calendar reforms and for introduction of leap seconds are ignored under the proleptic Gregorian calendar system. *end note*]

Wherever a calculation in a formula is specified to apply to number values and a date or time is provided, the effect shall be the same as if the date and/or time value is converted to the corresponding serial date-time. Wherever a calculation in a formula is specified to apply to or to deliver a date and/or time value, and a number value is supplied, the number value is interpreted as a serial date-time for the date and/or time. The relationships between serial date-times and dates and times are specified in §18.17.4.1, §18.17.4.2, and §18.17.4.3.