CANADIAN METEOROLOGICAL MARKUP LANGUAGE

SPECIFICATION

Version 3.02

History of the document

Version no	Date	Comments	Reviewers
3.02	2009-12-08	Corrected table Table E-26: Valid values for meteocode-forecast accumulation types.	Guylaine Hardy
3.01	2007-01-30	Changed wind-speed to be optional, and the value of wind-speed and gust-speed to be nonNegativeInteger.	Jianling Hua
3.0	2007-01-11	Added scribe-cloud-cover-ceiling-codeType for attribute 'ceiling-code' of element cloud-cover.	Jianling Hua
3.0	2006-12-06	Added the meteocode-forecast node under forecast, added pavement-forecast node to hold the elements under original forecast node. Removed the deplicated inclusion of the xsd files.	Jianling Hua
2.1	2006-08-23	Removed sensors from metadata and moved the information to an instrument level.	Todd Billings
2.02	2005-12-13	Changed height element name of the subsurface sensor node to sensor-depth.	Todd Billings
2.01	2005-11-30	Updated elevation-units types table, air-quality types table. Added timezone types table. Updated timezoneType complex type structure definition. Added timezonetypeType simple type structure definition. Added stationStateType and instrumentStateType stationStateQualifierType structure definitions. Updated CMML data elements section with new element definitions (station-state and instrument-state)	Todd Billings
2.0	2005-08-24	Restructured for inclusion of metadata, observation-series, and forecasting nodes.	Todd Billings
1.0	2005-06-29	Modified and restructured to finalize version 1.0	Yungjae Cho
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0.9	2005-04-27	Restructuration and finalisation of document for version 1.0.	François Gauvin Gilles Larose Evan Leclair
0.1	2004-06-15	Creation of document.	François Gauvin

For more information, refer to the CMML_control_document

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1. **Overview** : This document defines the Canadian Meteorological Markup Language (CMML). CMML is a new XML language which is being developed to initially support the exchange of road weather data between all Provinces and Territories of Canada (PTC) and Environment Canada (EC). However, the specification is being written with enough flexibility to accommodate exchange of other environmental science and weather applications. In order to support the interoperability, the future versions of CMML, all non core data elements, e.g. site specific data elements will be handled by using extension tags.

    1.1. **CMML Control Document** : The control document "CMML Control Document" defines the copyright and document distribution information relating to these specifications in addition to making the follow-up of its evolutions.

    1.2. CMML Requirements: See Appendix A

    1.3. Meteocode-Forecast Requirements: See Appendix B

    1.4. CMML Structure and Type Definitions: See Appendix C

    1.5. CMML Schema Organization: Appendix D

    1.6. **CMML Samples**: In addition to providing a definition of the elements and their attributes, CMML sample files can be found separate of this document. Please refer to the control document to know more.

2. **CMML Data Element Nomenclature**: This specification uses the following approach to describing elements:

2.1. Element and attribute names are all lower case.

2.2. Element and attribute names use a hyphen ("-") to separate multiple word names so as to improve readability (ex. <creation-date>). Attribute and element names avoid the use of abbreviations to enhance readability.

2.3. Within this document, child elements are nested in a sub-paragraph under their parents.

2.4. Attributes are also nested but do not have the angle brackets ("<>") and are italicized.

2.5. The element's and attribute's type is provided in braces ("{}"). For more information on each type refer to Appendix C .

2.6. If the element can occur zero or more times, an asterisk ("*") is placed after its name. See section 5.2.3.2 for an example.

2.7. If the element occurs zero or one times, a question mark ("?") follows its name. See section 5.3.2 for an example.

2.8. If the element must appear at least once, a plus sign ("+") trails its name. See section 5.2.3 for an example.

2.9. Element names without a special trailing character must occur exactly once. Section 5.2.1 provides an example of an element that is required exactly once.

2.10. The order of element descriptions in the paragraphs below is not significant. Any required ordering of elements is specified in Appendix C .

3. CMML Framework Elements:

3.1. **<cmml>** {cm:cmmlType}: The root element for CMML.

3.1.1. ***version*** {cm:non-emptyString}: Indicates which version of CMML the instance contains.

3.1.2. **<head>** {cm:headType}: Contains the header for the CMML instance. See section 4 for elements found in the <head> element.

3.1.3. **<data>** {cm:dataType}: Contains the environmental data. See section 5 for child elements of the <data> element.

4. **CMML Header Elements**: CMML header provides information about the CMML product and the data it contains. These elements are children of the <head> element.

4.1. **<product>** {cm:productType}: Holds header information about the product.

4.1.1. ***operational-mode*** {cm:operational-modeType}: Defines the status of the product. Applications can review the content of this element to determine if they should perform further processing. Sample values include "test", "developmental", "experimental", and "official" product.

4.1.1.1. Test Product: Indicates that this is an instance of an existing CMML product that contains some change being evaluated by a CMML development team. Users will typically not process this product.

4.1.1.2. Developmental Product: A new product that is not yet ready for public evaluation or use.

4.1.1.3. Experimental Product: Product is available for testing and evaluation for a specified, limited time period for the explicit purpose of obtaining customer feedback.

4.1.1.4. Official Product: Identifies an instance of an established CMML product.

4.1.2. **<title>** {xsd:string} [?]: Provides a concise summarization of what this CMML product contains.

4.1.3. **<field>** {cm:fieldType}: Specifies the general area within the environmental sciences that the data contained in the CMML instance is from. Example values include "meteorological" "hydrological" "oceanographical" "land surface" and "space"

4.1.4. **<category>** {cm:categoryType}: Defines the specific category that the product belongs to. Example values include "observation", "forecast", "analysis", "statistics" and "metadata". If a category is defined as "metadata", only metadata blocks should be included in the cmml file, otherwise metadata must not be included.

4.1.5. **<creation-date>** {cm:creation-dateType}: The date and time that the product was prepared.

4.1.5.1. ***refresh-frequency*** {xsd:duration}: Used by the production center to help users know how often to return for updated data. The suggested refresh frequency will help well mannered users know what the provider believes is a reasonable time between repeated accesses of the system.

4.1.6. **<current-issue>**[1] {xsd:dateTime}[?]: The issue date and time of this product.
4.1.7. **<next-issue>**[2] {xsd:dateTime} [?]: The date and time of the next issue of this product.
4.1.8. **<timezone>**[1] {xsd:string}[?]: Provides the timezone of the forecast.

4.1.9. **<status>** {cm:scribe-statusType}[?]: Status of the bulletin, used for marine forecasts. See Table D-4: Valid types for product status.

4.1.10. **<type>**[1] {cm:scribe-typeType}[?]: See Table D-5: Valid types for product type.

4.1.11. **<initials>**[1] {xsd:string}[?]: Identification of product authors.

4.1.12. **<valid-begin-time>**[1] {xsd:dateTime}[?]: Date and time at which the validity of the forecast begins.

4.1.13. **<valid-end-time>**[1] {xsd:dateTime}[?]: Date and time at which the validity of the forecast ends.

4.1.14. **<amended-regions>** {cm:scribe-amended-regionsType}[?]: List of amended or corrected regions in the forecast.

4.1.14.1. **<location>** {cm:scribe-locationType} [+]: See section 5.1.1.1.

4.2. **<source>** {cm:sourceType}[+] : Holds information about the product's source and links to credit and disclaimer information.

4.2.1. **<more-information>** {xsd:anyURI}[?] : A link to the web page of the forecast's source or a more complete forecast.

4.2.2. **<production-center>** {cm:production-centerType}: Production Center identifies which organization creates the product.

4.2.2.1. **<sub-center>** {xsd:string} [?]: The part of the production center that prepared the product.

4.2.3. **<disclaimer>** {xsd:anyURI} [?]: The URL containing a disclaimer regarding the data.

4.2.4. **<credit>** {xsd:anyURI} [?]: The URL used to credit the source of the data.

4.2.5. **<credit-logo>** {xsd:anyURI} [?]: The image link used with the credit URL to acknowledge the data source.

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[1] It is required when CMML document contains <meteocode-forecast> element.

[2] It is required when CMML document contains <meteocode-forecast> element.

4.2.6. **<feedback>** {xsd:anyURI} [?]: A URL to a web page used to provide the production center comments on the product.

5. **CMML Data Elements**: These elements hold the environmental data. They are children of the <data> element. At least one child element (<forecast>, <observation-series>, or <metadata>) must be present in a <data> element.

5.1. **<forecast>** {cm:forecastType}[*]: Defines forecast information. At least one child element (<meteocode-forecast> or <pavement-forecast>) must be present in a <forecast> element.

5.1.1. **<meteocode-forecast>** {cm:scribe-forecastType}[*]: Weather elements forecasted by Environment Canada through the Scribe application forecast product.

5.1.1.1. **<location>** {cm:scribe-locationType}[+]: Defines the location for the data contained in the element <meteocode-forecast>. The element must contain one of the following elements: <point> or <msc-zone-code>.

5.1.1.1.1. <**point**> {cm:scribe-pointType}: Element used to define the geographical point for which the data is valid.

5.1.1.1.1.1. **<latitude>** {xsd:decimal}: The latitude of the point where the data is valid.

5.1.1.1.1.2. **<longitude>** {xsd:decimal}: The longitude of the point where the data is valid

5.1.1.1.2. <**msc-zone-code**> {cm:scribe-msc-zone-codeType}: Contains the Meteorological Service of Canada forecast zone code for which the data is valid.

5.1.1.1.2.1. ***status*** {cm:scribe-msc-zone-code-statusType}[?]: Indicates the status for the region, used for marine forecasts. See Table E-33: Valid values for meteocode-forecast msc zone code status.

5.1.1.1.3. **<msc-zone-name>** {cm:scribe-msc-zone-nameType}[+]: Name of the region.

5.1.1.1.3.1. ***lang*** {cm:scribe-langType}: Language. Values are “en” for English or “fr” for French.

5.1.1.2. **<parameters>** {cm:scribe-parametersType}[+]: Holds the environmental data. At least one child element must be present in a <parameters> element.

5.1.1.2.1. **<accum-list>** {cm:scribe-accum-listType}[*]: Container for descriptions of accumulation of precipitation.

5.1.1.2.1.1. ***units*** : Defines the units of the accumulation. The default value is “mm”. See Table E-49: Valid unit types for meteocode-forecast accumulation.

5.1.1.2.1.2. **<accum-amount>** {cm:scribe-accum-amountType} [*]

5.1.1.2.1.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.1.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.1.2.3. ***type*** { cm:scribe-accum-typeType }: Identifies the type of accumulation of precipitation. See Table E-26: Valid values for meteocode-forecast accumulation types.

5.1.1.2.1.2.4. **<lower-limit>** {cm:scribe-accum-lower-limitType}: Lower limit value of precipitation amount.

5.1.1.2.1.2.4.1. ***cumul-inf*** {xsd:decimal}: Value of lower cumulative precipitation amount of current precipitation amount type.

5.1.1.2.1.2.5. **<upper-limit>** {cm:scribe-accum-upper-limitType}: Upper limit value of precipitation amount.

5.1.1.2.1.2.5.1. ***cumul-sup*** {xsd:decimal}: Value of upper cumulative precipitation amount of current precipitation amount type.

5.1.1.2.2. **<cloud-list>** {cm:scribe-cloud-listType}[*]: Container for cloud cover descriptions

5.1.1.2.2.1. ***units*** {cm:scribe-cloud-unitsType}: Defines the units of the cloud cover. The default value is in tenth of the sky “deci”. See Table E-50: Valid unit types for meteocode-forecast cloud□.

5.1.1.2.2.2. **<cloud-cover>** {cm:scribe-basic-cloud-coverType} [*]: Value of the cloud cover.

5.1.1.2.2.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.2.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid

5.1.1.2.2.2.3. ***ceiling-code*** {cm:scribe-cloud-cover-ceiling-codeType}[?]: Specifies the height above ground of the main cloud cover. These codes are produced automatically by Scribe and are generally not modified by the forecaster. If not modified, the ceiling value will not be present if cloud cover is "0". Although the definition of a ceiling (aviation rules) requires 6/10 of cloud cover, ceiling values will be produced at all cloud cover greater than "0" and will represent the height of the most representative cloud layer. See Table E-56: Valid values for meteocode-forecast cloud cover ceiling-code□

5.1.1.2.2.3. **<exception>** {cm:scribe-cloud-cover-exceptionType} [*]: See section 6.9 for a description of an exception.

5.1.1.2.2.3.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.2.3.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.2.3.3. **<excep-category>** {cm:scribe-excep-categoryType}: See section 6.9 for definition.

5.1.1.2.2.3.4. **<cloud-cover>**" {cm:scribe-cloud-coverType}: A different value of cloud cover for the exception.

5.1.1.2.2.3.4.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data of the exception is valid.

5.1.1.2.2.3.4.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data of the exception is valid.

5.1.1.2.2.3.4.3. ceiling-code {cm:scribe-cloud-cover-ceiling-codeType}[?]: See section 5.1.1.2.2.2.3

5.1.1.2.2.3.4.4. ***cover-start*** {xsd:nonNegativeInteger}: Value of cloud cover at exception start time.

5.1.1.2.2.3.4.5. ***cover-end*** {xsd:nonNegativeInteger}: Value of cloud cover at exception end time.

5.1.1.2.3. **<freezing-spray-list>** {cm:scribe-freezing-spray-listType}[*]: Container for the freezing spray, marine forecasts only.

5.1.1.2.3.1. **<freezing-spray>** {cm:scribe-freezing-sprayType}[*]

5.1.1.2.3.1.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.3.1.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.3.1.3. ***frequency*** {cm:scribe-freezing-spray-frequencyType}: See Table E-29: Valid types for meteocode-forecast freezing spray frequency.

5.1.1.2.3.1.4. ***intensity*** {cm:scribe-freezing-spray-intensityType}: See Table E-30: Valid types for meteocode-forecast freezing spray intensity.

5.1.1.2.3.1.5. ***occurrence***{cm:scribe-freezing-spray-occurType}: See Table E-31: Valid types for meteocode-forecast freezing spray occurrence.

5.1.1.2.3.1.6. ***ice-cover-modifier*** {cm:scribe-freezing-spray-ice-coverType} [?]: Ice cover modifiers applied to the freezing spray . See Table E-32: Valid types for meteocode-forecast freezing spray ice cover modifier.

5.1.1.2.3.1.7. **<exception>** {cm:scribe-freezing-spray-exceptionType} [?]: See section 6.9 for a description of an exception.

5.1.1.2.3.1.7.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.3.1.7.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.3.1.7.3. **<excep-category>** {cm:scribe-excep-categoryType}**:** See section 6.9 for definition.

5.1.1.2.3.1.7.4. **<freezing-spray>** {cm:scribe-basic-freezing-sprayType} [*]: contains the same attributes/elements defined in section 5.1.1.2.3.1, but without an <exception>.

5.1.1.2.4. **<precipitation-list>** {cm:scribe-precipitation-listType}[*]: Container for the precipitation values.

5.1.1.2.4.1. **<precipitation-event>** {cm:scribe-precipitation-eventType} [*]

5.1.1.2.4.1.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.4.1.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.4.1.3. ***type*** {cm:scribe-precipitation-typeType}: See Table E-37: Valid types for meteocode-forecast precipitation types.

5.1.1.2.4.1.4. ***frequency***{cm:scribe-precipitation-frequencyType}: See Table E-34: Valid types for meteocode-forecast precipitation frequency.

5.1.1.2.4.1.5. ***intensity***{cm:scribe-precipitation-intensityType}: See Table E-35: Valid types for meteocode-forecast precipitation intensity.

5.1.1.2.4.1.6. ***occurrence***{cm:scribe-precipitation-occurType}: See Table E-36: Valid types for meteocode-forecast precipitation occurrence.

5.1.1.2.4.1.7. **<exception>** {cm:scribe-precipitation-exceptionType} [?]: See section 6.9 for a description of an exception.

5.1.1.2.4.1.7.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.4.1.7.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.4.1.7.3. **<excep-category>** {cm:scribe-excep-categoryType}: See section 6.9 for definition.

5.1.1.2.4.1.7.4. **<precipitation-event>** {cm:scribe-basic-precipitation-eventType}: Contains the same attributes/elements defined in section 5.1.1.2.4.1, but without an <exception>.

5.1.1.2.4.1.8. **<precipitation-event>** {cm:scribe-precipitation-eventType} [*]: See section 5.1.1.2.4.1

5.1.1.2.4.1.8.1. <precipitation-event> {cm:scribe-precipitation-eventType} [*]: See section 5.1.1.2.4.1

Note: Since precipitation events can occur simultaneously, three levels of precipitation types are possible. Description of each of these levels is available in this XML format. Level 2 will be imbedded in level 1 and level 3 will be imbedded in level 2.

5.1.1.2.5. **<ice-cover-list>** {cm:scribe-ice-cover-listType}[*]: Container for the ice cover, marine forecast only.

5.1.1.2.5.1. ***units*** {xsd:string}: Defines the unit for the ice cover. The value is fixed at "%".

5.1.1.2.5.2. **<ice-cover>** {cm:scribe-ice-coverType} [*]

5.1.1.2.5.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.5.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.6. **<probability-of-precipitation-list>** {cm:scribe-probability-of-precipitation-listType}[*]: Container for the probabilities of precipitation.

5.1.1.2.6.1. ***units***:{xsd:string}: Defines the unit for the probability of precipitation. The value is fixed at "%".

5.1.1.2.6.2. **<probability-of-precipitation>** {cm:scribe-probability-of-precipitation-Type}[*]

5.1.1.2.6.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.6.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.7. **<snow-level-list>** {cm:scribe-snow-level-listType}[*]: Container for snow level descriptions.

5.1.1.2.7.1. ***units*** {cm:scribe-snow-level-unitsType}: Defines the units of the snow level. The default value is "m". See Table E-51: Valid unit types for meteocode-forecast snow level.

5.1.1.2.7.2. **<snow-level>** {cm:scribe-snow-levelType} [*]

5.1.1.2.7.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.7.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.8. **<temperature-list>** {cm:scribe-temperature-listType}[*]: Container for temperature descriptions.

5.1.1.2.8.1. ***type*** {cm:scribe-temperature-typeType}: Type of temperatures. See Table E-38: Valid values for meteocode-forecast temperature type.

5.1.1.2.8.2. ***units*** {cm:scribe-temperature-unitsType}: Defines the units of the temperature. The default value is "celsius". See Table E-52: Valid unit types for meteocode-forecast temperature.

5.1.1.2.8.3. **<temperature-value>** {cm:scribe-temperature-valueType}[*]

5.1.1.2.8.3.1. ***trend*** {cm:scribe-temperature-trendType}[?]: Indicates a tendency. See Table E-40: Valid types for meteocode-forecast temperature trend.

5.1.1.2.8.3.2. ***ground-frost*** {xsd:string}[?]: Indicate a ground frost status. See Table E-39: Valid values for meteocode-forecast temperature ground-frost

5.1.1.2.8.3.3. ***start***{xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.8.3.4. ***end*** {xsd:dateTime} : Specifies the end time of the period of time for which the data is valid.

5.1.1.2.8.3.5. **<limit>** {xsd:decimal}[?]: Climatological or sea-surface value of temperature. Real number. Value of -9999.00 indicates a missing value.

5.1.1.2.8.3.6. **<lower-limit>** {xsd:decimal}[?]: Lower value of a range of temperature (air-temperature or dew-point). Real number. Value of -9999.00 indicates a missing value.

5.1.1.2.8.3.7. **<upper-limit>** {xsd:decimal}[?]: Upper value of a range of temperature (air-temperature or dew-point). Real number. Value of -9999.00 indicates a missing value.

5.1.1.2.8.4. **<exception>** {cm:scribe-temperature-exceptionType}[*]: See section 6.9 for a description of an exception.

5.1.1.2.8.4.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.8.4.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.8.4.3. **<excep-category>** {cm:scribe-excep-categoryType}: See section 6.9 for definition.

5.1.1.2.8.4.4. **<temperature-value>** {cm:scribe-temperature-valueType}: See section 5.1.1.2.8.3 for definition.

5.1.1.2.9. **<UV-index-list>** {cm:scribe-UV-index-listType}[*]: Container for UV index forecast.

5.1.1.2.9.1. **<UV-index>** {cm:scribe-UV-indexType}[*]: Value of the UV index. Real number that varies from 0 to 15.

5.1.1.2.9.1.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.9.1.2. ***end*** {xsd:dateTime} : Specifies the end time of the period of time for which the data is valid.

5.1.1.2.10. **<visibility-list>** {cm:scribe-visibility-listType}[*]: Container for the visibility values.

5.1.1.2.10.1. **<visibility>** {cm:scribe-visibilityType} [*]

5.1.1.2.10.1.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.10.1.2. ***end*** {xsd:dateTime: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.10.1.3. ***type*** {cm:scribe-visibility-typeType}: See Table E-42: Valid types for meteocode-forecast visibility.

5.1.1.2.10.1.4. ***frequency*** {cm:scribe-visibility-frequencyType}: See Table E-43: Valid types for meteocode-forecast visibility frequency.

5.1.1.2.10.1.5. **<value>** {cm:scribe-valueType}[?]: Distance of horizontal visibility

5.1.1.2.10.1.5.1. ***unit*** {cm:scribe-value-unitsType}: Defines the units of visibility value. The default value is "NM". See Table E-53: Valid unit types for meteocode-forecast visibility value.

5.1.1.2.10.1.6. **<exception>** {cm:scribe-visibility-exceptionType} [?]: See 6.9 for a description of an exception.

5.1.1.2.10.1.6.1. ***start***{xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.10.1.6.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.10.1.6.3. **<excep-category>**{cm:scribe-excep-categoryType}: See section 6.9 for definition.

5.1.1.2.10.1.6.4. **<visibility>**{cm:scribe-basic-visibilityType}: Contains the same attributes/elements defined in section 5.1.1.2.10.1 but without an <exception>.

5.1.1.2.11. **<warning-list>**{cm:scribe-warning-listType}[*]: Container for warning descriptors. Three levels of warning can co-exist at the same time.

5.1.1.2.11.1. <**warning-event>** {cm:scribe-warning-eventType}[*]: Description of a warning event.

5.1.1.2.11.1.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.11.1.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.11.1.3. ***type*** {cm:scribe-warning-typeType}: Warning category. SeeTable E-44: Valid types for meteocode-forecast warning type

5.1.1.2.11.1.4. ***code*** {cm:scribe-warning-codeType}: See Table E-45: Valid values for meteocode-forecast warning codes.

5.1.1.2.11.1.5. ***status*** {cm:scribe-warning-statusType}: See Table E-46: Valid values for meteocode-forecast warning status.

5.1.1.2.11.1.6. **<warning-event>**{cm:scribe-warning-eventType}[*]: Second level of warning.

5.1.1.2.11.1.6.1. **<warning-event>**{cm:scribe-warning-eventType}[*]: Third level of warning.

5.1.1.2.12. **<wave-height-list>** {cm:scribe-wave-height-listType}[*]: Container for the wave height values.

5.1.1.2.12.1. ***units*** {cm:scribe-wave-height-unitsType}: Defines the units of the wave height. The default value is “m”. See Table E-54: Valid unit types for meteocode-forecast wave height.

5.1.1.2.12.2. **<wave-height>**{cm:scribe-wave-heightType}[*]: Container for the wave height.

5.1.1.2.12.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.12.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.12.2.3. ***ice-cover-modifier*** {cm:scribe-wave-height-ice-coverType}[?]: Ice cover modifiers applied to wave height. See Table E-41: Valid types for meteocode-forecast wave-height ice cover modifier.

5.1.1.2.12.2.4. **<lower-limit>**{xsd:decimal}: Lower value of a range of height. Real number.

5.1.1.2.12.2.5. **<upper-limit>**{xsd:decimal}: Upper value of a range of height. Real number.

5.1.1.2.13. **<wind-list>** {cm:scribe-wind-listType}[*]: Container for wind event descriptions.

5.1.1.2.13.1. ***units*** {cm: scribe-wind-unitsType}: Defines the units of the wind/gust speed. The default value is "kmh". See Table E-55: Valid unit types for meteocode-forecast wind.

5.1.1.2.13.2. **<wind>** {cm:scribe-windType}[*]: Container for a wind event.

5.1.1.2.13.2.1. ***start*** {xsd:dateTime}: Specifies the start time of the period of time for which the data is valid.

5.1.1.2.13.2.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.13.2.3. ***direction*** {cm:scribe-wind-directionType}: Wind direction. See Table E-47: Valid values for meteocode-forecast wind direction.

5.1.1.2.13.2.4. ***modificator*** {cm:scribe-wind-modificatorType} [?]: Modifiers applied to wind See Table E-48: Valid values for meteocode-forecast wind modificators.

5.1.1.2.13.2.5. **<wind-speed>** {cm:scribe-wind-speedType}[?]: Wind speed. The default unit value is in "kmh"

5.1.1.2.13.2.5.1. **<lower-limit>** {xsd:nonNegativeInteger}: Lower value of the speed. Non negative integer.

5.1.1.2.13.2.5.2. **<upper-limit>** {xsd: nonNegativeInteger }: Upper value of the speed. Non negative integer.

5.1.1.2.13.2.6. **<gust-speed>** {cm:scribe-gust-speedType}[?]: Gust speed.

5.1.1.2.13.2.6.1. **<lower-limit>** {xsd: nonNegativeInteger }: Lower value of the speed. Non negative integer.

5.1.1.2.13.2.6.2. **<upper-limit>** {xsd: nonNegativeInteger }: Upper value of the speed. Non negative integer.

5.1.1.2.13.2.7. **<exception>** {cm:scribe-wind-exceptionType}[?]: See section 6.9 for a description of an exception.

5.1.1.2.13.2.7.1. ***start*** : {xsd:dateTime}Specifies the start time of the period of time for which the data is valid.

5.1.1.2.13.2.7.2. ***end*** {xsd:dateTime}: Specifies the end time of the period of time for which the data is valid.

5.1.1.2.13.2.7.3. **<excep-category>** {cm:scribe-excep-categoryType}: See section 6.9 for definition.

5.1.1.2.13.2.7.4. **<wind>** {cm:scribe-basic-wind-type}: Contains the same attributes/elements defined in section 5.1.1.2.13.2 but without an <exception>.

5.1.2. **<pavement-forecast>** {cm:pavement-forecastType}[*]: Defines pavement forecast information.

5.1.2.1. **<location>** {cm:locationType} [+]: Defines the location that provides the data contained in the element <forecast>. The element must contain exactly one of the following elements; <point>, <city>, <nws-zone>, <area>, <route>, or <station>.

5.1.2.1.1. <location-key> {xsd:string} : The location-key element is used to relate the location to its corresponding parameters. Must be unique.

5.1.2.1.2. <point> see section 6.1.

5.1.2.1.3. <city> {cm:cityType} [?]: Contains the city name for which the data is.

5.1.2.1.3.1. ***province*** {cm:provinceType}: The two digit abbreviation for the province that the city resides.

5.1.2.1.3.2. ***summarization***: see section 6.2.

5.1.2.1.4. **<nws-zone>** {xsd: string} [?]: Contains the National Weather Service forecast zone code for which the data is valid.

5.1.2.1.4.1. ***province*** {cm:provinceType}: Defines the two letter province ID.

5.1.2.1.4.2. ***summarization***: see section 6.2

5.1.2.1.5. **<area>** {cm:areaType} [?]: A geometrical shape may be used to define which grid points the data represents. The element must contain exactly one of its child elements.

5.1.2.1.5.1. **<circle>** {cm:circleType} [?]: A circular area about a grid point. The area can contain any number of grid points which are summarized.

5.1.2.1.5.1.1. **<point>** see section 6.1.

5.1.2.1.5.1.2. **<radius>** {cm:radiusType}: The distance from the center point of the circle to edge of the circular area.

5.1.2.1.5.1.2.1. ***radius-units*** {cm:radius-unitsType): The units of the radius measurement. Example values include “statute-miles” and “kilometers”.

5.1.2.1.5.2. **<rectangle>** {cm:rectangleType} [?]: A rectangular area is defined by two latitude and longitude pairs. These pairs form a diagonal from which a rectangle can be consistently constructed. The area can contain any number of grid points which are summarized.

5.1.2.1.5.2.1. **<point>** see section 6.1.

5.1.2.1.5.2.2. **<point>** see section 6.1.

5.1.2.1.5.3. **<polygon>** {cm:polygonType} [?]: A polygon area which is defined by three or more latitude and longitude pairs. The area can contain any number of grid points which are summarized.

5.1.2.1.5.3.1. **<point>** see section 6.1.

5.1.2.1.5.3.2. **<point>** see section 6.1.

5.1.2.1.5.3.3. **<point>** see section 6.1.

5.1.2.1.6. **<route>** {cm:linestringType} [?] : A linear road network which is defined by two or more latitude and longitude pairs.

5.1.2.1.6.1. **<point>** see section 6.1.

5.1.2.1.6.2. **<point>** see section 6.1.

5.1.2.1.7. **<station>** {cm: originType} [?]: Defines the station that provides the data.

5.1.2.1.7.1. ***type*** {cm:origintypeType} : Defines the type of station. Example values are "station" and "region". See Table E-11: Valid pavement-forecast origintype types

5.1.2.1.7.2. **<id>** {cm: identifierType} [+]: Contains an id of station.

5.1.2.1.7.2.1. ***type*** {cm:identifiertypeType} : Defines the type of ID. Example values are "client" and "network". See Table E-10: Valid pavement-forecast identifiertype types.

5.1.2.2. **<time-layout>** {cm:time-layoutElementType} [+]: Contains the start and stop valid times and any associated period names for the data. Since different environmental parameters have different time schemes (valid at different interval and available for different lengths of time into the future), there will be one <time-layout> element for each of these unique temporal configurations. Each data parameter will reference exactly one of these time layouts.

5.1.2.2.1. ***time-coordinate*** {cm:time-coordinateType}: The time coordinate can be either "local" or "UTC". See Table E-21: Valid pavement-forecast time-coordinate types.

5.1.2.2.2. ***summarization*** see section 6.2.

5.1.2.2.3. **<layout-key>** {cm:layout-keyType}: The key used to associate this time layout with a particular parameter element.

5.1.2.2.4. **<start-valid-time>** {cm:start-valid-timeType} [+]: The start time of the period of time for which the data is valid.

5.1.2.2.4.1. ***period-name*** {xsd:string} [?]: Contains the name associated with this time interval (ex. TODAY).

5.1.2.2.5. **<end-valid-time>** {xsd:dateTime} [*]: The end time of the period of time for which the data is valid. The absence of this element indicates that the element is valid at a specific time.

5.1.2.3. **<parameters>** {cm:parametersType} [+]: Holds the environmental data.

5.1.2.3.1. ***applicable-location*** {xsd:string} : The applicable-location attribute is used to relate the location to a particular list of parameters.

5.1.2.3.2. **<pressure>** {cm:pressureType} [*]: Container for the pressure values.

5.1.2.3.2.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of pressure. The default value is 1.

5.1.2.3.2.2. ***type*** {xsd:string}: Specifies the type of variable measured for pressure. Example values include “atmospheric” and “average-atmospheric”. See Table E-15: Valid types for pavement-forecast pressure

5.1.2.3.2.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.2.4. ***units*** {cm:unitType}[?]: Defines the units of the pressure value. The default value is “mb”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.2.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.2.6. ***time-layout*** see section 6.3.

5.1.2.3.2.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value.

5.1.2.3.2.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data.

5.1.2.3.2.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.2.10. **<value>** {xsd:anyType} [+]: The pressure value. Missing values are represented by an empty element and xsi:nil="true".

5.1.2.3.2.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.3. **<wind>** {cm:windType} [*]: Container for the wind values.

5.1.2.3.3.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of wind. The default value is 1.

5.1.2.3.3.2. ***type*** {xsd:string}: Specifies the type of variable measured for wind. Example values include "average-direction" and "speed". See Table E-24: Valid types for pavement-forecast wind.

5.1.2.3.3.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.3.4. ***units*** {cm:unitType}[?]: Defines the units of the wind values. Example values include "deg" and "km/h". The default value is "deg". See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.3.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.3.6. ***time-layout*** see section 6.3.

5.1.2.3.3.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value.

5.1.2.3.3.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data.

5.1.2.3.3.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.3.10. **<value>** {xsd:anyType} [+]: The wind value. Missing values are represented by an empty element and xsi:nil="true".

5.1.2.3.3.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.4. **<temperature>** {cm:temperatureType} [*]: Container for temperature data.

5.1.2.3.4.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of temperature. The default value is 1.

5.1.2.3.4.2. ***type*** {xsd:string}: Specifies the type of variable measured for temperature. Example values include “maximum-air-temperature”, “minimum-air-temperature”, “air-temperature”, “dew point”, “wet bulb”. See Table E-20: Valid types for pavement-forecast temperature.

5.1.2.3.4.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.4.4. ***units*** {cm:unitType}[?]: Defines the units of the temperature value. Example values include “degF”, “degC”, and “K”. The default value is “degC”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.4.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.4.6. ***time-layout*** see section 6.3.

5.1.2.3.4.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value.

5.1.2.3.4.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data.

5.1.2.3.4.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.4.10. **<value>** {xsd:anyType} [+]: The temperature value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.4.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.5. **<precipitation>** {cm:precipitationType} [*]: Container for the precipitation values

5.1.2.3.5.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of precipitation. The default value is 1.

5.1.2.3.5.2. ***type*** {xsd:string}: Specifies the type of variable measured for precipitation. Example values include “rate”, “situation”. See Table E-14: Valid types for pavement-forecast precipitation.

5.1.2.3.5.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.5.4. ***units*** {cm:unitType}[?]: Defines the units of the precipitation value. Example values include “inches” and “millimeters”. The default value is “mm”. See Table E-22: Valid pavement-forecast unit types

5.1.2.3.5.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.5.6. ***time-layout*** see section 6.3.

5.1.2.3.5.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value.

5.1.2.3.5.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.5.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.5.10. **<value>** {xsd:anyType} [+]: The precipitation type parameter’s value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.5.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.6. **<radiation>** {cm:radiationType} [?]: Container for the radiation values .

5.1.2.3.6.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of radiation. The default value is 1.

5.1.2.3.6.2. ***type*** {xsd:string}: Specifies the type of variable measured for radiation. Example values include “total-sun”, “total-radiation”, “average-short-wave-up” and “average-short-wave-down. See Table E-16: Valid types for pavement-forecast radiation

5.1.2.3.6.3. ***units*** {cm:unitType}[?]: Defines the units of the radiation values. Example values include “W/m²”. The default value is “W/m²”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.6.4. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.6.5. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.6.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.6.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.6.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.6.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.6.10. **<value>** {xsd:anyType} [+]: The radiation value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.6.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.7. **<visibility>** {cm:visibilityType} [*]: Container for the visibility values .

5.1.2.3.7.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of visibility. The default value is 1.

5.1.2.3.7.2. ***type*** {xsd:string}: Specifies the type of variable measured for visibility. Example values include “distance” and “situation”. See Table E-23: Valid types for pavement-forecast visibility.

5.1.2.3.7.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.7.4. ***units*** {cm:unitType}[?]: Defines the units of the visibility value. Example values include “km” and “m”. The default value is “m”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.7.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.7.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.7.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.7.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.7.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.7.10. **<value>** {xsd:anyType} [+]: The visibility value Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.7.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.8. **<pavement>** {cm:pavementType} [*]: Container for the pavement values .

5.1.2.3.8.1. ***lane-number*** { xsd:nonNegativeInteger } [?]: Specifies the lane number where the values are measured. The default value is 1.

5.1.2.3.8.2. ***index***[2] { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of pavement. The default value is 1.

5.1.2.3.8.3. ***type*** {xsd:string}: Specifies the type of variable measured for pavement. Example values include “surface-status”, “temperature” and “salinity”. See Table E-12: Valid types for pavement-forecast pavement.

5.1.2.3.8.4. ***height*** {xsd: integer}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.8.5. ***units*** {cm:unitType}[?]: Defines the units of the pavement value. Example values include “degC”, “degF” and “K”. The default value is “degC”. See Table E-22: Valid pavement-forecast unit types.

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[2] Pavement index is also associated to a puck. For instance, index 1 represents the pavement value from puck 1

5.1.2.3.8.6. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.8.7. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.8.8. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.8.9. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.8.10. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.8.11. **<value>** {xsd:anyType} [+]: The pavement value. Missing values are represented by an empty element and xsi:nil="true".

5.1.2.3.8.12. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.9. **<subsurface>** {cm:subsurfaceType} [*]: Container for the subsurface values.

5.1.2.3.9.1. ***lane-number*** { xsd:nonNegativeInteger } [?]: Specifies the lane number where the values are measured. The default value is 1.

5.1.2.3.9.2. ***index***[3] { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of subsurface. The default value is 1.

5.1.2.3.9.3. ***type*** {xsd:string} : Specifies the type of variable measured for subsurface. Example values include "temperature", "moisture" and "average-temperature". See Table E-18: Valid types for pavement-forecast subsurface.

5.1.2.3.9.4. ***sensor-depth*** {xsd:nonNegativeInteger}: Defines the depth where the measure was taken. The depth will be measured in centimeters.

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[3] Subsurface index is also associated to a puck. For instance, index 1 represents the subsurface value from puck 1.

5.1.2.3.9.5. ***units*** {cm:unitType}[?]: Defines the units of the subsurface value. Example values include “degC”, “degF” and “K”. The default value is “degC”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.9.6. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.9.7. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.9.8. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.9.9. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.9.10. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.9.11. **<value>** {xsd:anyType} [+]: The subsurface value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.9.12. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.10. **<air-quality>** {cm:airQualityType} [*]: Container for the air quality values .

5.1.2.3.10.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of air-quality. The default value is 1.

5.1.2.3.10.2. ***type*** {xsd:string}: Specifies the type of variable measured for air quality. Example values include “carbon-monoxide”, “carbon-dioxide” and “ozone”. See Table E-6: Valid types for pavement-forecast air-quality.

5.1.2.3.10.3. ***height*** {xsd:nonNegativeInteger}[?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.10.4. ***units*** {cm:unitType}[?]: Defines the units of the air quality value. Example values include “ppm” and “ppb”. The default value is “ppb”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.10.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a

conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.10.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.10.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.10.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.10.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.10.10. **<value>** {xsd:anyType} [+]: The air quality value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.10.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.11. **<physical-status>** {cm:physicalStatusType} [*]: Container for the physical status values .

5.1.2.3.11.1. ***type*** {xsd:string}: Specifies the type of variable measured for physical status. Example values include “door-open” and “battery-minimum-voltage”. See Table E-13: Valid types for pavement-forecast physical-status.

5.1.2.3.11.2. ***units*** {cm:unitType}[?]: Defines the units of the physical status value. Example values include “V” and “bitmap”. The default value is “V”. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.11.3. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.11.4. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.11.5. **<value>** {xsd:anyType} [+]: The physical status value. Missing values are represented by an empty element and xsi:nil=”true” .

5.1.2.3.11.6. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.11.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.11.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.11.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.12. **<humidity>** {cm:humidityType} [?]: Container for humidity values .

5.1.2.3.12.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of humidity. The default value is 1.

5.1.2.3.12.2. ***type*** {xsd:string}: Specifies the type of variable measured for humidity. Examples values include “relative-humidity” and “average-relative-humidity”. See Table E-9: Valid types for pavement-forecast humidity.

5.1.2.3.12.3. ***height*** {xsd:nonNegativeInteger} [?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.12.4. ***units*** {cm:unitType}[?]: Defines the units of the humidity values. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.12.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.12.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.12.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.12.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.12.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.12.10. **<value>** {xsd:anyType} [+]: The humidity value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.12.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.13. **<snow>** {cm:snowType} [?]: Container for snow values .

5.1.2.3.13.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of snow. The default value is 1.

5.1.2.3.13.2. ***type*** {xsd:string}: Specifies the type of variable measured for snow. See Table E-17: Valid types for pavement-forecast snow

5.1.2.3.13.3. ***height*** {xsd:nonNegativeInteger} [?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.13.4. ***units*** {cm:unitType}[?]: Defines the units of the snow values. Example values include “cm” and “mm”. The default value is “cm”.

5.1.2.3.13.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.13.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.13.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.13.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.13.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.13.10. **<value>** {xsd:anyType} [+]: The snow value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.13.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.14. **<weather>** {cm:weatherType} [?]: Container for weather values .

5.1.2.3.14.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of weather. The default value is 1.

5.1.2.3.14.2. ***type*** {xsd:string}: Specifies the type of variable measured for weather. See Table E-25: Valid types for pavement-forecast weather.

5.1.2.3.14.3. ***height*** {xsd:nonNegativeInteger} [?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.14.4. ***units*** {cm:unitType}[?]: Defines the units of the weather values. The default value is "%". See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.14.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.14.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.14.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.14.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.14.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.14.10. **<value>** {xsd:anyType} [+]: The weather value. Missing values are represented by an empty element and xsi:nil="true".

5.1.2.3.14.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.1.2.3.15. **<extension>** {cm:extensionType} [*]: Container for any type of values.

5.1.2.3.15.1. ***index*** { xsd:nonNegativeInteger } [?]: Specifies the index for a same type of extension. The default value is 1.

5.1.2.3.15.2. ***type*** {xsd:string}: Specifies the type of variable measured for extension.

5.1.2.3.15.3. ***height*** {xsd:nonNegativeInteger} [?]: Defines the height where values was measured. The height unit is centimeters.

5.1.2.3.15.4. ***units*** {cm:unitType}[?]: Defines the units of the extension values. See Table E-22: Valid pavement-forecast unit types.

5.1.2.3.15.5. ***categorical-code*** {xsd:string}[?]: Defines the name of the code that represent the values. This code can be used to do the mapping with a

conversion table that defines the meaning of each possible value that is already known by the requester.

5.1.2.3.15.6. ***time-layout*** {cm:time-layoutType}: see section 6.3.

5.1.2.3.15.7. ***categorical-table*** {cm:categorical-tableType} [?]: Foreign key to a list of categories that define the meaning of the value .

5.1.2.3.15.8. ***conversion-table*** {cm:conversion-tableType} [?]: Foreign key to a list of conversions tables that provide a equivalent value for the data .

5.1.2.3.15.9. ***sampling-table*** {cm:sampling-tableType} [?]: Foreign key to a list of sampling tables that provide precision for the data and how it was acquired.

5.1.2.3.15.10. **<value>** {xsd:anyType} [+]: The extension value. Missing values are represented by an empty element and xsi:nil=”true”.

5.1.2.3.15.11. **<name>** {xsd:string} [?]: The name of this parameter. The name value can be used for display purposes.

5.2. **<observation-series>** {cm:observation-seriesType}[*]: Defines a series of observations for a location.

5.2.1. **<origin>** {cm:originType} : The originator of the observation.

5.2.1.1. ***type***{cm:origintypeType}: What type of originator. Example values include “station” and “region”.

5.2.1.2. **<id>** {cm:identifierType}[+] : A key that uniquely identifies the originator

5.2.1.2.1. ***type*** {cm:identifiertypeType}: What type of identifier. Example values include “client” and “network”.

5.2.2. **<location>** {cm:locationType}[?] : The location where the observation is being taken. This is an optional element that is included when the location of an observation changes from one observation to the next. Examples include mobile stations, or ad-hoc regions.

5.2.2.1. **<point>** : see section 6.1..

5.2.2.2. **<area>** {cm:areaType} [?]: A geometrical shape may be used to define which grid points the data represents. The element must contain exactly one of its child elements.

5.2.2.2.1. **<circle>** {cm:circleType} [?]: A circular area about a grid point. The area can contain any number of grid points which are summarized.

5.2.2.2.1.1. **<point>**: see section 6.1..

5.2.2.2.1.2. **<radius>** {cm:radiusType}: The distance from the center point of the circle to edge of the circular area.

5.2.2.2.1.3. ***radius-units*** {cm:radius-unitsType}: The units of the radius measurement. Example values include “statute-miles” and “kilometers”.

5.2.2.2.2. **<rectangle>** {cm:rectangleType} [?]: A rectangular area is defined by two latitude and longitude pairs. These pairs form a diagonal from which a rectangle can be consistently constructed. The area can contain any number of grid points which are summarized.

5.2.2.2.2.1. **<point>** see section 6.1.

5.2.2.2.2.2. **<point>** see section 6.1.

5.2.2.2.3. **<polygon>**{cm:polygonType} [?]: A polygon area which is defined by three or more latitude and longitude pairs. The area can contain any number of grid points which are summarized.

5.2.2.2.3.1. **<point>** see section 6.1.

5.2.2.2.3.2. **<point>** see section 6.1.

5.2.2.2.3.3. **<point>** see section 6.1.

5.2.2.3. **<route>** {cm:linestringType} [?] : A linear road network which is defined by two or more latitude and longitude pairs.

5.2.2.3.1. **<point>** see section 6.1.

5.2.2.3.2. **<point>** see section 6.1.

5.2.3. **<observation>** {cm:observationType}[+] : Holds the environmental data. At least one child element must exist.

5.2.3.1. ***valid-time*** {xsd:dateTime}: The date, time, and timezone of the observation.

5.2.3.2. **<pressure>** {cm:pressureObsType}[*]: Container for pressure measurements

5.2.3.2.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of pressure

5.2.3.2.2. ***type*** {cm:pressureTypeType}: The type of pressure measurement the pressure node is describing.

5.2.3.2.3. **<qualifier>** see section 6.4

5.2.3.2.4. **<value>** see section 6.5

5.2.3.2.5. **<qc>** see section 6.6

5.2.3.3. **<wind>** {cm:windObsType}[*]: Container for wind measurements

5.2.3.3.1.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of wind

5.2.3.3.1.2. ***type***{cm:windTypeType}: The type of wind measurement the wind node is describing.

5.2.3.3.2. **<qualifier>** see section 6.4

5.2.3.3.3. **<value>** see section 6.5

5.2.3.3.4. **<qc>** see section 6.6

5.2.3.4. **<temperature>**{cm:temperatureObsType}[*]: Container for temperature measurements

5.2.3.4.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of temperature

5.2.3.4.2. ***type*** {cm:temperatureTypeType}: The type of temperature measurement the temperature node is describing.

5.2.3.4.3. **<qualifier>** see section 6.4

5.2.3.4.4. **<value>** see section 6.5

5.2.3.4.5. **<qc>** see section 6.6

5.2.3.5. **<precipitation>**{cm:precipitationObsType}[*]: Container for precipitation measurements

5.2.3.5.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of precipitation

5.2.3.5.2. ***type*** {cm:precipitationTypeType}: The type of precipitation measurement the precipitation node is describing.

5.2.3.5.3. **<qualifier>** see section 6.4

5.2.3.5.4. **<value>** see section 6.5

5.2.3.5.5. **<qc>** see section 6.6

5.2.3.6. **<radiation>**{cm:radiationObsType}[*]: Container for radiation measurements

5.2.3.6.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of radiation

5.2.3.6.2. ***type*** {cm:radiationTypeType}: The type of radiation measurement the radiation node is describing.

5.2.3.6.3. <qualifier> see section 6.4

5.2.3.6.4. <value> see section 6.5

5.2.3.6.5. <qc> see section 6.6

5.2.3.7. **<visibility>**{cm:visibilityObsType}[*]: Container for visibility measurements

5.2.3.7.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of visibility

5.2.3.7.2. ***type*** {cm:visibilityTypeType}: The type of visibility measurement the visibility node is describing.

5.2.3.7.3. <qualifier> see section 6.4

5.2.3.7.4. <value> see section 6.5

5.2.3.7.5. <qc> see section 6.6

5.2.3.8. **<pavement>**{cm:pavementObsType}[*]: Container for pavement measurements

5.2.3.8.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of pavement

5.2.3.8.2. ***type*** {cm:pavementTypeType}: The type of pavement measurement the pavement node is describing.

5.2.3.8.3. <qualifier> see section 6.4

5.2.3.8.4. <value> see section 6.5

5.2.3.8.5. <qc> see section 6.6

5.2.3.9. **<subsurface>**{cm:subsurfaceObsType}[*]: Container for subsurface measurements

5.2.3.9.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of subsurface

5.2.3.9.2. ***type*** {cm:subsurfaceTypeType}: The type of subsurface measurement the subsurface node is describing.

5.2.3.9.3. <qualifier> see section 6.4

5.2.3.9.4. <value> see section 6.5

5.2.3.9.5. <qc> see section 6.6

5.2.3.10. **<air-quality>** {cm:air-qualityObsType}[*]: Container for air-quality measurements

5.2.3.10.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of air-quality

5.2.3.10.2. ***type*** {cm:air-qualityTypeType}: The type of air-quality measurement the air-quality node is describing.

5.2.3.10.3. <qualifier> see section 6.4

5.2.3.10.4. <value> see section 6.5

5.2.3.10.5. <qc> see section 6.6

5.2.3.11. **<physical-status>**{cm:physical-statusObsType}[*]: Container for physical-status measurements

5.2.3.11.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of physical-status

5.2.3.11.2. ***type*** {cm:physical-statusTypeType}: The type of physical-status measurement the physical-status node is describing.

5.2.3.11.3. <qualifier> see section 6.4

5.2.3.11.4. <value> see section 6.5

5.2.3.11.5. <qc> see section 6.6

5.2.3.12. **<humidity>**{cm:humidityObsType}[*]: Container for humidity measurements

5.2.3.12.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of humidity

5.2.3.12.2. ***type*** {cm:humidityTypeType}: The type of humidity measurement the humidity node is describing.

5.2.3.12.3. **<qualifier>** see section 6.4

5.2.3.12.4. **<value>** see section 6.5

5.2.3.12.5. **<qc>** see section 6.6

5.2.3.13. **<weather>** {cm:weatherObsType}[*]: Container for weather measurements

5.2.3.13.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of weather

5.2.3.13.2. ***type*** {cm:weatherTypeType}: The type of weather measurement the weather node is describing.

5.2.3.13.3. **<qualifier>** see section 6.4

5.2.3.13.4. **<value>** see section 6.5

5.2.3.13.5. **<qc>** see section 6.6

5.2.3.14. **<snow>** {cm:snowObsType}[*]: Container for snow measurements

5.2.3.14.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of snow

5.2.3.14.2. ***type*** {cm:snowTypeType}: The type of snow measurement the snow node is describing.

5.2.3.14.3. **<qualifier>** see section 6.4

5.2.3.14.4. **<value>** see section 6.5

5.2.3.14.5. **<qc>** see section 6.6

5.2.3.15. **<snapshot-camera>** {cm:snapshot-cameraObsType}[*]: Container for snapshot-camera measurements

5.2.3.15.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of snapshot-camera

5.2.3.15.2. ***type*** {cm:snapshot-cameraTypeType}: The type of snapshot-camera measurement the snapshot-camera node is describing.

5.2.3.15.3. **<qualifier>** see section 6.4

5.2.3.15.4. **<value>** see section 6.5

5.2.3.15.5. **<qc>** see section 6.6

5.2.3.16. **<extension>** {cm:extensionObsType}[*]: Container for extension measurements

5.2.3.16.1. ***index*** {xsd:nonNegativeInteger}: Specifies the index for a same type of extension

5.2.3.16.2. **<qualifier>** see section 6.4

5.2.3.16.3. **<value>** see section 6.5

5.2.3.16.4. **<qc>** see section 6.6

5.3. **<metadata>** {cm:metadataType}[*]: Contains metadata.

5.3.1. **<location>** {cm:location-metadataType} [?] Metadata information about a specific location.

5.3.1.1. ***type*** {cm:origintypeType} What type of location. Example values include "station" and "region"

5.3.1.2. **<id>** {cm:identifierType}[+] : A key that uniquely identifies the location

5.3.1.2.1. ***type*** {cm:identifiertypeType}: What type of identifier. Example values include "client" and "network".

5.3.1.3. **<region-metadata>** {cm:region-metadataType} [?] Metadata information about a region.

5.3.1.3.1. **<name>** {xsd:string} [?] A unique identifier for this location assigned by the client.

5.3.1.3.2. **<description>** {xsd:string} [?] A text description of this location that includes any relevant details that cannot be further specified in the CMML metadata.

5.3.1.3.3. **<city>** {xsd:string} [?] The city that contains or administers this location. Omit if not applicable.

5.3.1.3.4. **<country>** {cm:ISO-country-codeType} [?] Species the two-letter ISO country code for the country that contains this location.

5.3.1.3.5. **<province>** {cm:CA-province-codeType} [?] If the location is within Canada, this specifies the two-letter identifier code for the associated province or territory.

5.3.1.3.6. **<state>** {cm:US-state-codeType} [?] If the location is within the USA, this specifies the two-letter identifier code for the associated state or possession.

5.3.1.3.7. **<climatic-zone>** {xsd:string} [?] Specifies the climatic zone of this location, if available.

5.3.1.3.8. **<district>** {xsd:string} [?] Specifies the district that contains this location for those clients that group locations in that manner.

5.3.1.3.9. **<timezone>** {cm:timezoneType} [?] Specifies the time zone and time zone offset at this location.

5.3.1.3.10. <data-owner> {cm:contactType} [?] A reference to the contact that is responsible for distribution and dissemination of this locations data. See section 6.7

5.3.1.3.11. **<area>** {cm:areaType} [?] A region may represent a geographical area. This is represented in CMML by a closed polygon. Locations inside this polygon belong to the specified area.

5.3.1.3.12. **<route>** {cm:linestringType} [?] A region may represent a route along some path. This is represented in CMML by an open polygon. Locations on the line formed by the polygon belong to the specified route.

5.3.1.4. <station-metadata> {cm:station-metadataType} [?] Metadata information about a station. At least one child instrument must be present in a <station-metadata> element.

5.3.1.4.1. **<name>** {xsd:string} A unique identifier for this location assigned by the client.

5.3.1.4.2. **<description>** {xsd:string} A text description of this location that includes any relevant details that are cannot be further specified in the CMML metadata.

5.3.1.4.3. **<city>** {xsd:string} [?] The city that contains or administers this location. Omit if not applicable.

5.3.1.4.4. **<country>** {cm:ISO-country-codeType} Species the two-letter ISO country code for the country that contains this location.

5.3.1.4.5. **<province>** {cm:CA-province-codeType} If the location is within Canada, this specifies the two-letter identifier code for the associated province or territory. It should be noted that <state> or <province> must be present in a <station-metadata> element but not both. They are mutually exclusive.

5.3.1.4.6. **<state>** {cm:US-state-codeType} If the location is within the USA, this specifies the two-letter identifier code for the associated state or possession. It should be noted that <state> or <province> must be present in a <station-metadata> element but not both. They are mutually exclusive.

5.3.1.4.7. **<climatic-zone>** {xsd:string} [?] Specifies the climatic zone of this location, if available.

5.3.1.4.8. **<district>** {xsd:string} [?] Specifies the district that contains this location for those clients that group locations in that manner.

5.3.1.4.9. **<timezone>** {cm:timezoneType} Specifies the time zone and time zone offset at this location.

5.3.1.4.10. <data-owner> {cm:contactType} A reference to the organization that owns the rights to the data. SEE SECTION 6.7

5.3.1.4.11. **<point>** {cm:pointType} [?] A station is located at a specific geographic point. This includes the latitude, longitude and elevation of the station.

5.3.1.4.12. **<station-state>** {cm:stationStateType} Describes the state of the station. Examples include “active-operational”, “active-testing”, “inactive-uninstalled, “inactive-scheduled-maintenance”, and “inactive-unscheduled-maintenance”.

5.3.1.4.13. <category> {cm:station-categoryType} [?] Stations are categorized as “permanent”, “mobile”, or “transportable”.

5.3.1.4.14. <type> {cm:station-typeType} [?] Stations are either “automatic”, “staffed” of of “unknown” type.

5.3.1.4.15. **<installation-date>** {xsd:date} [?] The date when this station was installed at this location.

5.3.1.4.16. **<commission-date>** {xsd:date} [?] The date when this station was commissioned.

5.3.1.4.17. **<last-maintenance-date>** {xsd:date} [?] The date when this station was last maintained.

5.3.1.4.18. **<last-inspection-date>** {xsd:date} [?] The date when this station was last inspected.

5.3.1.4.19. <station-owner> {cm:contactType} [?] A reference to the contact that owns the station and associated equipment. See section 6.7

5.3.1.4.20. <station-maintainer> {cm:contactType} [?] A reference to the contact that is responsible for maintaining this station. See section 6.7

5.3.1.4.21. **<rpu>** {cm:rpuType} [?] Describes the station's Remote Processing Unit (RPU).

5.3.1.4.21.1. ***cmml-index*** {xsd:nonNegativeInteger} Because the RPU can return physical status information, it is treated as a sensor-bearing instrument. This requires a CMML index. Since a station can have no more than one RPU, this index should always have a value of "1". This is a required attribute to offer future flexibility

5.3.1.4.21.2. <equipment-information> {cm:equipment-informationType} [?] SEE SECTION 6.8

5.3.1.4.21.3. **<ip-address>** {cm:ip-addressType} [?] The IP address of the RPU, if it is connected to the internet.

5.3.1.4.21.4. **<phone-number>** {cm:phone-numberType} [?] The phone number of the RPU's internal modem, if available.

5.3.1.4.21.5. **<physical-status>** {cm:physical-statusSensType} [*] Describes which CMML physical status data the RPU can return.

5.3.1.4.21.5.1. ***type*** {cm:windTypeType} The type of measurement the physical status sensor measures.

5.3.1.4.21.5.2. **<description>** {xsd:string} [*] A text description of the sensor.

5.3.1.4.21.5.3. **<instrument-state>** {xsd:string} Current state of the sensor.

5.3.1.4.21.5.4. **<units>**{cm:unitType} [*] The unit of measurement the sensor is measured in.

5.3.1.4.21.5.5. **<accuracy>**{xsd:string} [*] The accuracy of the sensor

5.3.1.4.21.5.6. **<resolution>**{xsd:string} [*] The resolution of the sensor.

5.3.1.4.21.5.7. **<sampling-interval>**{xsd:string} [*] The time between each sample.

5.3.1.4.21.5.8. **<lower-range>** {xsd:decimal} [*] The smallest value of the sensor.

5.3.1.4.21.5.9. **<upper-range>**{xsd:decimal} [*] The largest value of the sensor.

5.3.1.4.22. **<reporting-frequency>** {xsd:string} [?] Describes in words how frequently this station reports data.

5.3.1.4.23. **<vegetation>** {cm:vegetationType} [*] Describes the type of vegetation present at the site.

5.3.1.4.23.1. **<type>** {xsd:string} [?] Describes the type of vegetation.

5.3.1.4.23.2. **<age>** {xsd:string} [?] Indicates the age of the vegetation

5.3.1.4.23.3. **<height>** {xsd:string} [?] Indicates the height of the vegetation

5.3.1.4.23.4. **<proximity>** {xsd:string} [?] Indicates the proximity of the vegetation to the station

5.3.1.4.23.5. **<direction>** {cm:direction-codeType} [?] Indicates the direction of the vegetation.

5.3.1.4.24. **<pressure-instrument>** {cm:pressure-instrumentType} [*] Describes the various pressure instruments associated with this station.

5.3.1.4.24.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.24.2. ***type***- {cm:pressureTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.24.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.24.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.24.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.24.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.24.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.24.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.24.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.24.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.24.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.24.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.24.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.24.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.24.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.24.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.24.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.24.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.24.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.24.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.24.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.24.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.24.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.24.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.24.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.24.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.24.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.24.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.24.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.24.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.24.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.24.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.24.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.24.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.24.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.24.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.24.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.24.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.24.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.24.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.24.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.24.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.24.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.24.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.24.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.24.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.24.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.24.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.24.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.25. **<wind-instrument>** {cm:wind-instrumentType} [*] Describes the various wind instruments associated with this station.

5.3.1.4.25.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.25.2. ***type***- {cm:windTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.25.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.25.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.25.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.25.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.25.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.25.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.25.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.25.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.25.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.25.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.25.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.25.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.25.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.25.16. **<last-maintenance-date>** {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.25.17. **<last-inspection-date>** {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.25.18. **<calibration-history>** {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.25.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.25.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.25.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.25.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.25.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.25.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.25.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.25.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.25.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.25.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.25.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.25.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.25.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.25.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.25.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.25.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.25.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.25.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.25.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.25.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.25.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.25.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.25.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.25.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.25.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.25.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.25.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.25.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.25.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.25.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.25.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.26. **<temperature-instrument>** {cm:temperature-instrumentType} [*] Describes the various temperature instruments associated with this station.

5.3.1.4.26.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.26.2. ***type***- {cm:temperatureTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.26.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.26.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.26.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.26.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.26.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.26.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.26.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.26.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.26.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.26.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.26.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.26.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.26.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.26.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.26.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.26.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.26.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.26.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.26.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.26.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.26.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.26.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.26.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.26.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.26.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.26.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.26.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.26.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.26.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.26.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.26.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.26.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.26.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.26.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.26.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.26.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.26.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.26.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.26.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.26.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.26.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.26.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.26.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.26.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.26.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.26.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.26.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.27. **<precipitation-instrument>** {cm:precipitation-instrumentType} [*] Describes the various precipitation instruments associated with this station.

5.3.1.4.27.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.27.2. ***type***- {cm:precipitationTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.27.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.27.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.27.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.27.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.27.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.27.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.27.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.27.10. <upper-range>{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.27.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.27.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.27.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.27.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.27.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.27.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.27.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.27.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.27.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.27.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.27.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.27.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.27.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.27.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.27.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.27.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.27.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.27.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.27.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.27.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.27.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.27.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.27.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.27.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.27.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.27.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.27.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.27.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.27.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.27.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.27.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.27.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.27.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.27.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.27.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.27.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.27.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.27.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.27.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.28. **<radiation-instrument>** {cm:radiation-instrumentType} [*] Describes the various radiation instruments associated with this station.

5.3.1.4.28.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.28.2. ***type***- {cm:radiationTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.28.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.28.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.28.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.28.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.28.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.28.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.28.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.28.10. <upper-range>{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.28.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.28.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.28.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.28.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.28.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.28.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.28.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.28.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.28.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.28.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.28.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.28.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.28.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.28.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.28.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.28.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.28.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.28.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.28.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.28.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.28.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.28.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.28.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.28.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.28.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.28.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.28.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.28.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.28.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.28.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.28.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.28.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.28.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.28.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.28.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.28.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.28.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.28.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.28.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.29. **<visibility-instrument>** {cm:visibility-instrumentType} [*] Describes the various visibility instruments associated with this station.

5.3.1.4.29.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.29.2. ***type***- {cm:visibilityTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.29.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.29.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include "active-operational", "active-not-reporting", "inactive-suppressed", and "inactive-unscheduled-maintenance".

5.3.1.4.29.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.29.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.29.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.29.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.29.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.29.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.29.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.29.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.29.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.29.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.29.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.29.16. **<last-maintenance-date>** {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.29.17. **<last-inspection-date>** {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.29.18. **<calibration-history>** {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.29.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.29.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.29.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.29.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.29.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.29.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.29.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.29.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.29.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.29.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.29.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.29.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.29.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.29.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.29.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.29.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.29.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.29.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.29.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.29.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.29.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.29.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.29.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.29.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.29.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.29.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.29.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.29.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.29.21.2. ***end-date*** {xsd:gMonthDay} Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.29.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.29.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.30. **<pavement-instrument>** {cm:pavement-instrumentType} [*] Describes the various pavement instruments associated with this station.

5.3.1.4.30.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.30.2. ***type***- {cm:pavementTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.30.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.30.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.30.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.30.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.30.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.30.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.30.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.30.10. <upper-range>{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.30.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.30.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.30.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.30.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.30.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.30.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.30.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.30.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.30.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.30.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.30.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.30.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.30.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.30.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.30.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.30.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.30.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.30.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.30.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.30.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.30.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.30.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.30.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.30.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.30.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.30.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.30.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.30.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.30.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.30.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.30.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.30.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.30.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.30.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.30.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.30.21.1. ***start-date*** {xsd:gMonthDay} Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.30.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.30.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.30.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.31. **<subsurface-instrument>** {cm:subsurface-instrumentType} [*] Describes the various subsurface instruments associated with this station.

5.3.1.4.31.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.31.2. ***type***- {cm:subsurfaceTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.31.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.31.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include "active-operational", "active-not-reporting", "inactive-suppressed", and "inactive-unscheduled-maintenance".

5.3.1.4.31.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.31.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.31.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.31.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.31.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.31.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.31.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.31.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.31.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.31.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.31.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.31.16. **<last-maintenance-date>** {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.31.17. **<last-inspection-date>** {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.31.18. **<calibration-history>** {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.31.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.31.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.31.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.31.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.31.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.31.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.31.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.31.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.31.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.31.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.31.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.31.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.31.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.31.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.31.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.31.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.31.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.31.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.31.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.31.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.31.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.31.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.31.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.31.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.31.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.31.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.31.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.31.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.31.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.31.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.31.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.32. **<air-quality-instrument>** {cm:air-quality-instrumentType} [*] Describes the various air-quality instruments associated with this station.

5.3.1.4.32.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.32.2. ***type***- {cm:air-qualityTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.32.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.32.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.32.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.32.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.32.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.32.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.32.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.32.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.32.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.32.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.32.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.32.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.32.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.32.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.32.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.32.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.32.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.32.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.32.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.32.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.32.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.32.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.32.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.32.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.32.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.32.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.32.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.32.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.32.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.32.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.32.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.32.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.32.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.32.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.32.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.32.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.32.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.32.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.32.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.32.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.32.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.32.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.32.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.32.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.32.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.32.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.32.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.33. **<humidity-instrument>** {cm:humidity-instrumentType} [*] Describes the various humidity instruments associated with this station.

5.3.1.4.33.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.33.2. ***type***- {cm:humidityTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.33.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.33.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include "active-operational", "active-not-reporting", "inactive-suppressed", and "inactive-unscheduled-maintenance".

5.3.1.4.33.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.33.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.33.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.33.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.33.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.33.10. <upper-range>{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.33.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.33.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.33.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.33.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.33.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.33.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.33.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.33.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.33.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.33.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.33.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.33.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.33.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.33.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.33.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.33.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.33.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.33.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.33.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.33.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.33.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.33.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.33.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.33.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.33.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.33.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.33.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.33.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.33.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.33.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.33.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.33.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.33.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.33.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.33.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.33.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.33.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.33.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.33.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.34. **<snow-instrument>** {cm:snow-instrumentType} [*] Describes the various snow instruments associated with this station.

5.3.1.4.34.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.34.2. ***type***- {cm:snowTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.34.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.34.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.34.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.34.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.34.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.34.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.34.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.34.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.34.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.34.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.34.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.34.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.34.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.34.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.34.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.34.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.34.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.34.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.34.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.34.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.34.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.34.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.34.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.34.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.34.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.34.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.34.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.34.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.34.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.34.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.34.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.34.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.34.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.34.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge’s construction. The list presently defined is not comprehensive.

5.3.1.4.34.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.34.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.34.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.34.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.34.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.34.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.34.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass’s construction. The list presently defined is not comprehensive.

5.3.1.4.34.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.34.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.34.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.34.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.34.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.34.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.35. **<weather-instrument>** {cm:weather-instrumentType} [*] Describes the various weather instruments associated with this station.

5.3.1.4.35.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.35.2. ***type***- {cm:weatherTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.35.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.35.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.35.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.35.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.35.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.35.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.35.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.35.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.35.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.35.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.35.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.35.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.35.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.35.16. **<last-maintenance-date>** {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.35.17. **<last-inspection-date>** {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.35.18. **<calibration-history>** {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.35.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.35.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.35.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.35.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.35.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.35.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is

embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.35.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.35.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.35.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.35.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.35.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.35.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.35.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.35.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.35.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.35.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.35.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.35.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge’s construction. The list presently defined is not comprehensive.

5.3.1.4.35.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.35.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.35.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.35.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.35.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.35.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.35.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.35.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.35.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.35.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.35.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.35.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.35.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.36. **<snapshot-camera-instrument>** {cm:snapshot-camera-instrumentType} [*] Describes the various snapshot-camera instruments associated with this station.

5.3.1.4.36.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.36.2. ***type***- {cm:snapshot-cameraTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.36.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.36.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.36.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.36.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.36.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.36.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.36.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.36.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.36.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.36.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.36.13. **<equipment-information>** {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.36.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.36.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.36.16. **<last-maintenance-date>** {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.36.17. **<last-inspection-date>** {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.36.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.36.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.36.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.36.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.36.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.36.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.36.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.36.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.36.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.36.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.36.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.36.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.36.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: “cut” – lower than surrounding land, “fill” – built up relative to surrounding land, or “neutral”.

5.3.1.4.36.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.36.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.36.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.36.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.36.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.36.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.36.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.36.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.36.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.36.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.36.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.36.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.36.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.36.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.36.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.36.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.36.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.36.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.36.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.1.4.37. **<extension-instrument>** {cm:extension-instrumentType} [*] Describes the various extension instruments associated with this station.

5.3.1.4.37.1. ***cmml-index***- {xsd:nonNegativeInteger} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.37.2. ***sensor-name***- {cm:extensionTypeType} The CMML index is used to distinguish measurements returned by different instruments. This is a required attribute.

5.3.1.4.37.3. **<description>** {xsd:string} [?] Describes the instrument in detail, including any details deemed relevant by the client that are not captured elsewhere in the CMML metadata.

5.3.1.4.37.4. **<instrument-state>** {cm:instrumentStateType} Describes the state of the instrument. Examples include “active-operational”, “active-not-reporting”, “inactive-suppressed”, and “inactive-unscheduled-maintenance”.

5.3.1.4.37.5. **<units>**{cm:unitType} [?] The unit of measurement the sensor is measured in.

5.3.1.4.37.6. **<accuracy>**{xsd:string} [?] The accuracy of the sensor

5.3.1.4.37.7. **<resolution>**{xsd:string} [?] The resolution of the sensor.

5.3.1.4.37.8. **<sampling-interval>**{xsd:string} [?] The time between each sample.

5.3.1.4.37.9. **<lower-range>** {xsd:decimal} [?] The smallest value of the sensor.

5.3.1.4.37.10. **<upper-range>**{xsd:decimal} [?] The largest value of the sensor.

5.3.1.4.37.11. **<instrument-id>** {xsd:string} [?] A client assigned identifier for this instrument. This should be sufficient to identify the instrument if the associated station is also known.

5.3.1.4.37.12. **<point>** {cm:pointType} [?] Specifies the location of an instrument when different than the location of station it is associated with. Omit if not required. see section 6.1.

5.3.1.4.37.13. <equipment-information> {cm:equipment-informationType} [?] see section 6.8

5.3.1.4.37.14. **<installation-date>** {xsd:date} [?] The date this instrument was installed in its current location.

5.3.1.4.37.15. **<commission-date>** {xsd:date} [?] The date this instrument was commissioned.

5.3.1.4.37.16. <last-maintenance-date> {xsd:date} [?] The date this instrument was last maintained.

5.3.1.4.37.17. <last-inspection-date> {xsd:date} [?] The date this instrument was last inspected.

5.3.1.4.37.18. <calibration-history> {cm:calibration-historyType} [?] Describes when and how this instrument has been calibrated.

5.3.1.4.37.18.1. **<calibration>** {cm:calibrationType} [*] Each calibration event is recorded individually.

5.3.1.4.37.18.1.1. ***date*** {xsd:time} The date when this calibration was performed. This is a required attribute.

5.3.1.4.37.18.1.2. **<calibrated-by>** {cm:contactType} A client assigned identifier for the person or organization responsible for this calibration.

5.3.1.4.37.18.1.3. **<comment>** {cm:calibrationCommentType} [*] Any relevant details pertaining to this calibration.

5.3.1.4.37.19. **<lane-number>** {xsd:string} [?] A text description of the lane this instrument is located in. This should follow the standard used by the client.

5.3.1.4.37.20. **<road-construction>** {cm:road-constructionType} [?] Details the construction of the roadway in which a pavement or subsurface sensor is embedded. Omit for other sensors. Must contain exactly one of the following elements: <road>, <bridge>, or <overpass>.

5.3.1.4.37.20.1. **<road>** {cm:roadType} The default roadway type. Any roadway that is not a bridge or an overpass.

5.3.1.4.37.20.1.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.37.20.1.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.37.20.1.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.37.20.1.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.37.20.1.5. <earthwork> {cm:earthworkType} [?] How the road is situated relative to surrounding land. The valid results are: "cut" – lower than surrounding land, "fill" – built up relative to surrounding land, or "neutral".

5.3.1.4.37.20.2. **<bridge>** {cm:bridgeType} A bridge must be over water. For CMML metadata purposes, any other raised roadway will be considered an overpass.

5.3.1.4.37.20.2.1. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.37.20.2.2. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.37.20.2.3. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.37.20.2.4. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.37.20.2.5. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the bridge's construction. The list presently defined is not comprehensive.

5.3.1.4.37.20.2.6. **<water-surface-elevation>** {cm:elevationType} [?] The typical elevation of the water surface beneath the bridge.

5.3.1.4.37.20.3. **<overpass>** {cm:overpassType} Any elevated roadway that does not cross over water.

5.3.1.4.37.20.4. **<surface>** {cm:surfaceType} The type of material making up the road surface. The list presently defined is not comprehensive.

5.3.1.4.37.20.4.1. **<slope>** {cm:slopeType} [?] The angle, in degrees, that the road makes from the horizontal.

5.3.1.4.37.20.4.2. **<aspect>** {cm:aspectType} [?] The direction in which the slope faces at this location.

5.3.1.4.37.20.4.3. **<pavement-surface-elevation>** {cm:elevationType} [?] The elevation of the pavement surface.

5.3.1.4.37.20.4.4. **<material>** {cm:bridge-or-overpass-materialType} [?] The primary material used in the overpass's construction. The list presently defined is not comprehensive.

5.3.1.4.37.20.4.5. **<lower-roadway-elevation>** {cm:elevationType} [?] The elevation of the roadway or other surface immediately beneath the overpass.

5.3.1.4.37.21. **<shadowing>** {cm:shadowingType} [*] The times of day when this instrument will be in shadow at different times of the year.

5.3.1.4.37.21.1. ***start-date*** {xsd: gMonthDay } Specifies the first date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.37.21.2. ***end-date*** {xsd: gMonthDay } Specifies the last date at which this shadowing value is valid. This is a required attribute.

5.3.1.4.37.21.3. **<shadowing-starts>** {xsd:time} Specifies the time of day when the instrument is first overcome by shadows.

5.3.1.4.37.21.4. **<shadowing-ends>** {xsd:time} Specifies the time of day when the instrument ceases to be in continual shadow.

5.3.2. **<supplementary-metadata>** {cm:supplementary-metadataType} [?] Metadata to help further define the interpretation of observed data. At least one child element of either <conversion-definitions>, <categorical-definitions>, or <sampling-definitions> and one <data-owner> element must be present in a <supplementary-metadata> element.

5.3.2.1. **<data-owner>** {cm:contactType} A reference to the organization that owns the rights to the data. SEE SECTION 6.7

5.3.2.2. **<categorical-definitions>** {cm:categorical-DefinitionsType} [?] Contains the definitions of categories found in parameter value elements

5.3.2.2.1. **<categorical-table>** {cm:categorical-tableType} [+] Contains the categorical data.

5.3.2.2.1.1. ***category*** {xsd:string} The category corresponding to the value. This is a required attribute.

5.3.2.2.1.2. ***units*** {xsd:string} The units of the data in the categories. This is a required attribute.

5.3.2.2.1.3. **<categorical-key>** {xsd:string} The primary key relating the data in the parameter element to a particular categorical table.

5.3.2.2.1.4. **<value>** {cm:valueCategoryType} [+] The value found in the data.

5.3.2.3. **<conversion-definitions>** {cm:conversion-definitionsType} [?] Contains look-up tables used to relate numerical data to an equivalent value.

5.3.2.3.1. **<conversion-table>** {cm:conversion-tableType} [+] Holds the range of data associated with each equivalent value.

5.3.2.3.1.1. ***units*** {xsd:string} Specifies the units. This is a required attribute.

5.3.2.3.1.2. **<conversion-key>** The primary key relating the data in the parameter element to a particular conversion table.

5.3.2.3.1.3. **<start-value>** {xsd:anyType} The starting value of the range of data for which the value is equivalent.

5.3.2.3.1.4. **<end-value>** {xsd:anyType} The ending value of the range of data for which the value is equivalent.

5.3.2.3.1.5. **<equivalent-value>** {xsd:string} The equivalent value of the data.

5.3.2.4. **<sampling-definitions>** {cm:sampling-definitionsType} [?] Contains look-up tables used to qualify the values. N.B. : To obtain sampling period you must calculate the following equation: sampling-period = sampling-start + (number-of-samples * sample-interval)

5.3.2.4.1. **<sampling-table>** {cm:sampling-tableType} [+] Holds the range of data associated with each equivalent value

5.3.2.4.1.1. **<sampling-key>** The primary key relating the data in the parameter element to a particular sampling table.

5.3.2.4.1.2. **<sampling-interval>** {cm:sampling-intervalType} The interval between each sample. Must be a non-negative integer number.

5.3.2.4.1.2.1. ***units*** {xsd:string} Specifies the time units used to define the sampling interval.

5.3.2.4.1.3. **<number-of-samples>** {xsd:nonNegativeInteger} Specifies the number of samples in the sampling period.

5.3.2.4.1.4. **<sampling-start>** {xsd:nonNegativeInteger} Start of measure into the sampling period in the same units. Example: For a sampling period of 600seconds (10 minutes), if we only take sample from the last 2 minutes the value will be 480.

6. Common Element and Attribute Definitions :

6.1. **<point>** {cm:pointType} [?]: Element used to define the grid point for which the data is valid.

6.1.1. **<latitude>** {xsd:decimal}: The latitude of the point where the data is valid.

6.1.2. **<longitude>** {xsd:decimal}: The longitude of the point where the data is valid.

6.1.3. **<elevation>** {cm:elevationType}: The elevation of the point where the data is valid.

6.1.3.1. ***datum*** {cm:datumType} : A reference point for the elevation. See Table E-7: Valid pavement-forecast datum types.

6.1.3.2. ***units*** {cm:elevation-unitsType } : The units of measurement the elevation is in. See Table E-8: Valid pavement-forecast elevation-units types.

6.2. ***summarization*** {cm:summarizationType} [?]: See Table E-19: Valid pavement-forecast summarization types.

6.2.1. Type of Spatial Summarization: Collections of grid point values may be summarized into a single value. If this is done, the type of summarization will be provided (mean, median, mode, centroid value etc.).

6.2.2. Type of Temporal Summarization: A number of grid point values may be summarized for a given period of time. When this is done, the type of temporal summarization will be provided (period, hourly, 3 hourly, daily, etc.).

6.2.3. A value of “none” indicates that the values are valid at a single grid point or time.

6.3. ***time-layout*** {cm: time-layoutAttributeType}: Defines the key to the appropriate valid times and any relevant period name information.

6.4. **<qualifier>** {cm:qualifierType}[*]: Element used to hold optional values that describe the parent Element it belongs to.

6.4.1. ***type*** {cm:qualifiertypeType} : The type of qualifier. Example values include “height”, “name”, “lane-number”, “conversion-table”,”categorical-table”, “sensor-depth”, and “sampling-table”.

6.4.2. ***units*** {cm:unitType} : Indicates what unit of measurement the qualifier is in.

6.5. **<value>** {cm:valueType}: Element used to hold a single observed value

6.5.1. ***units*** {cm:unitType} : Indicates what unit of measurement the value is in.

6.6. **<qc>** {cm:qcType}[*]: Contains quality control elements

6.6.1. ***performer*** {xsd:string} : Who performed the quality control.

6.6.2. **<summary>** {cm:summaryType }: A summary of the most severe problem with the value observed.

6.6.3. **<qc-flag>** {cm:qc-flagType} [+]: Element used to define the quality control that was carried out on the value and the result of this one.

6.6.3.1. ***type*** {cm:qc-flagtypeType}: Specifies the type of quality control that this flag defines. Examples values include “range”, “temporal” and “inter-variable”.

6.6.3.2. ***value*** {cm:qc-flagvalueType}: The value resulting from the quality control. Examples values include “doubtful” and “inconsistency”.

6.6.3.3. ***associated-measurement-category*** {cm:measurement-categoryType} [?]: The parameter that is associated with the current measurement when quality control type is "inter-variable".

6.6.3.4. ***associated-measurement-type*** { cm:measurement-typeType } [?]: The parameter type that is associated with the current measurement types when quality control type is "inter-variable".

6.6.3.5. **<message>** {xsd:messageType} [+]: Element that contains the quality control message.

6.6.3.5.1. ***language*** {xsd:string} [?]: The language of the message. Examples values include “en”and “fr”. The default value is “en”.

6.7. **<contact>**{cm:contactType} A person or organization that can be contacted for additional information about certain designated areas of responsibility.

6.7.1. **<name>** {xsd:string} The name of the contact or contact organization.

6.7.2. **<address>** {xsd:string} [?] A mailing address for this contact.

6.7.3. **<phone-number>**{cm:phone-numberType} [?] A phone number where this contact can be reached.

6.7.4. **<email>** {cm:emailType} [?] An email address where this contact can be reached.

6.8. **<equipment-information>**{cm:equipmentType} Each significant piece of equipment associated with a station needs to have certain common values recorded, if they are available. Significant pieces of equipment include the RPU and all measuring instruments.

6.8.1. **<manufacturer>** {xsd:string} [?] Specifies the name of the manufacturer of this piece of equipment.

6.8.2. **<model-number>** {xsd:string} [?]Specifies the model number of this piece of equipment, if available.

6.8.3. **<serial-number>** {xsd:string} [?] Specifies the serial number of this piece of equipment, if available.

6.9. **<exception>**: An exception or local effect is defined as the occurrence of a weather element specific to a location/time inside a forecast region. The exception generally refers to a particular geographical location in the forecast region (Along the coast, Over higher terrain, Inland …). The exception statement is attached to the main weather element or it can stand alone if no main condition exist but some weather element is forecasted as an exception. The exception value will be kept constant for the duration of weather element to which it is related. Thus, exceptions will not be interpolated, they will have a constant value for a define duration. Main weather elements (not exceptions) can be interpolated. Only the following elements for meteocode-forecast can have exceptions: cloud, precipitation, temperature, wind, visibility and freezing spray. They are defined as {cm:scribe-cloud-cover-exceptionType}, {cm:scribe-precipitation-event-exceptionType}, {cm:scribe-temperature-value-exceptionType}, {cm:scribe-wind-exceptionType}, {cm:scribe-visibilty-exceptionType} and {cm:scribe-freezing-spray-exceptionType} respectively.

6.10. **<excep-category>** {cm:scribe-excep-categoryType}:

6.10.1. ***excep-type*** {cm:scribe-excep-typeType}: See Table E-28: Valid values for meteocode-forecast exception types.

6.10.2. ***excep-code*** {cm:scribe-excep-codeType}: See Table E-27: Valid values for meteocode-forecast exception codes.

6.10.3. **<excep-description>** {cm:scribe-excep-discriptionType}: Description of the exception.

6.10.3.1. ***lang*** {cm:scribe-langType}: Language. Values are “en” for English or “fr” for French.

7. XML Considerations .

7.1. Namespace: CMML will use the namespace http://www_todefine_com

7.2. **Schema:** CMML will use XML Schema to perform validity checking.

7.3. **Character Set:** CMML will use ISO-8859-1 encoding.

Appendix A Requirements

The Road Weather Information System for Canada (RWISC) is being implemented to provide a more efficient, sustainable and safer highway system. This is achieved by integrating a Canada-wide network of Environmental System Sensors (ESS) and instrumented vehicles which provide a continuous stream of observation data describing road conditions. Provincial Computer Centers acquire data from fixed and mobile ESS stations in real-time.

In order to facilitate this integration, a requirement was identified to develop a standard way of exchanging data between Canadian provincial servers and federal government servers. By leveraging standards, RWISC will be able to tie together disparate information from multiple heterogeneous systems nationally and facilitate information transfer between various agencies to support their needs.

After reviewing the strengths of NOAA's Digital Weather Markup Language (DWML) and the Road Web Markup Language (RWML) from Japan, it was decided to adopt DWML as the basis for a new XML schema standard to facilitate data exchange between diversified systems. DWML is not ideally suited for moving road weather information and it required major modifications. As a result, the Canadian Meteorological Markup Language (CMML) evolved.

CMML is an XML language for the encoding and transfer of weather and road weather data to standardize data transfer between RWIN and Provincial Computer Centers. The CMML specification is being written with enough flexibility to accommodate other environmental science and sensor applications. The CMML element definitions are based on the National Transportation Communications for ITS Protocol (NTCIP) Centre to Field standard (NTCIP 1204), and World Meteorological Organization (WMO) standards. By providing general flexibility and ease of maintenance, emphasis on industry standards minimizes development efforts and encourages interaction with other decision support systems.

Appendix B Meteocode-Forecast Requirements

The Storm Prediction Centers of Canada currently produce Canadian weather forecasts using the Scribe forecast product application. These forecasts are available in two formats. The first one is a text format to which all Canadian are used to. The second one is a digital format called meteocode in which all weather elements are described explicitly. In fact, the text format is generated from the digital format and constitute a generalization of the detailed weather elements suite contained in the digital format. The digital format has now been translated in XML format for the benefit of any user that would like to extract and format, partially or totally, any of the official Weather Elements forecasted by Environment Canada.

Appendix C Structure and Type Definitions

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weatherTypeType 124
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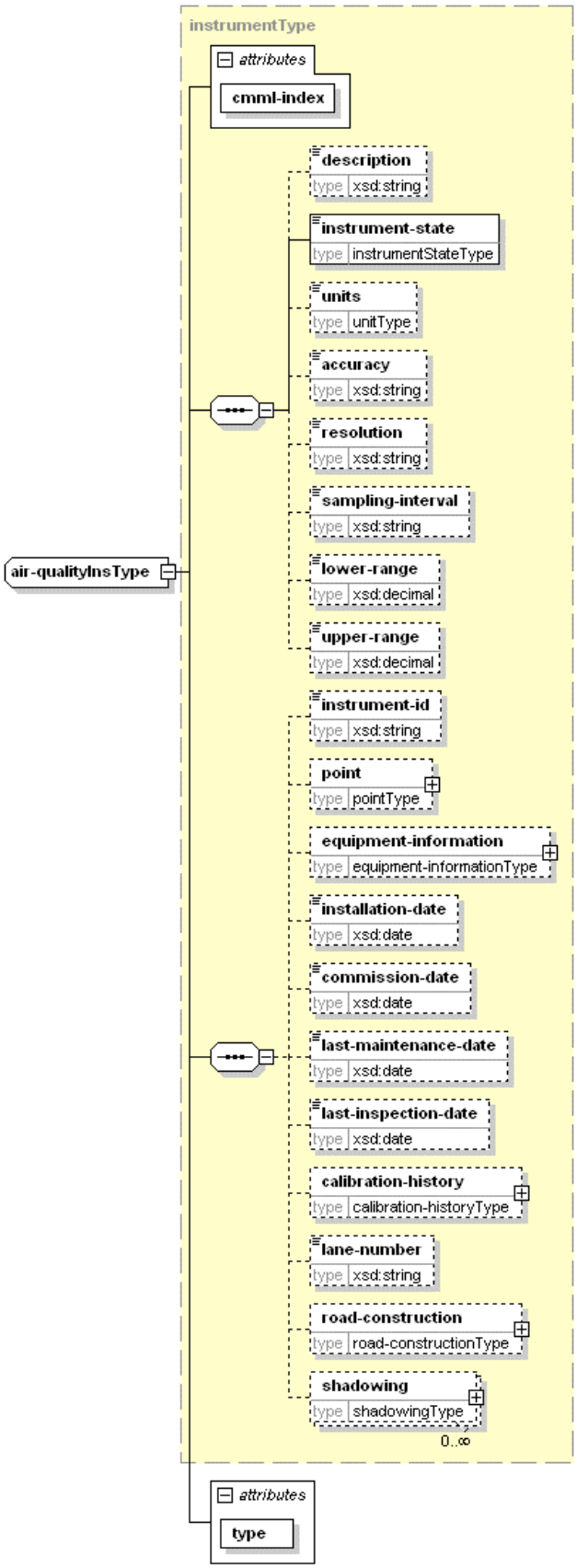
Complex Types

air-qualityInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
air-qualityInsType
attributes
type

type extension of instrumentType

properties base instrumentType

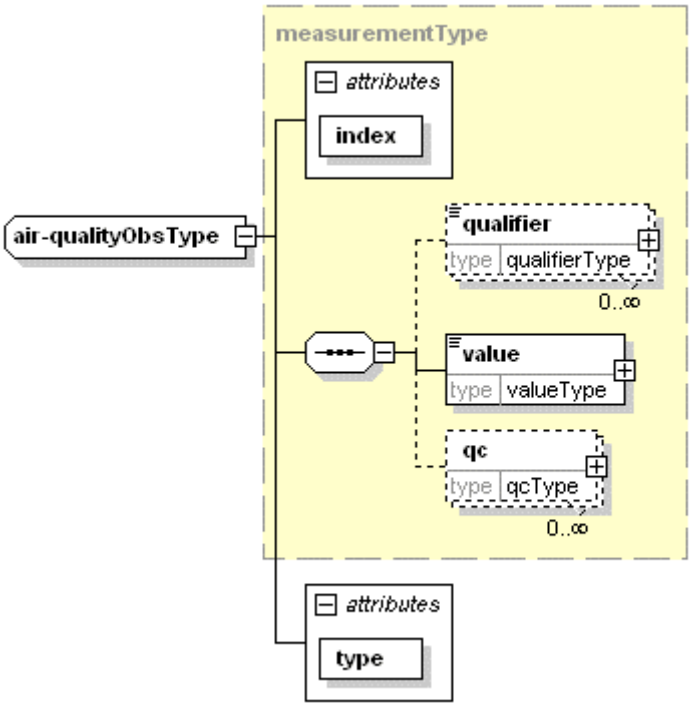
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-metadataType/air-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	air_	required		

air-qualityObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

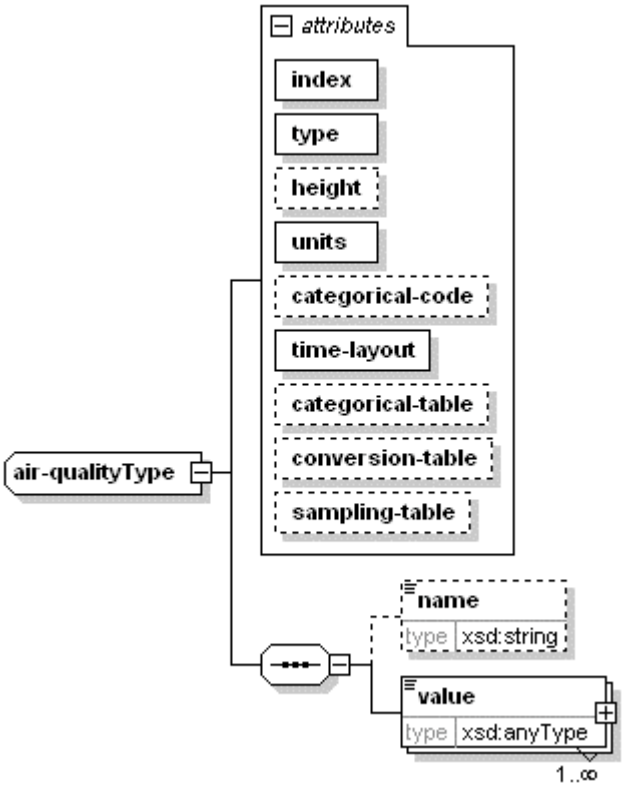
used by element observationType/air

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	air-	required		

air-qualityType

diagram



children [name](#) [value](#)

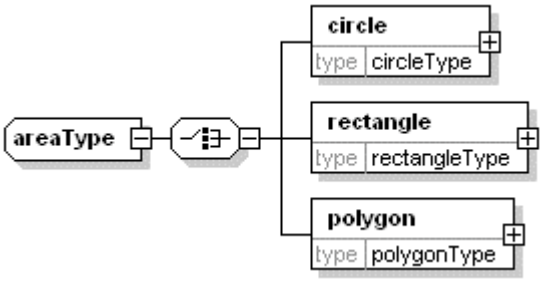
used by element parametersType/air

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	air-qualityTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time	required		

areaType

diagram

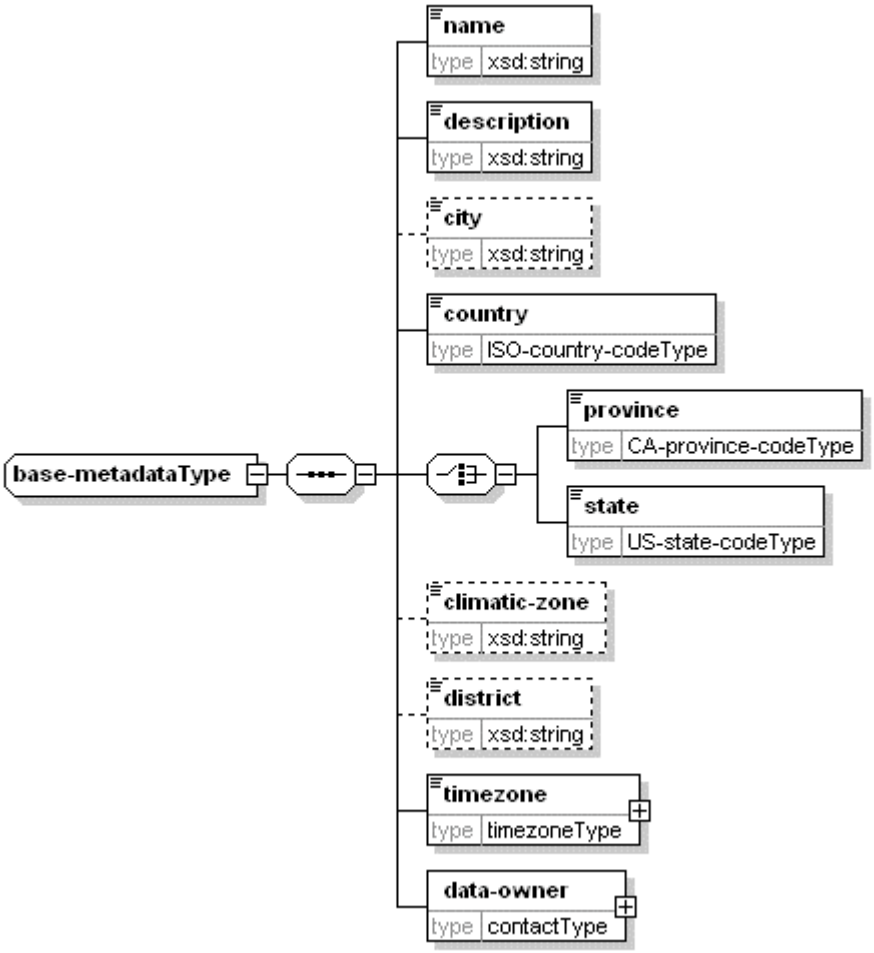


children circle rectangle polygon

used by elements locationType/area forecast-locationType/area

base-metadataType

diagram

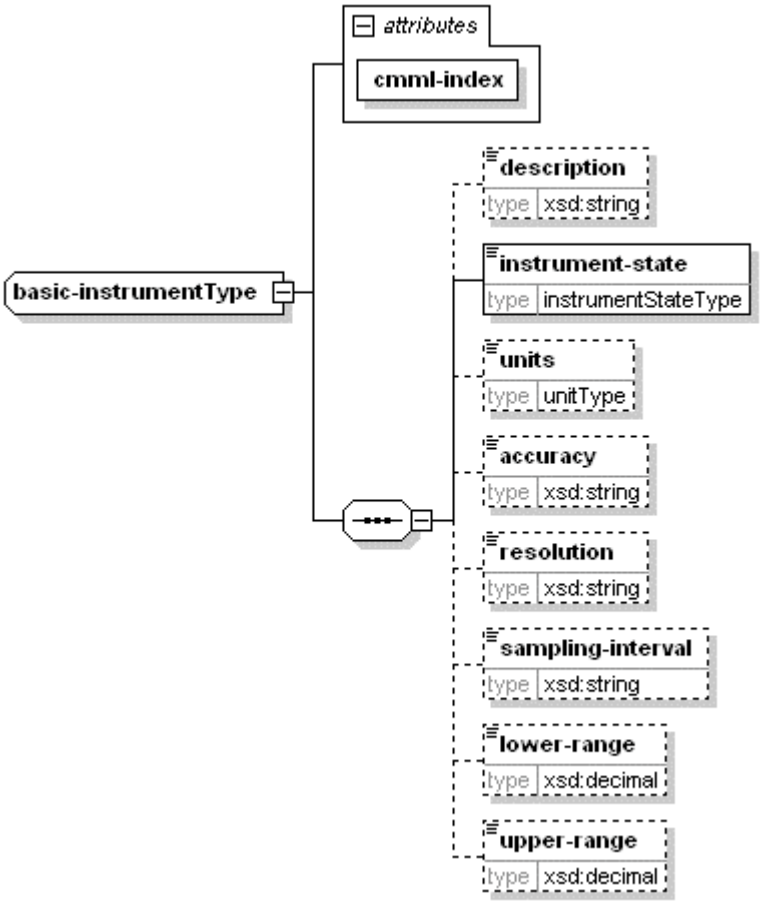


children name description city country province state climatic-zone district timezone data-owner

used by complexTypes region-metadataType station-

basic-instrumentType

diagram



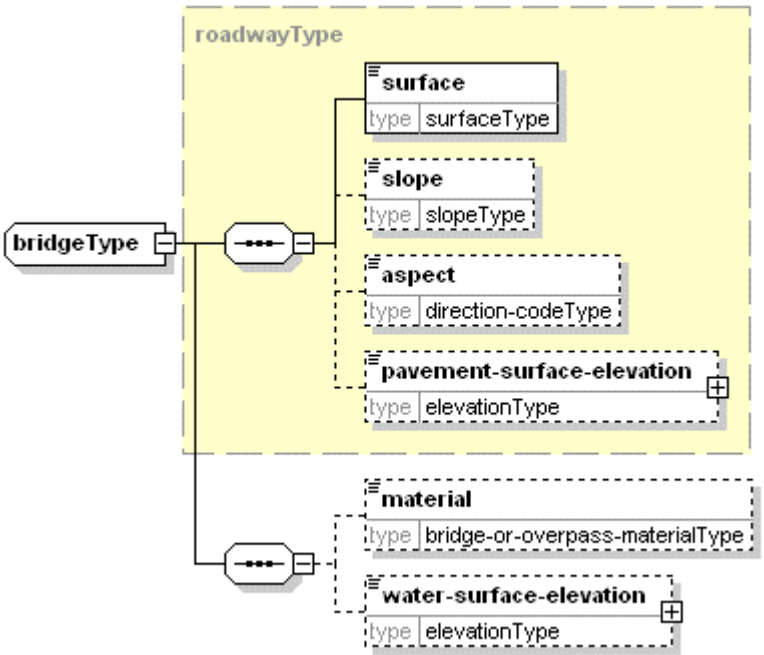
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range

used by complexTypes instrumentType physical-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		

bridgeType

diagram



type extension of roadwayType

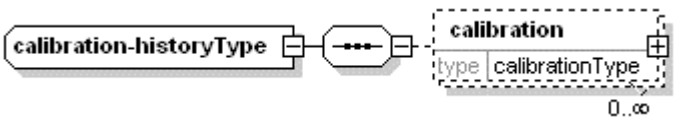
properties base roadwayType

children surface slope aspect pavement-surface-elevation material water-surface-elevation

used by element road-

calibration-historyType

diagram

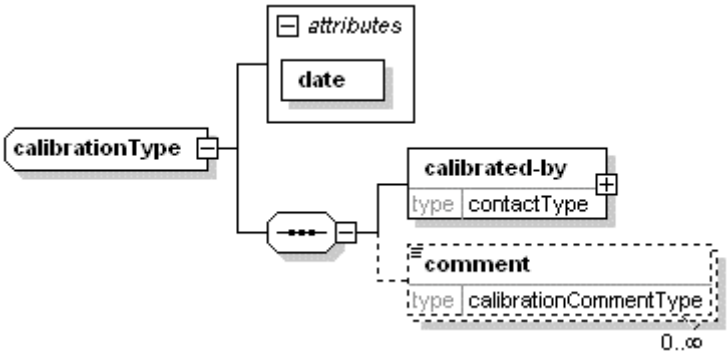


children calibration

used by element instrumentType/calibratio

calibrationType

diagram



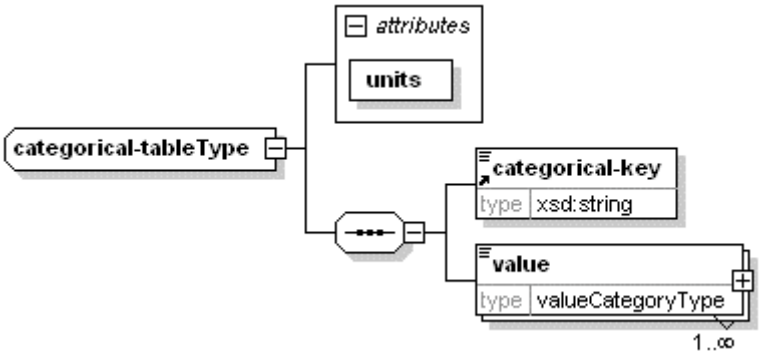
children calibrated-by comment

used by element calibration-

attributes	Name	Type	Use	Default	Fixed
	date	**xsd:date**	required		

categorical-tableType

diagram



children [categorical-key](#) [value](#)

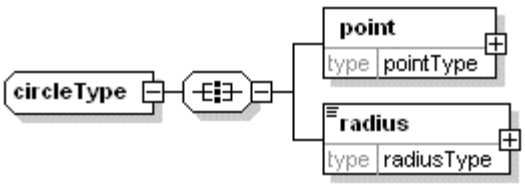
used by element supplementary-metadataType/categorical-

attributes

Name	Type	Use	Default	Fixed
units	unitType	required		

circleType

diagram

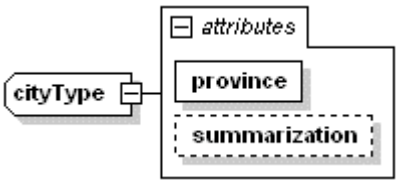


children [point](#) [radius](#)

used by element areaType/ci

cityType

diagram



type extension of **xsd:string**

properties base xsd:string

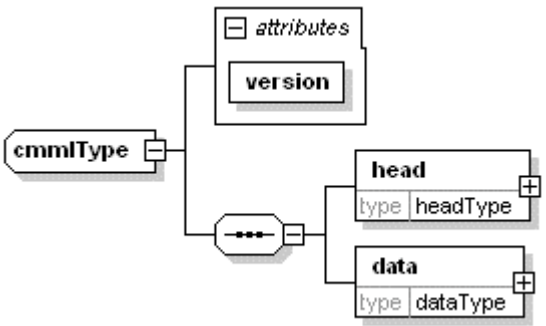
used by element forecast-

attributes

Name	Type	Use	Default	Fixed
province	provinceType	required		

cmmlType

diagram



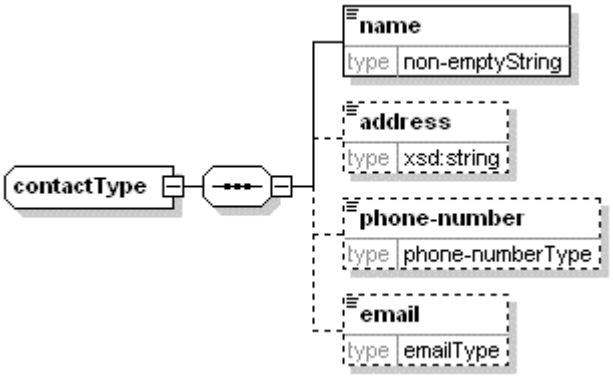
children head data

used by element cm

attributes	Name	Type	Use	Default	Fixed
	version	non-	required		

contactType

diagram

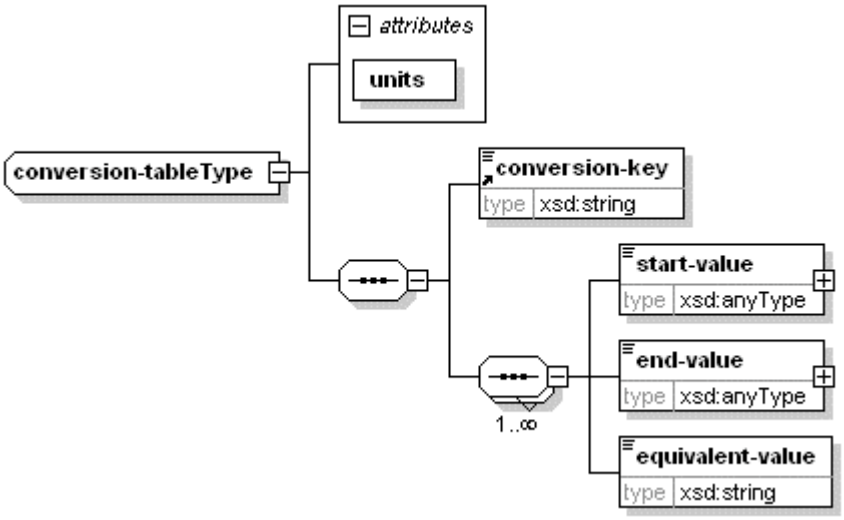


children name address phone-number email

used by elements calibrationType/calibrated-by supplementary-metadataType/data-owner

conversion-tableType

diagram



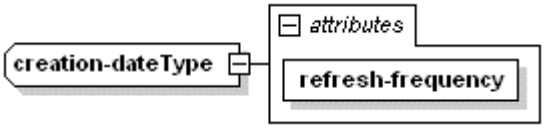
children conversion-key start-value end-value equivalent-value

used by element supplementary-metadataType/conversion-

attributes	Name	Type	Use	Default	Fixed
	units	unitType	required		

creation-dateType

diagram



type extension of **xsd:dateTime**

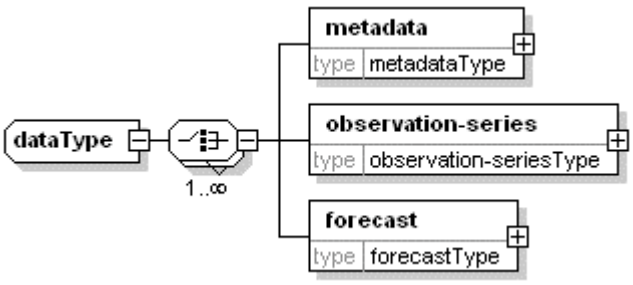
properties base xsd:dateTime

used by element productType/creati

attributes	Name	Type	Use	Default	Fixed
	refresh-frequency	**xsd:duration**	required		

dataType

diagram

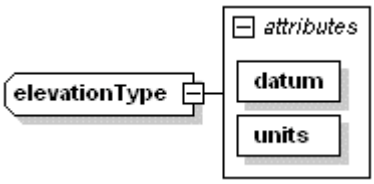


children metadata observation-series forecast

used by element cmmlType/

elevationType

diagram



type extension of **xsd:decimal**

properties base xsd:decimal

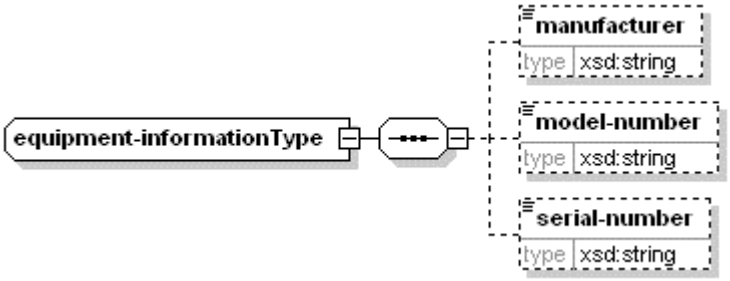
used by elements pointType/elevation overpassType/lower-roadway-elevation

attributes

Name	Type	Use	Default	Fixed
datum	datumType	required		
units		required		

equipment-informationType

diagram



children manufacturer model-number serial-number

used by elements rpuType/equipment-information

type extension of instrumentType

properties base instrumentType

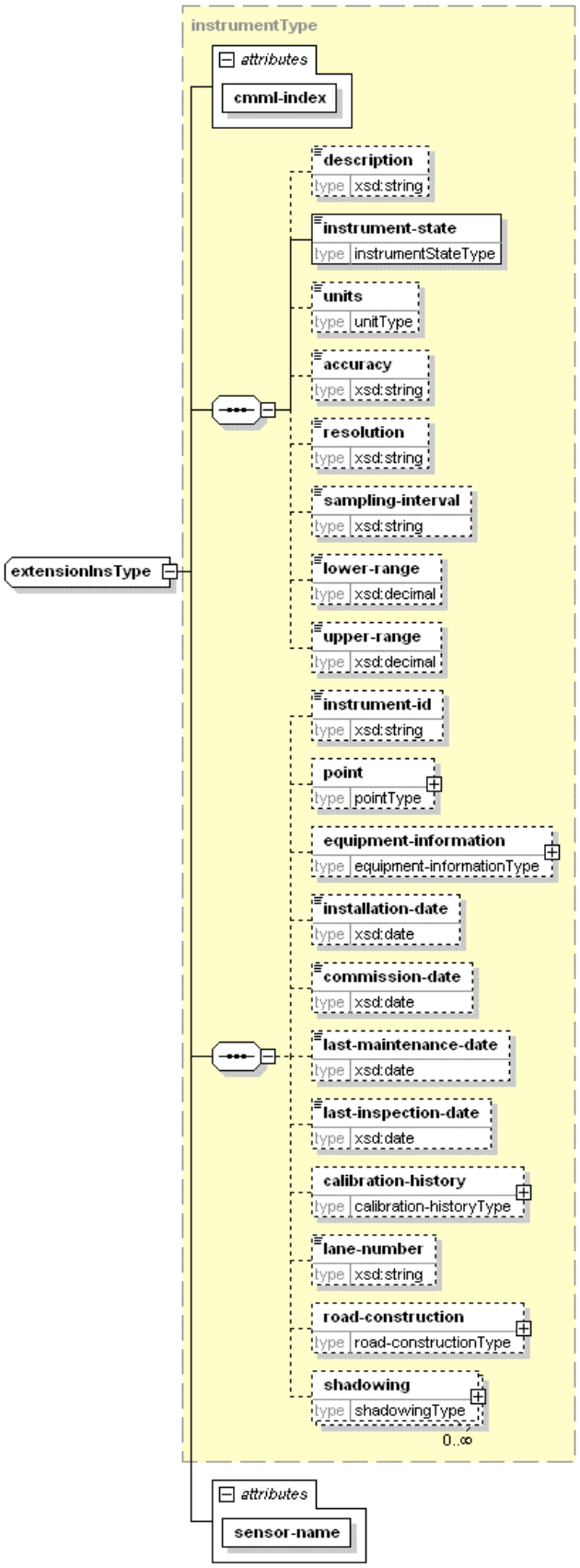
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	sensor-name	**xsd:string**	required		

extensionInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
extensionInsType
attributes
sensor-name

type extension of instrumentType

properties base instrumentType

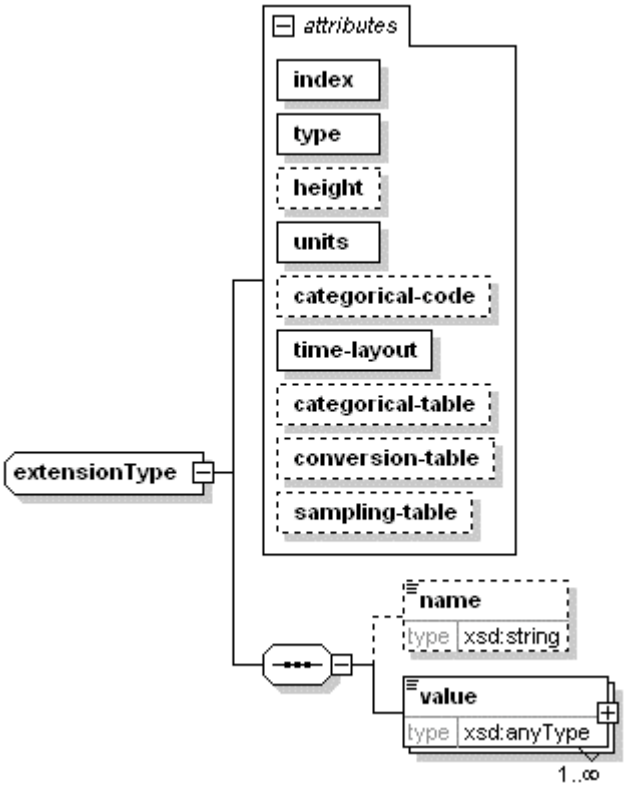
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	sensor-name	**xsd:string**	required		

extensionType

diagram



children [name](#) [value](#)

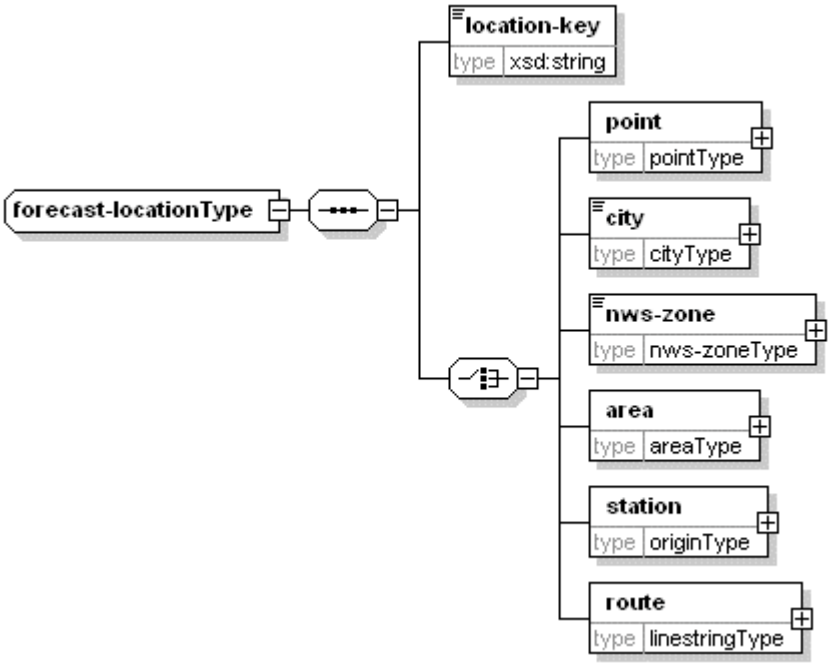
used by element parametersType/ex

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	**xsd:string**	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttributeType	required		

forecast-locationType

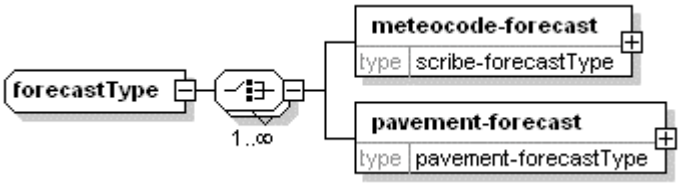
diagram



children location-key point city nws-zone area station route

forecastType

diagram

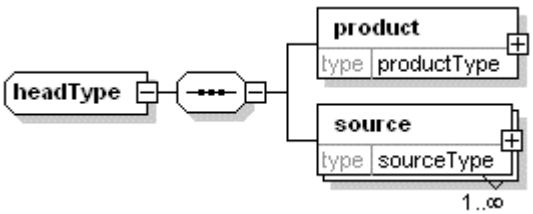


children meteocode-forecast pavement-forecast

used by element dataType/for

headType

diagram

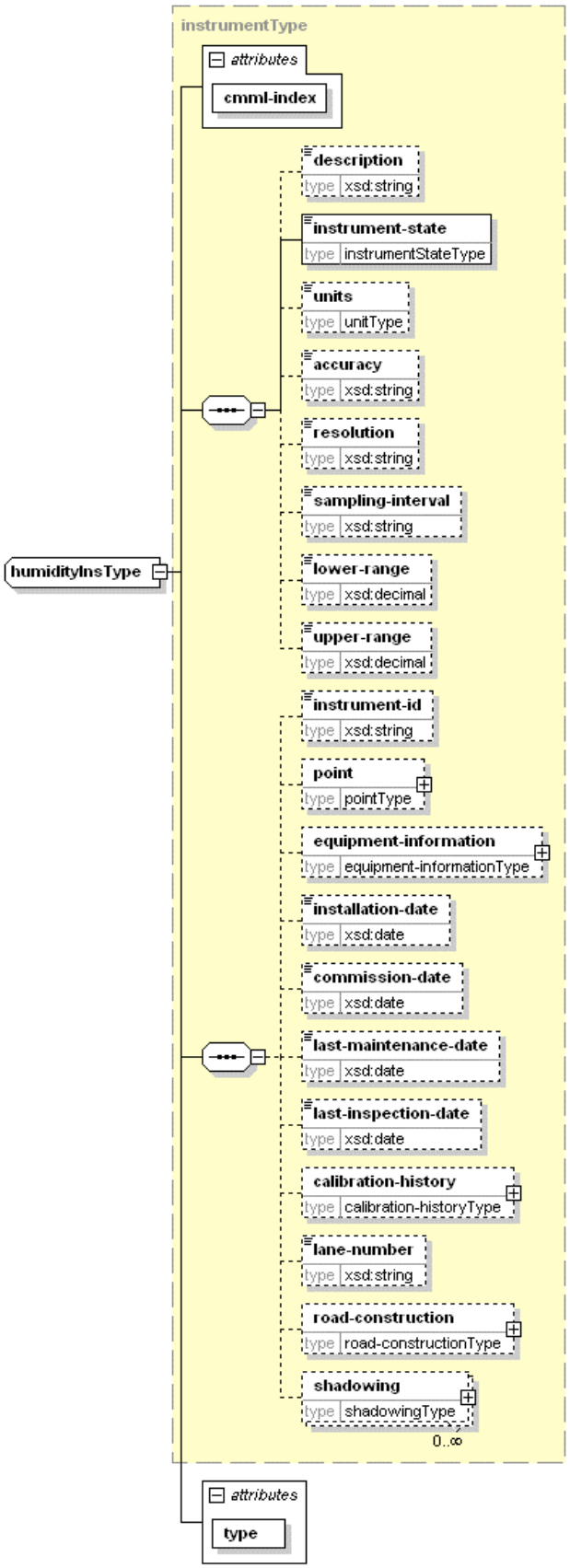


children product source

used by element cmmlType/

humidityInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
humidityInsType
attributes
type

type extension of instrumentType

properties base instrumentType

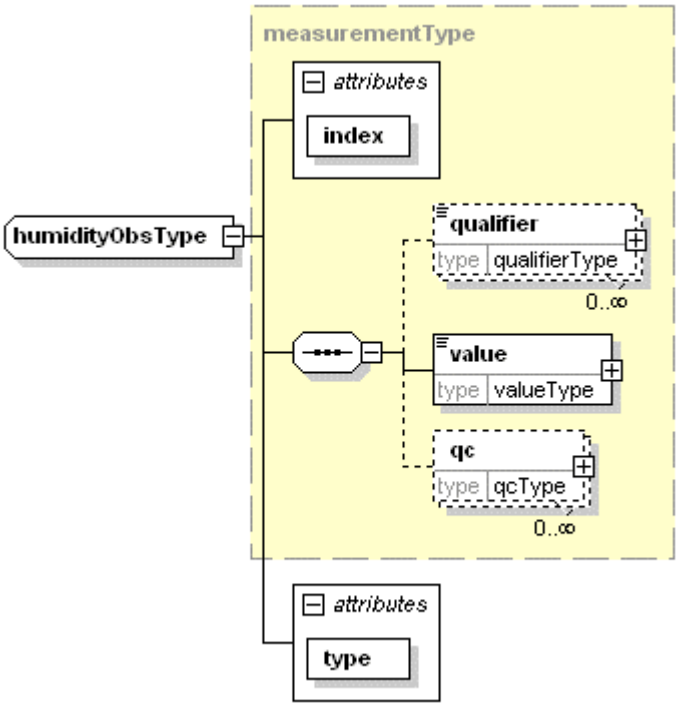
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	humidityType	required		

humidityObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

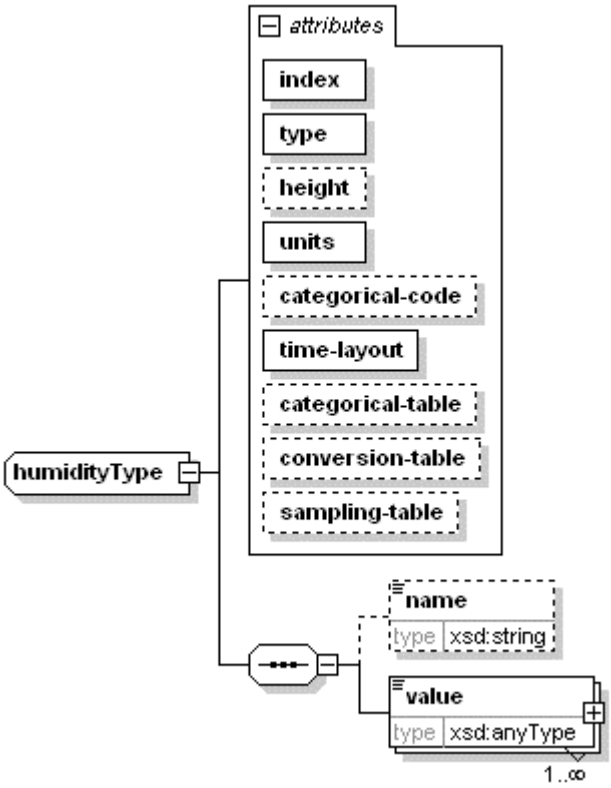
used by element observationType/h

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	humidityType	required		

humidityType

diagram



children name value

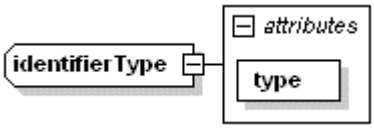
used by element parametersType/h

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	humidityTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttribute	required		

identifierType

diagram



properties mixed true

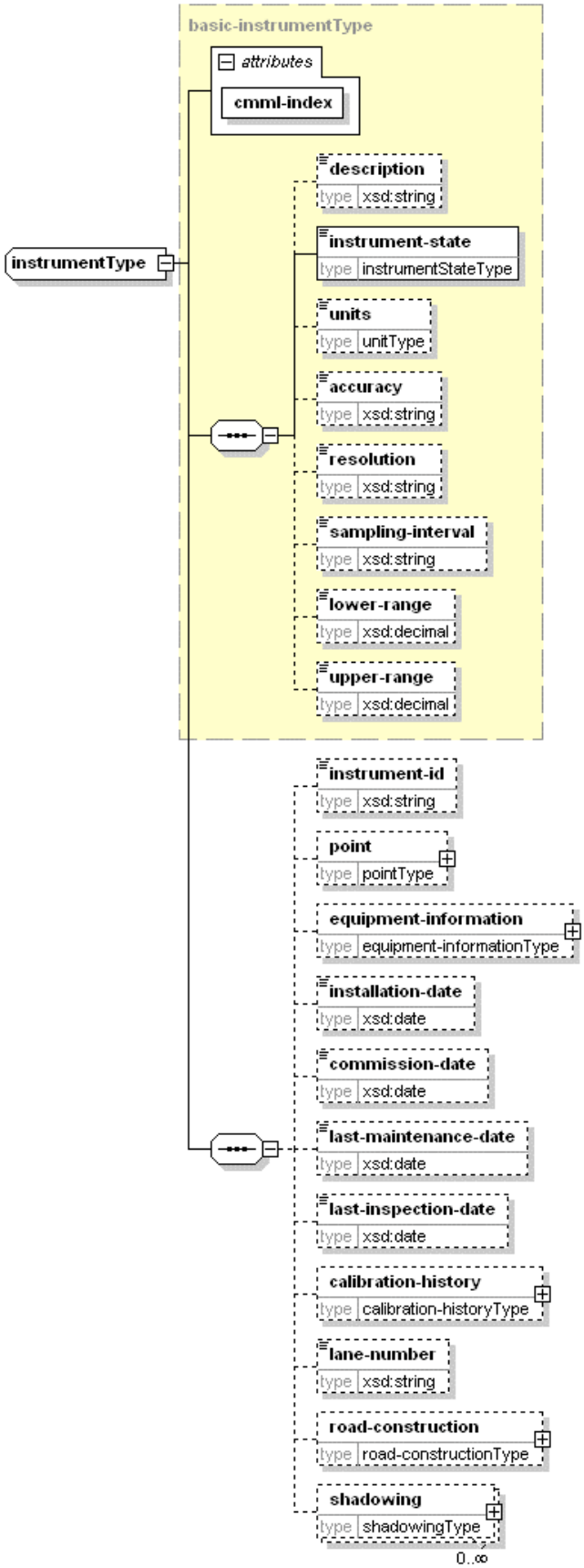
used by element originTyp

attributes

Name	Type	Use	Default	Fixed
type	identifiertypeT	required		

instrumentType

diagram


basic-instrumentType
attributes
cmml-index
instrumentType
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞

type extension of basic-instrumentType

properties base basic-instrumentType

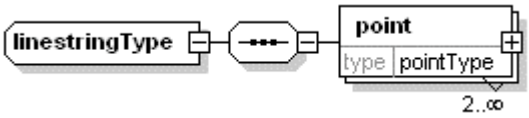
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by	complexTypes	air-qualityInsType	extensionInsType	humidityInsType
		pavementInsType	precipitationInsType	pressureInsType

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		

linestringType

diagram

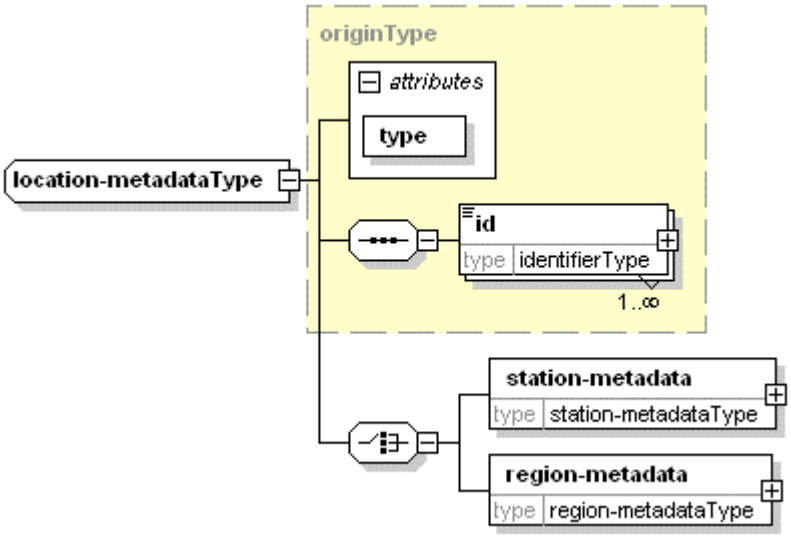


children [point](#)

used by elements locationType/route forecast-locationType/route region-

location-metadataType

diagram



type extension of originType

properties base originType

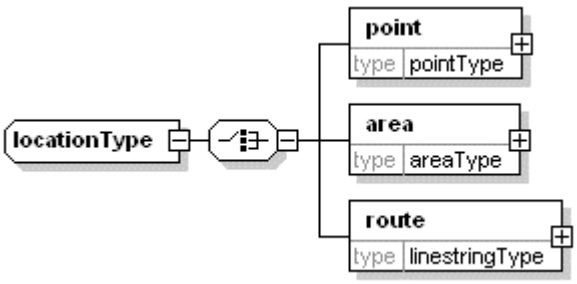
children id station-metadata region-metadata

used by element metadataType/lo

attributes	Name	Type	Use	Default	Fixed
	type	originTypeTyp	required		

locationType

diagram

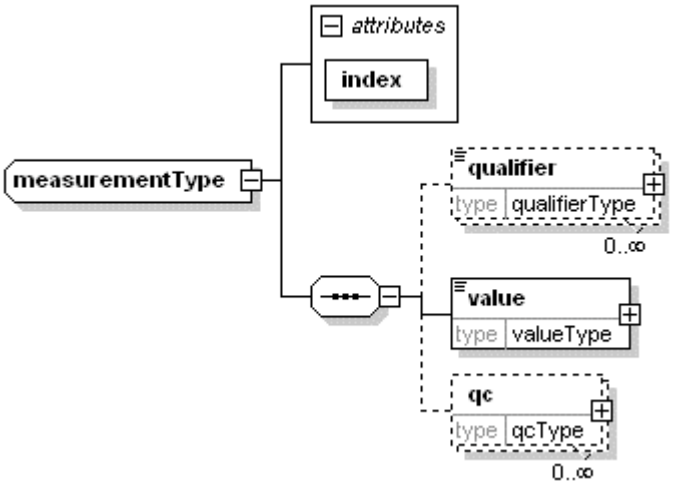


children point area route

used by elements pavement-forecastType/location observation-

measurementType

diagram



children qualifier value qc

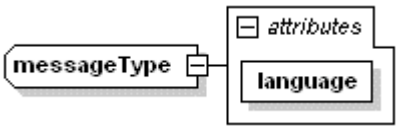
used by element observationType/extension

complexTypes air-qualityObsType humidityObsType pavementObsType physical-statusObsType precipitationObsType pressureObsType

attributes	Name	Type	Use	Default	Fixed
	index	**xsd:nonNegativeInteger**	required		

messageType

diagram



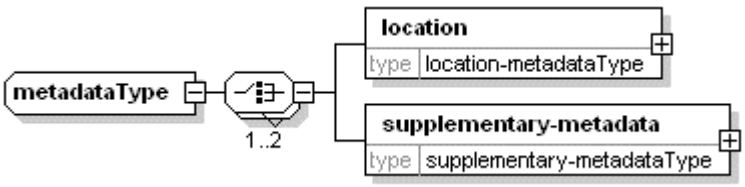
properties mixed true

used by element gc-

attributes	Name	Type	Use	Default	Fixed
	language		required		

metadataType

diagram

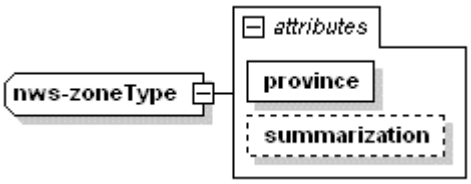


children location supplementary-metadata

used by element dataType/met

nws-zoneType

diagram



type extension of **xsd:string**
properties base xsd:string

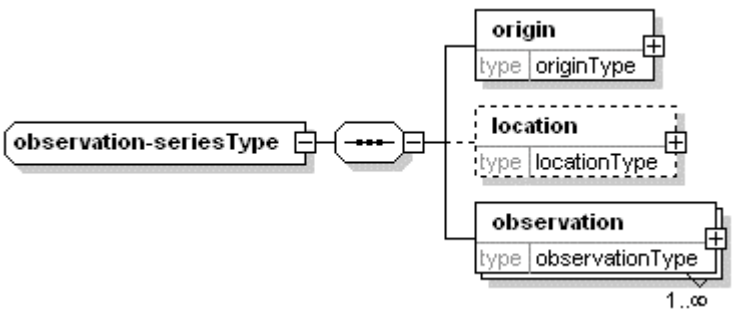
used by element forecast-

attributes

Name	Type	Use	Default	Fixed
province	provinceType	required		
summarization		optional		

observation-seriesType

diagram

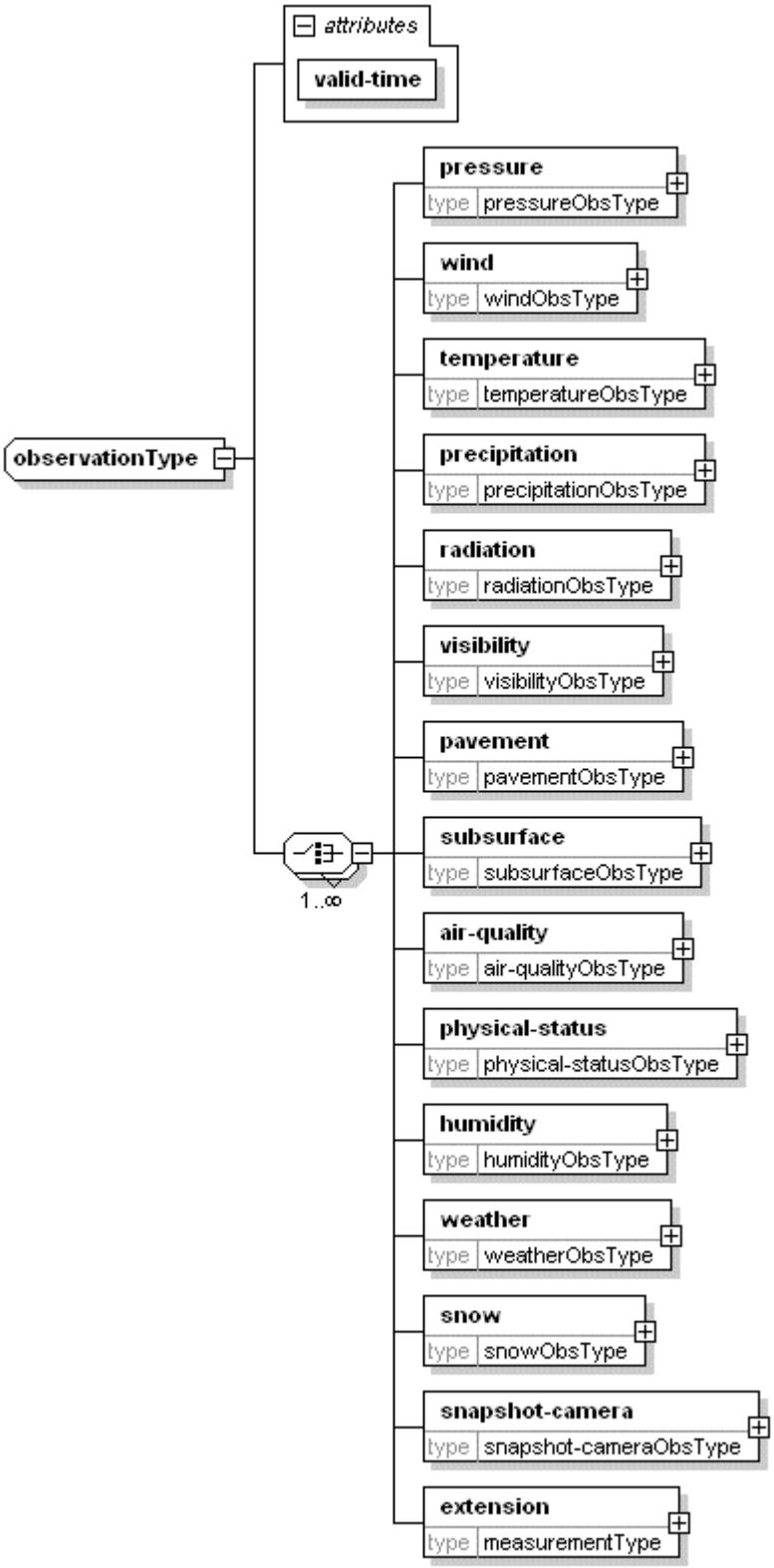


children origin location observation

used by element dataType/observatio

observationType

diagram



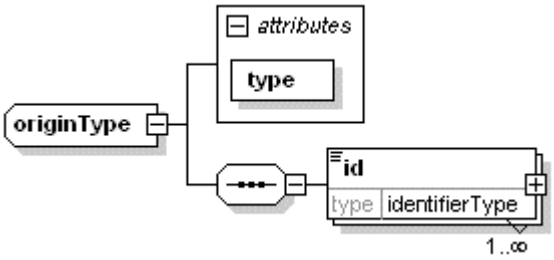
children pressure wind temperature precipitation radiation visibility pavement subsurface air-quality physical-status humidity weather snow snapshot-camera extension

used by element observation-

attributes	Name	Type	Use	Default	Fixed
	valid-time	**xsd:dateTime**	required		

originType

diagram



children [id](#)

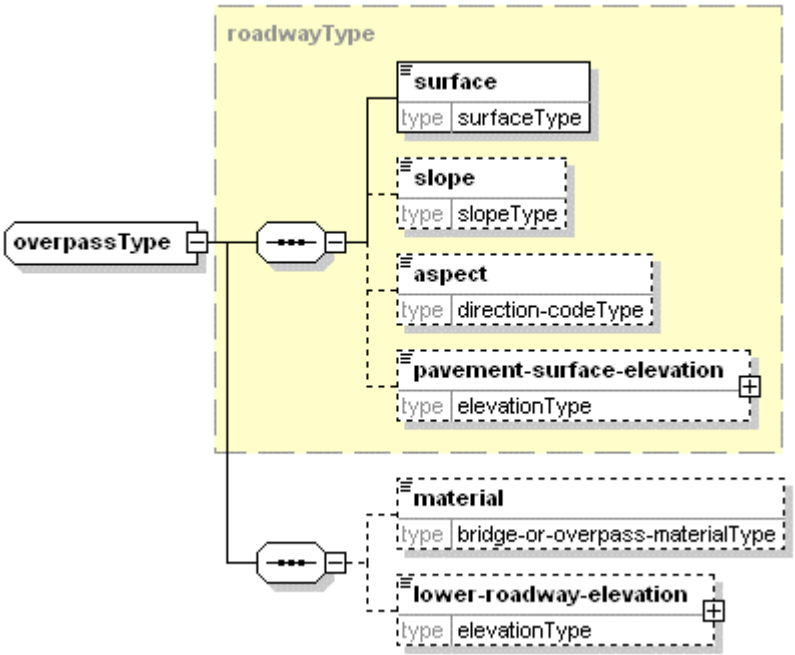
used by elements [observation-seriesType/origin](#) [forecast-](#)

attributes

Name	Type	Use	Default	Fixed
type	originTypeTyp	required		

overpassType

diagram



type extension of roadwayType

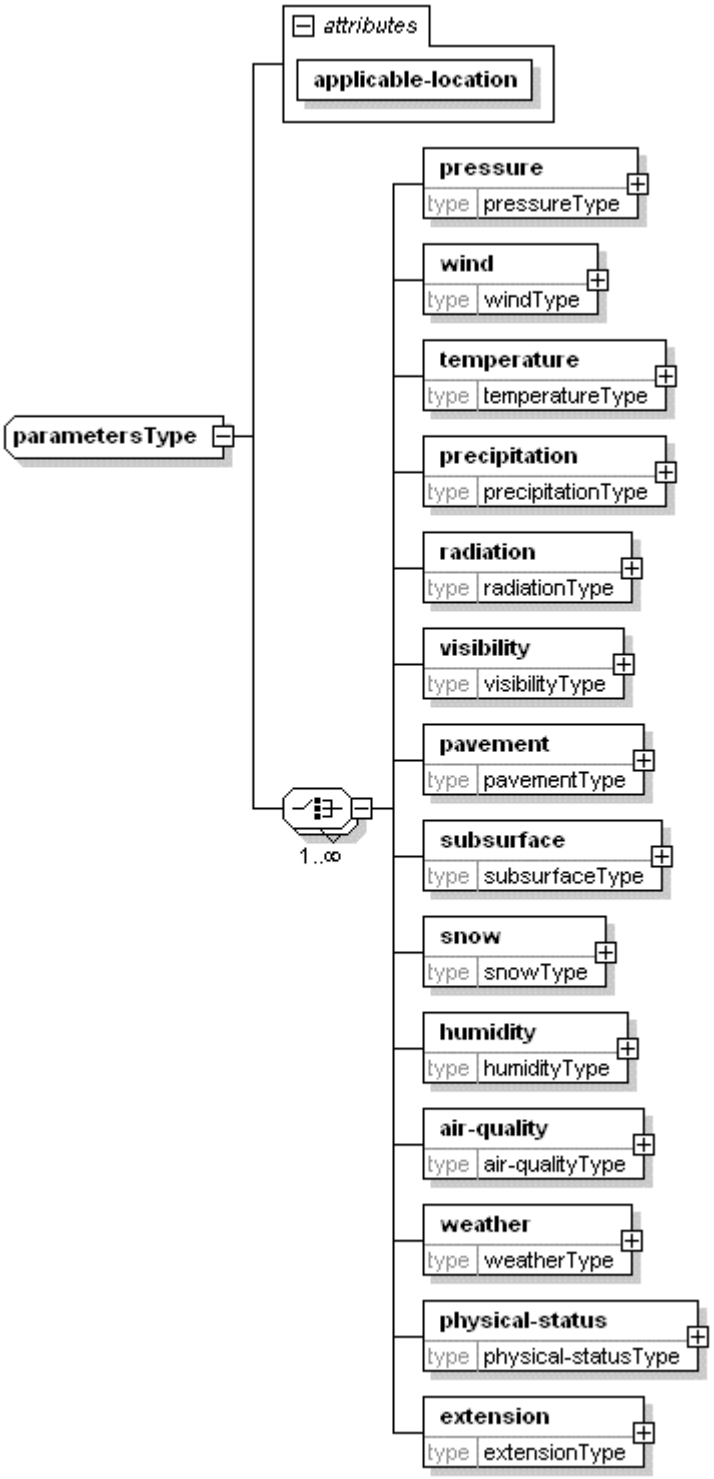
properties base roadwayType

children surface slope aspect pavement-surface-elevation material lower-roadway-elevation

used by element road-

parametersType

diagram



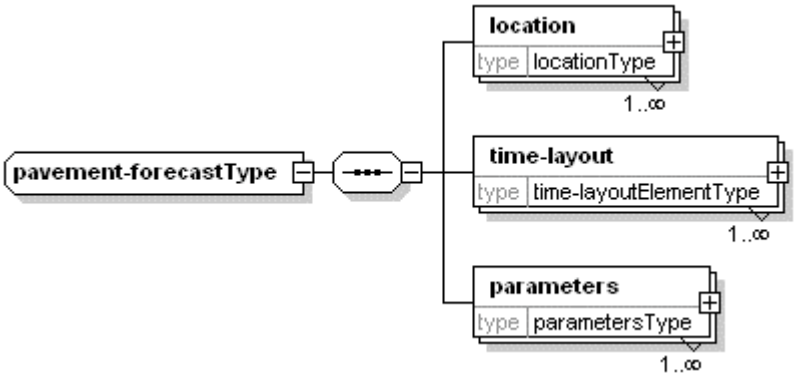
children pressure wind temperature precipitation radiation visibility pavement subsurface snow humidity air-quality weather physical-status extension

used by element pavement-

attributes	Name	Type	Use	Default	Fixed
	applicable-location	non-	required		

pavement-forecastType

diagram

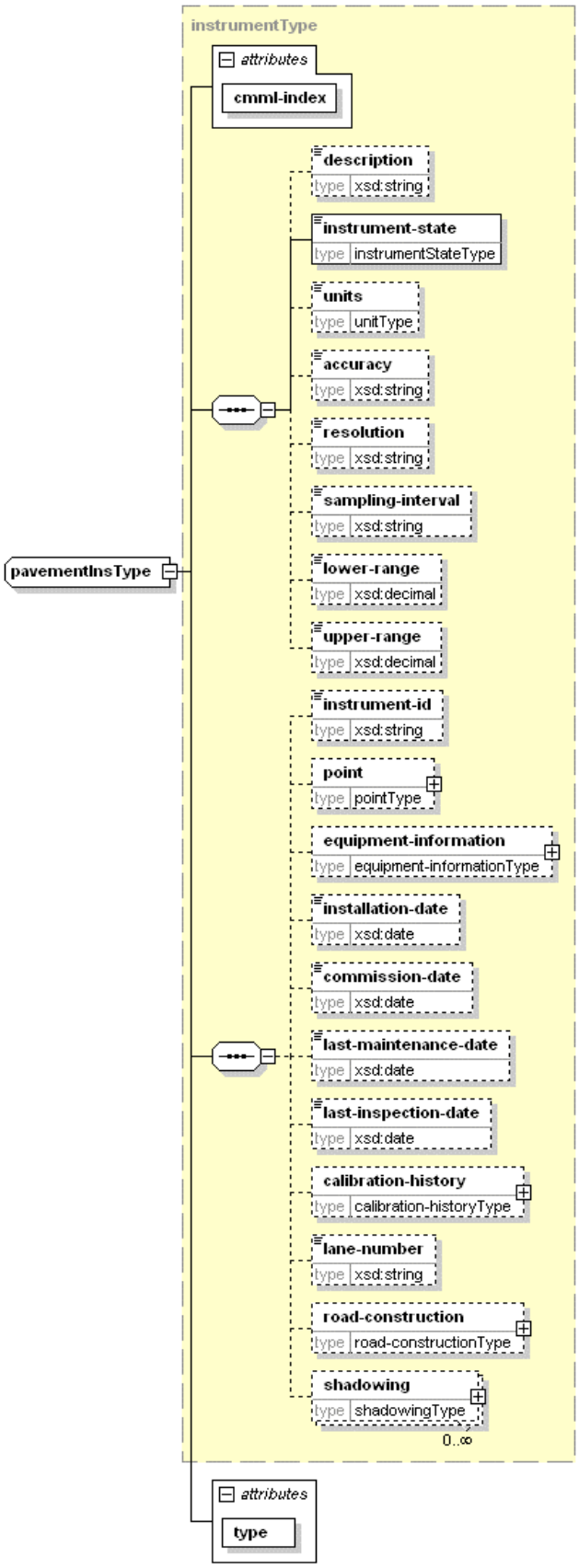


children location time-layout parameters

used by element forecastType/pavement

pavementInsType

diagram


pavementInsType
instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
attributes
type

type extension of instrumentType

properties base instrumentType

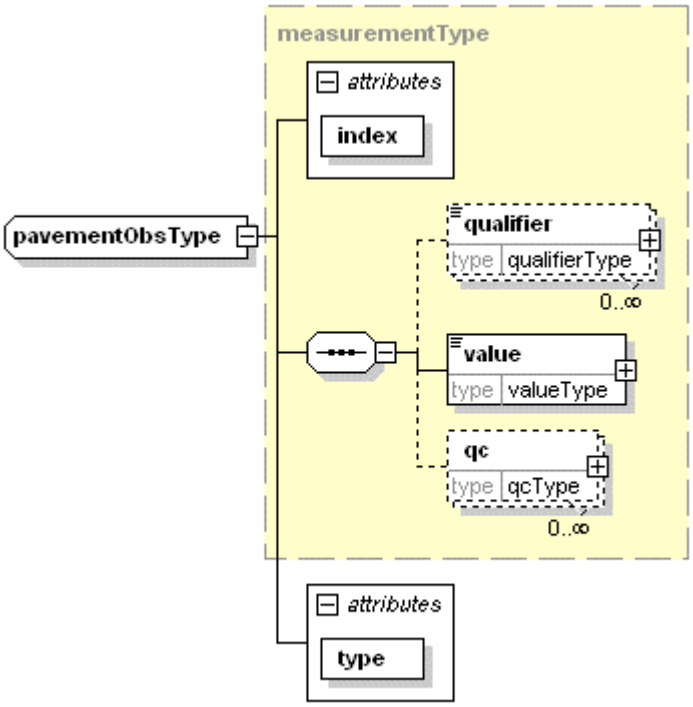
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	pavementTyp	required		

pavementObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

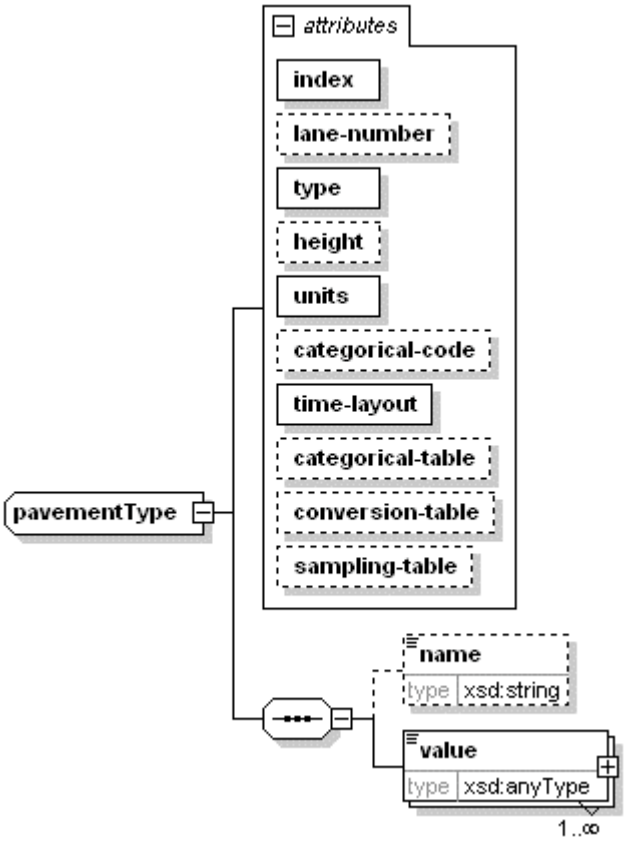
used by element observationType/pa

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	pavementTyp	required		

pavementType

diagram



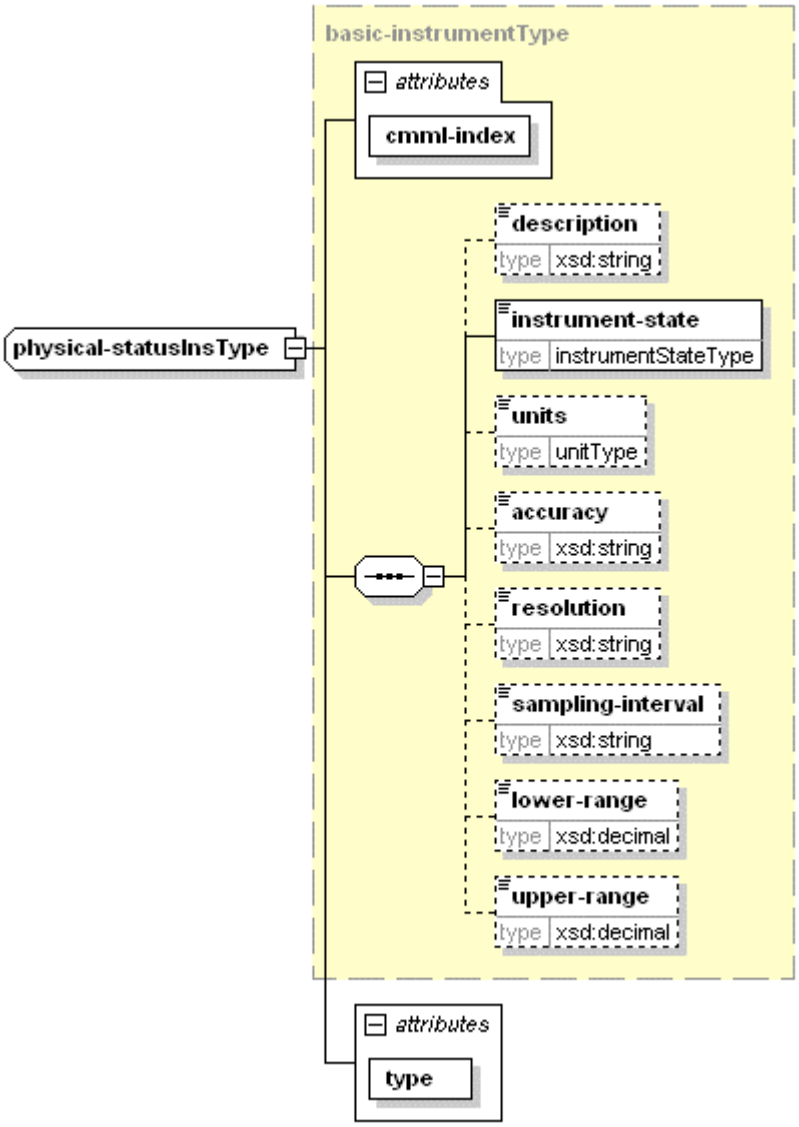
children [name](#) [value](#)

used by element parametersType/pa

attributes	Name	Type	Use	Default	Fixed
	index	**xsd:nonNegativeInteger**	required		
	lane-number	**xsd:nonNegativeInteger**	optional		
	type	pavementTypeType	required		
	height	**xsd:integer**	optional		
	units	unitType	required		
	categorical-code	**xsd:string**	optional		
	time-layout	time-layoutAttribute	required		

physical-statusInsType

diagram



type extension of basic-instrumentType

properties base basic-instrumentType

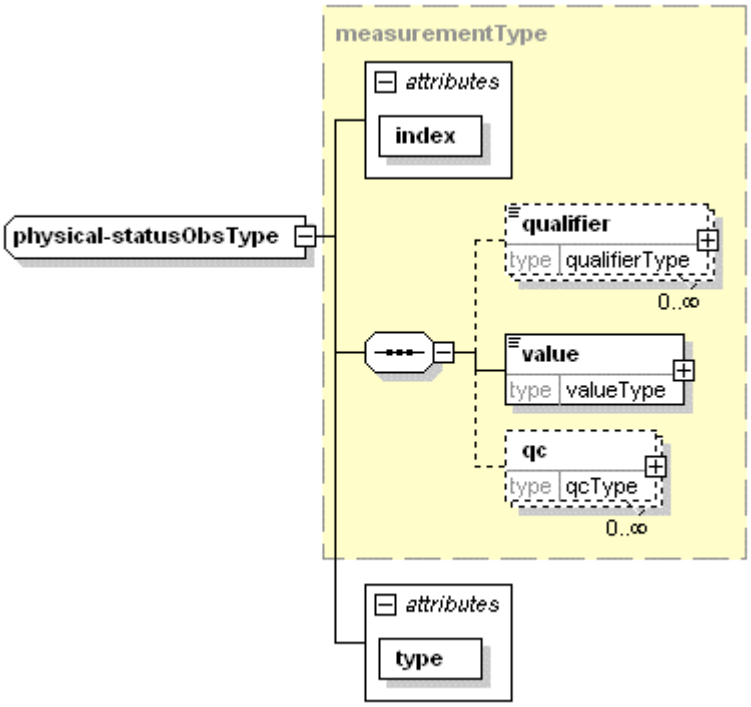
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range

used by element gpuType/physical-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	physical-	required		

physical-statusObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

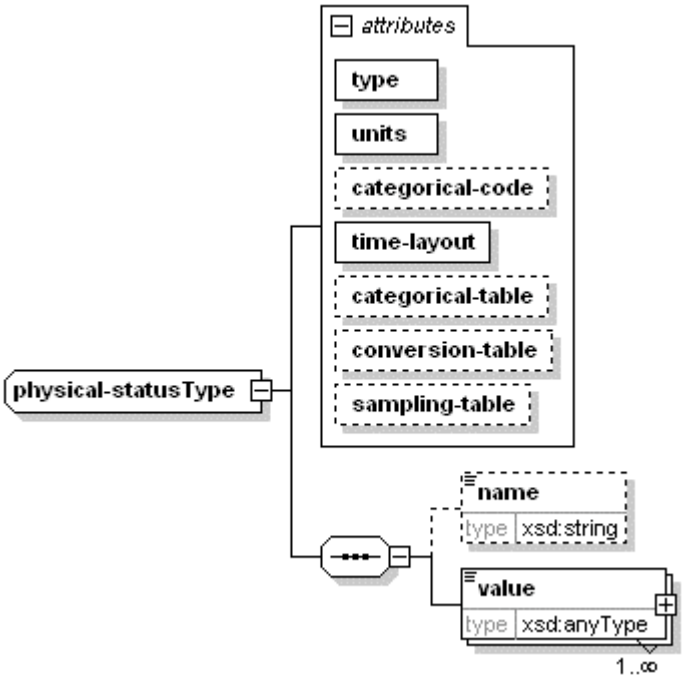
used by element observationType/physic

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	physical-	required		

physical-statusType

diagram



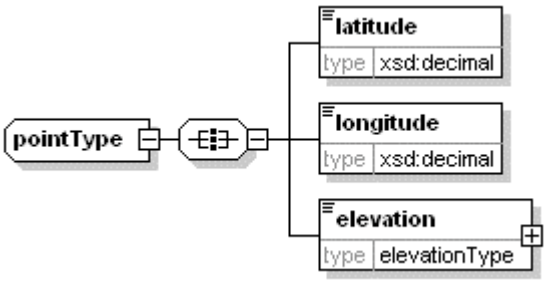
children name value

used by element parametersType/physic

attributes	Name	Type	Use	Default	Fixed
	type	physical-statusTypeType	required		
	units	unitType	required		
	categorical-code	**xsd:string**	optional		
	time-layout	time-	required		

pointType

diagram

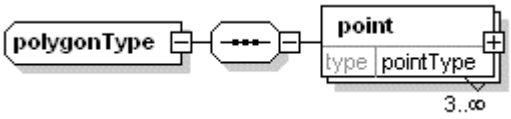


children latitude longitude elevation

used by elements locationType/point forecast-locationType/point linestringType/point

polygonType

diagram

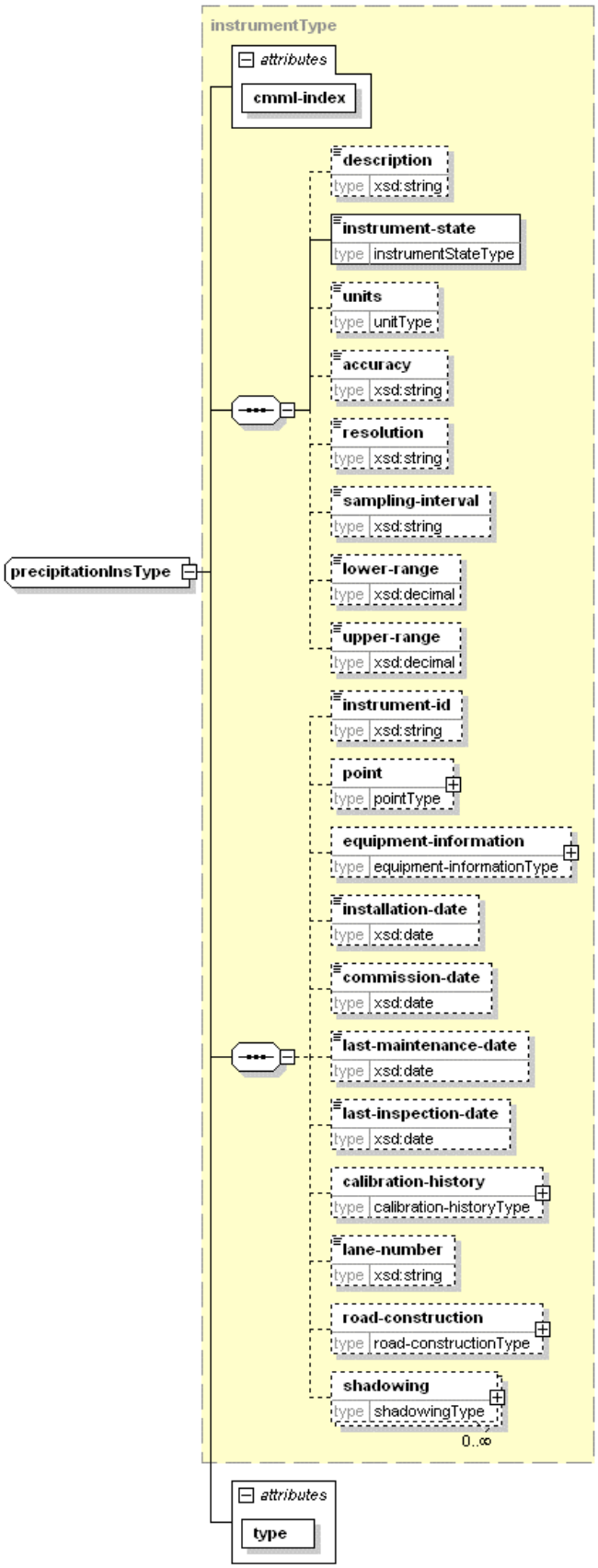


children point

used by element areaType/pol

precipitationInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
precipitationInsType
attributes
type

type extension of instrumentType

properties base instrumentType

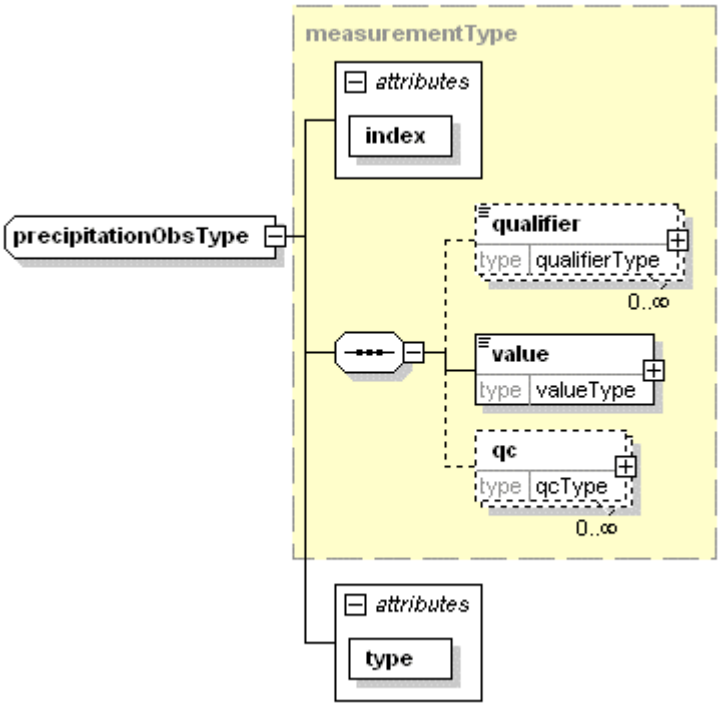
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	precipitationT	required		

precipitationObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

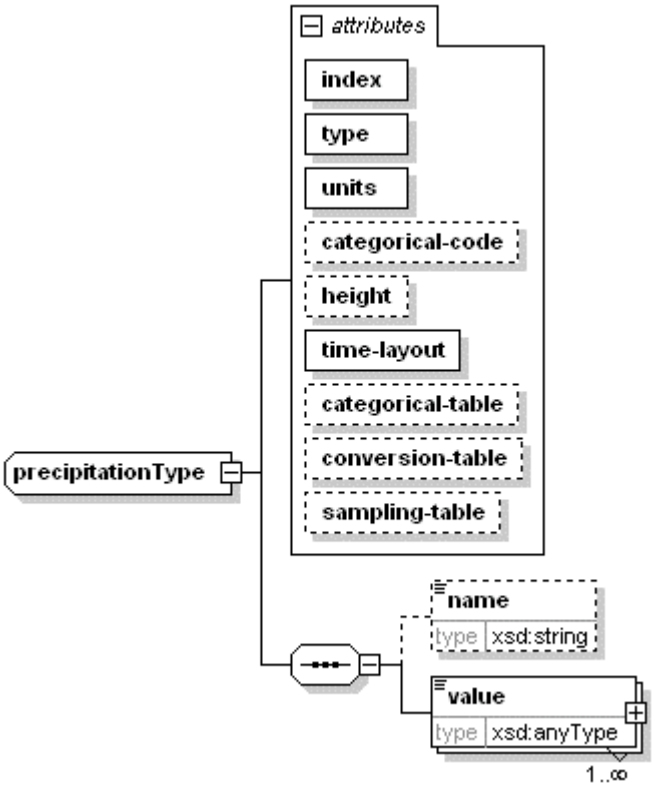
used by element observationType/preci

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	precipitationT	required		

precipitationType

diagram



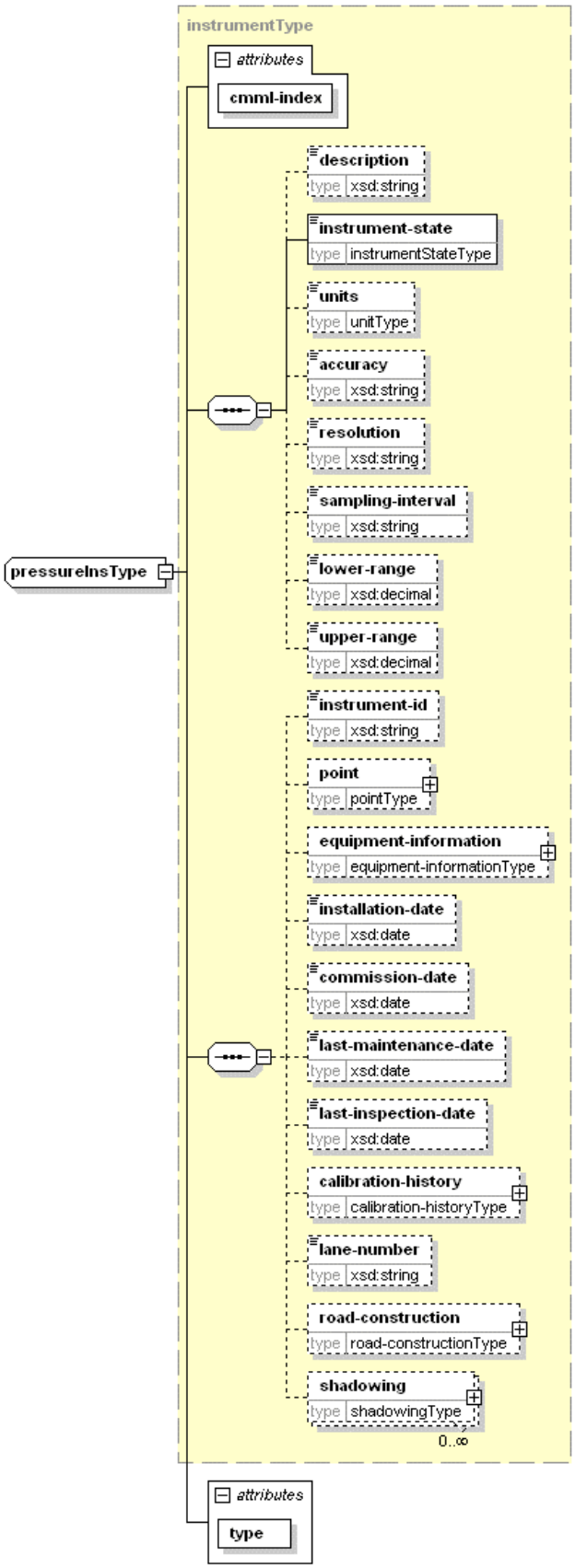
children name value

used by element parametersType/prec

attributes	Name	Type	Use	Default	Fixed
	index	**xsd:nonNegativeInteger**	required		
	type	precipitationTypeType	required		
	units	unitType	required		
	categorical-code	**xsd:string**	optional		
	height	**xsd:nonNegativeInteger**	optional		
	time-layout	time-layoutAttribute	required		

pressureInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
pressureInsType
attributes
type

type extension of instrumentType

properties base instrumentType

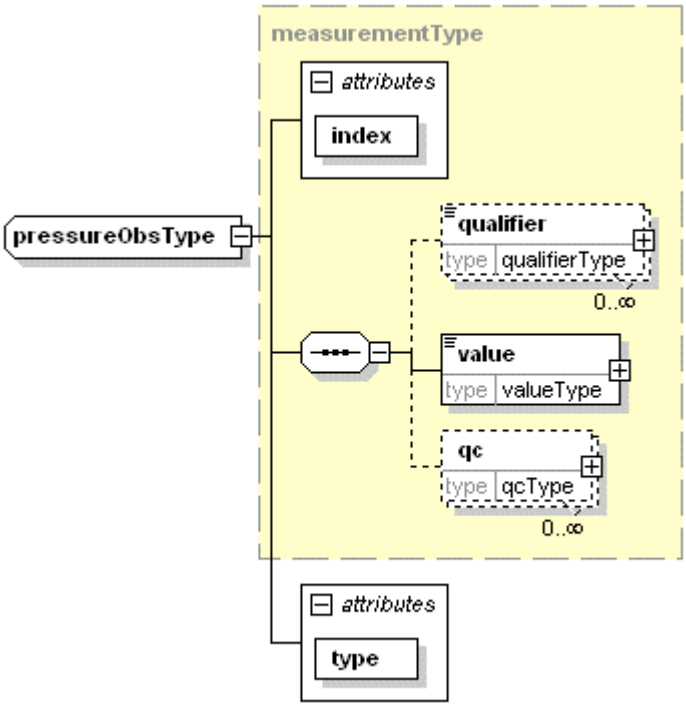
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	pressureType	required		

pressureObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

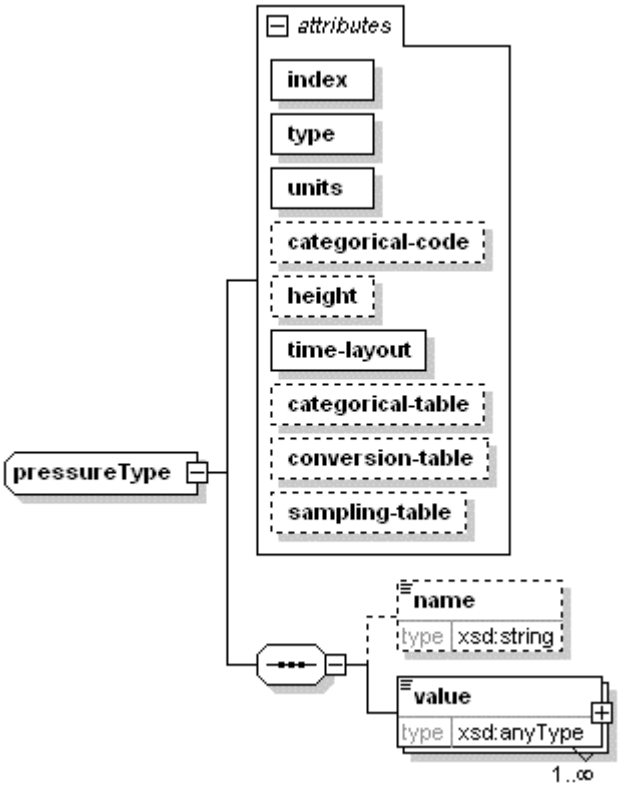
used by element observationType/pr

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	pressureType	required		

pressureType

diagram



children [name](#) [value](#)

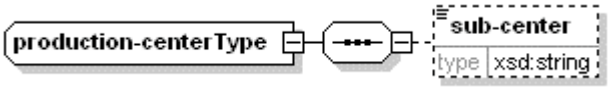
used by element parametersType/pr

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	pressureTypeType	required		
units	unitType	required		
categorical-code	**xsd:string**	optional		
height	**xsd:nonNegativeInteger**	optional		
time-layout	time-layoutAttribute	required		

production-centerType

diagram



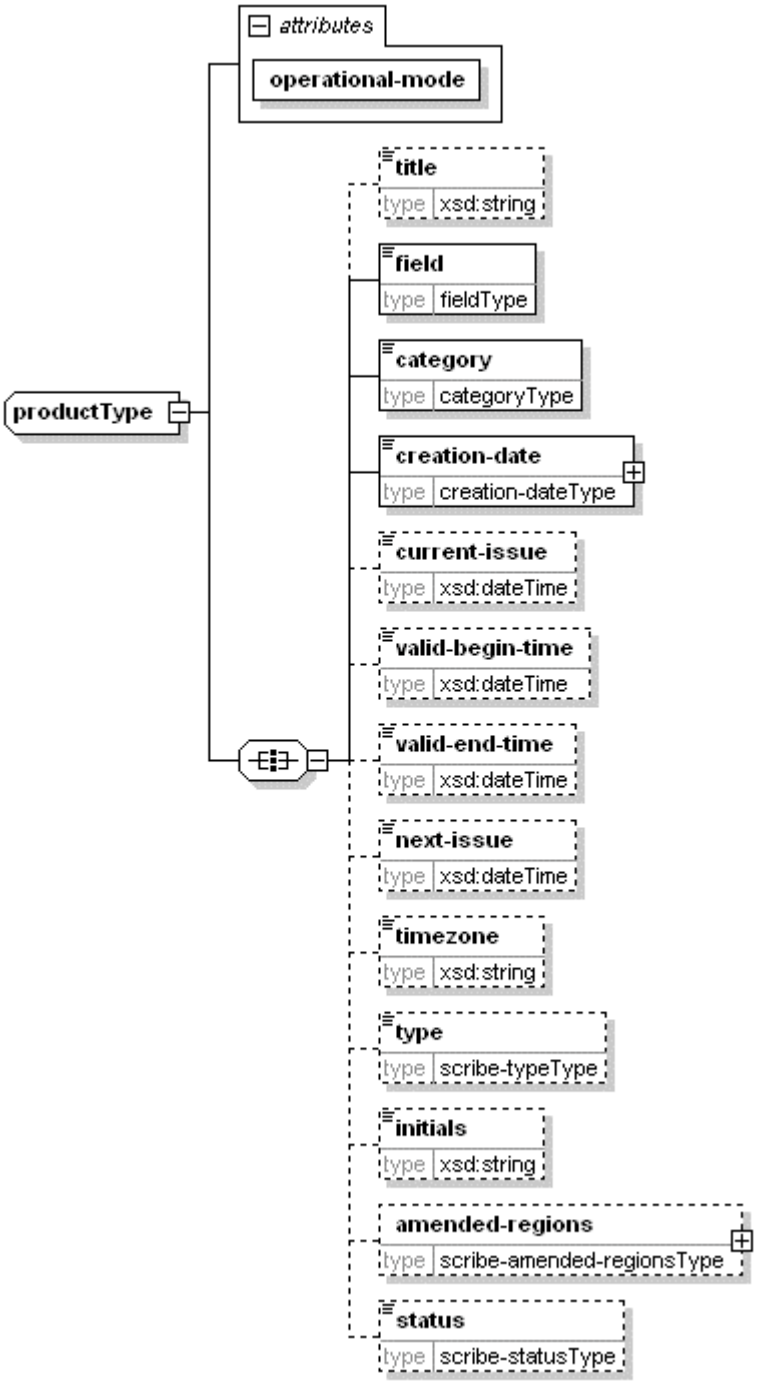
properties mixed true

children sub-center

used by element sourceType/productio

productType

diagram



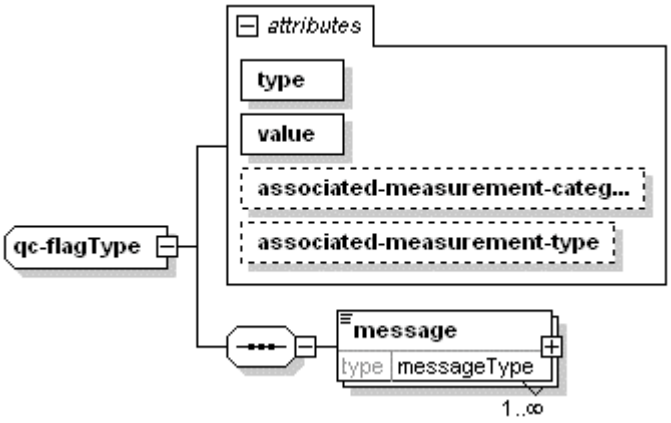
children title field category creation-date current-issue valid-begin-time valid-end-time next-issue timezone type initials amended-regions status

used by element headType/pr

attributes	Name	Type	Use	Default	Fixed
	operational-mode	operational-	required		

qc-flagType

diagram



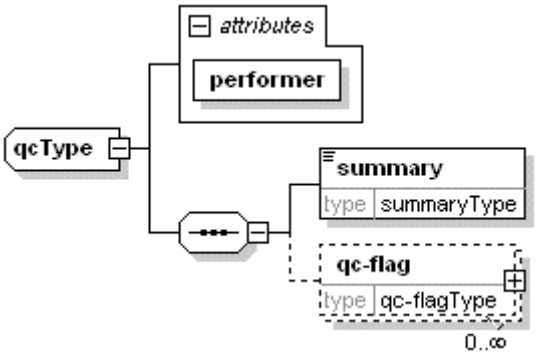
children [message](#)

used by element qcType/qc-

attributes	Name	Type	Use	Default	Fixed
	type	qc-flagtypeType	required		
	value	qc-flagvalueType	required		
	associated-measurement		optional		

qcType

diagram



children summary qc-flag

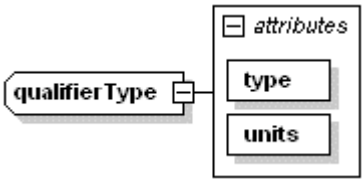
used by element measurementTy

attributes

Name	Type	Use	Default	Fixed
performer	non-	required		

qualifierType

diagram



properties mixed true

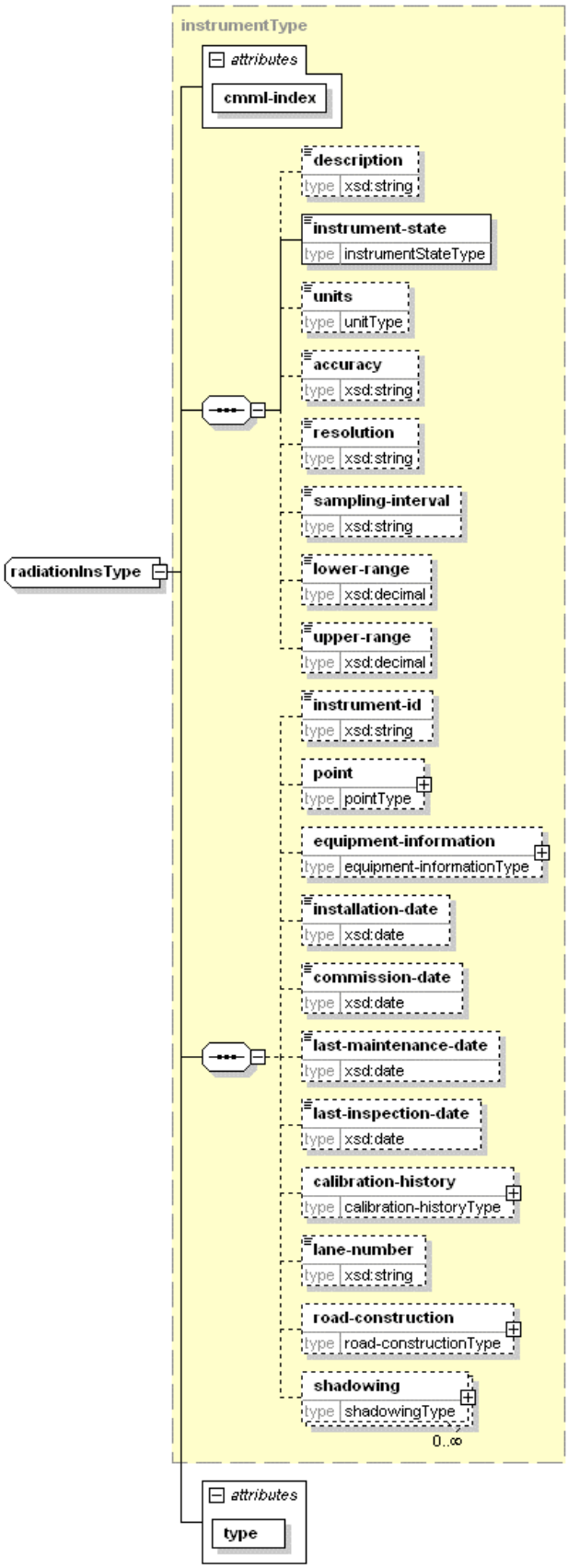
used by element measurementType/

attributes

Name	Type	Use	Default	Fixed
type		required		
units	unitType	required		

radiationInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
radiationInsType
attributes
type

type extension of instrumentType

properties base instrumentType

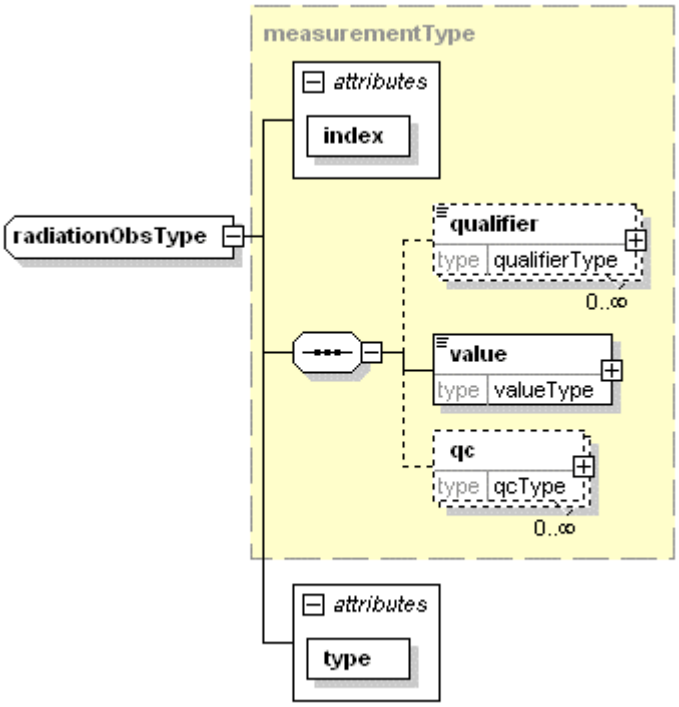
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	radiationType	required		

radiationObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

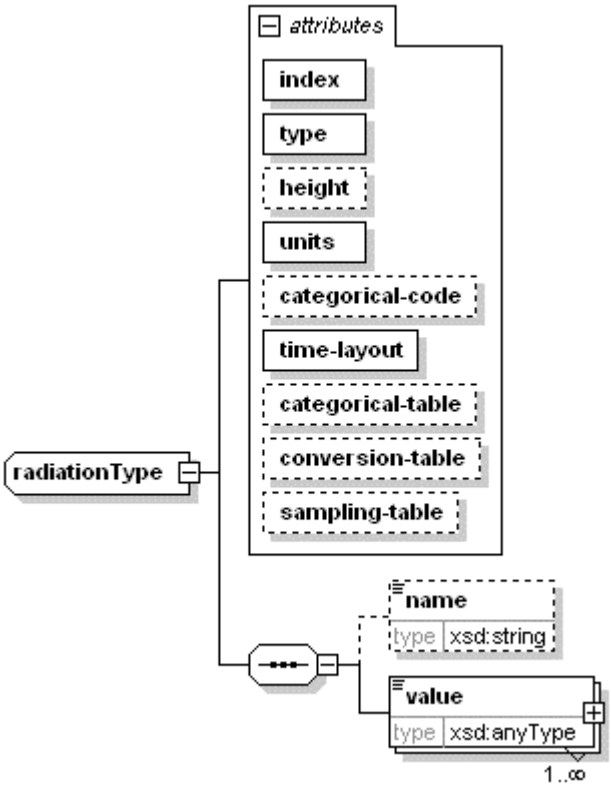
used by element observationType/ra

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	radiationType	required		

radiationType

diagram



children name value

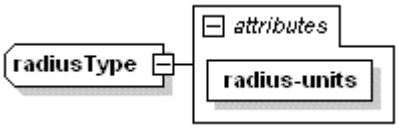
used by element parametersType/ra

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	radiationTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttribute	required		

radiusType

diagram



type extension of **xsd:decimal**

properties base xsd:decimal

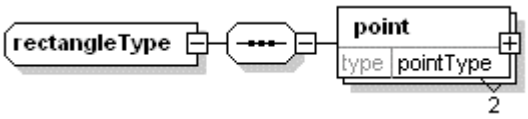
used by element circleType/ra

attributes

Name	Type	Use	Default	Fixed
radius-units	radius-	required		

rectangleType

diagram

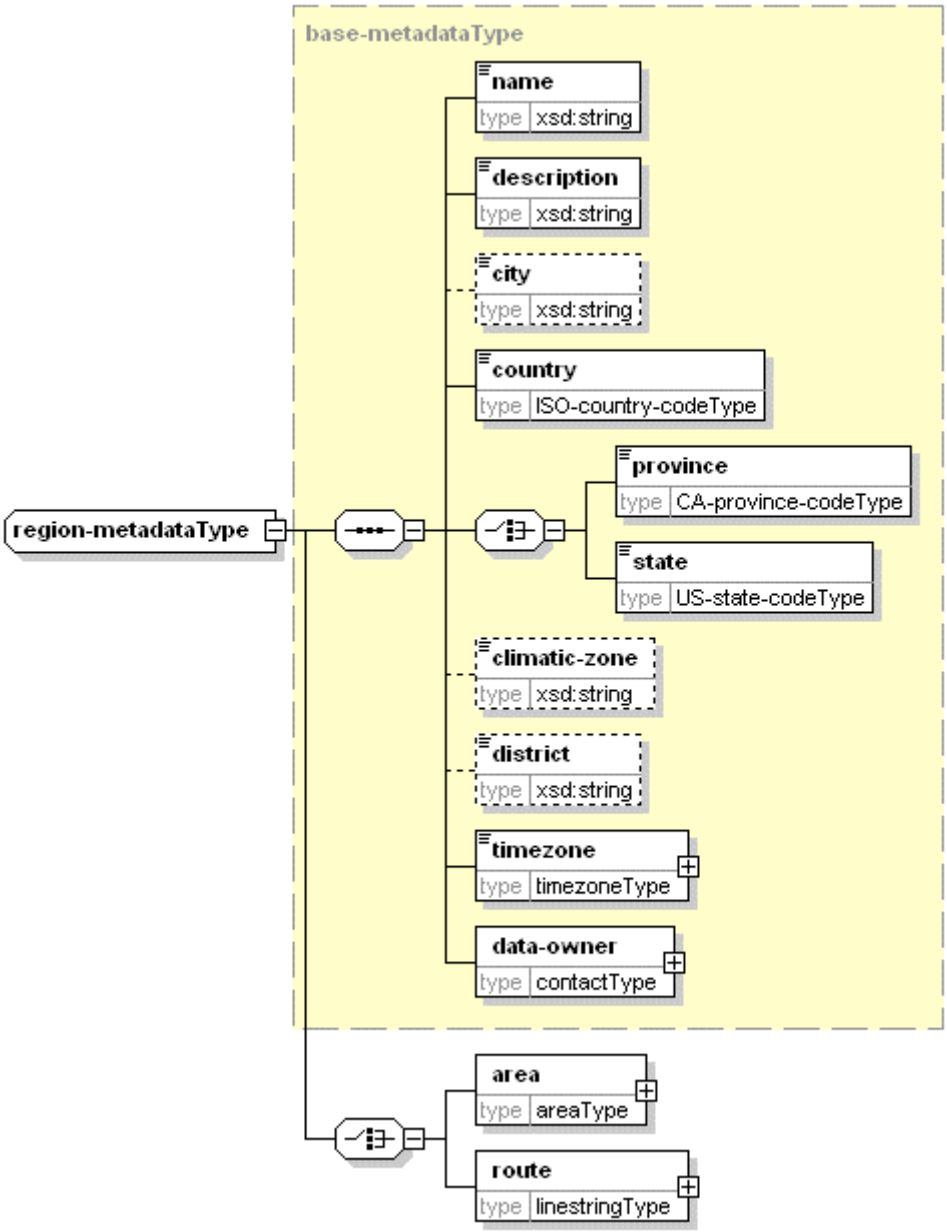


children point

used by element areaType/rect

region-metadataType

diagram



type extension of base-metadataType

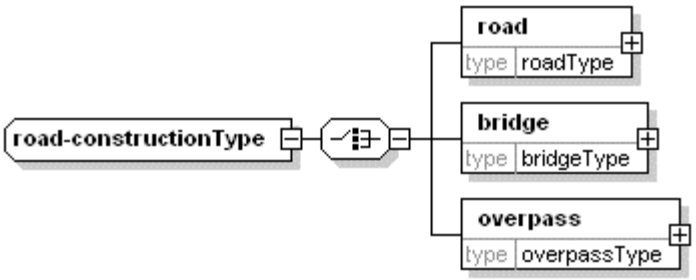
properties base base-metadataType

children name description city country province state climatic-zone district timezone data-owner area route

used by element location-

road-constructionType

diagram

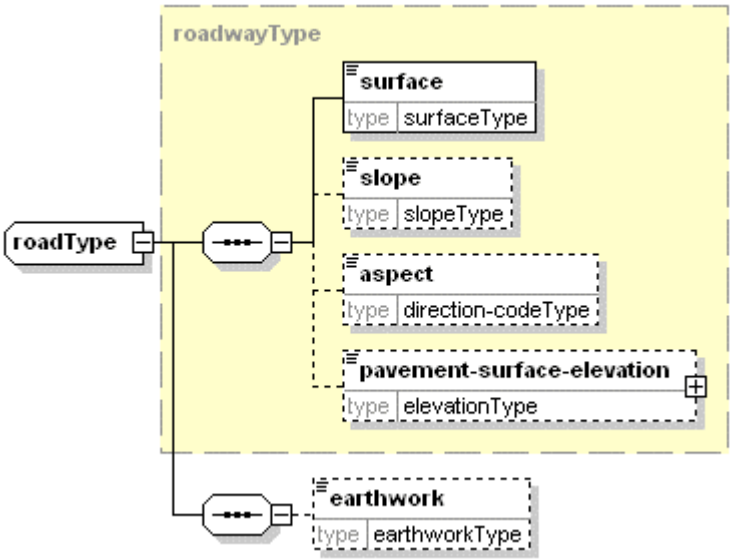


children road bridge overpass

used by element instrumentType/road-

roadType

diagram



type extension of roadwayType

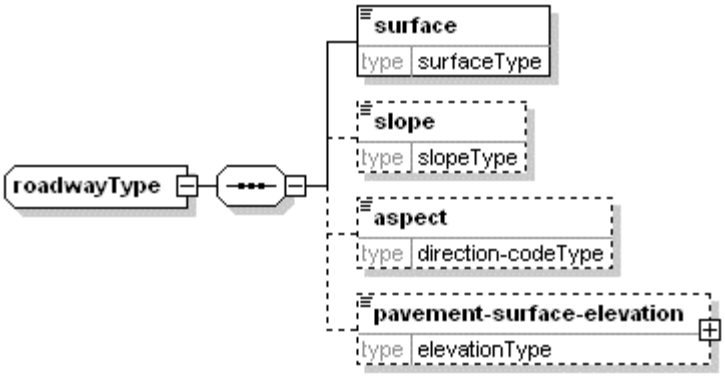
properties base roadwayType

children surface slope aspect pavement-surface-elevation earthwork

used by element road-

roadwayType

diagram

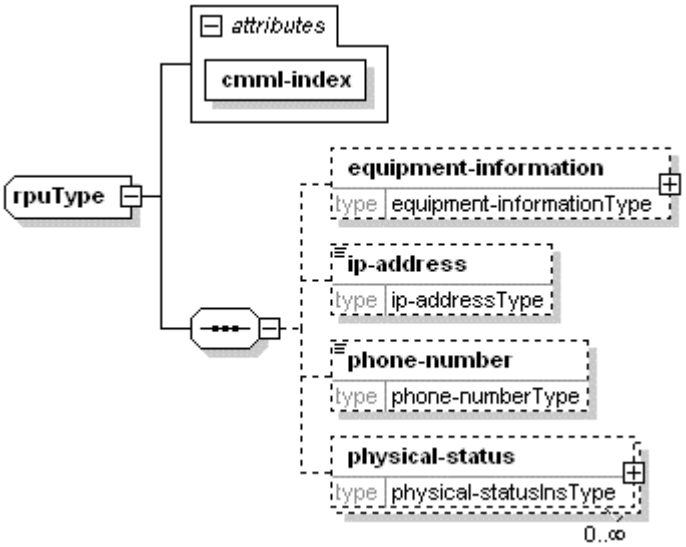


children surface slope aspect pavement-surface-elevation

used by complexTypes bridgeType overpassType

rpuType

diagram



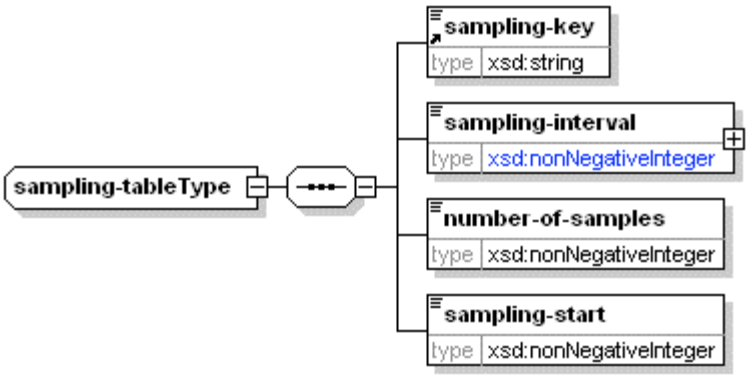
children equipment-information ip-address phone-number physical-status

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		

sampling-tableType

diagram

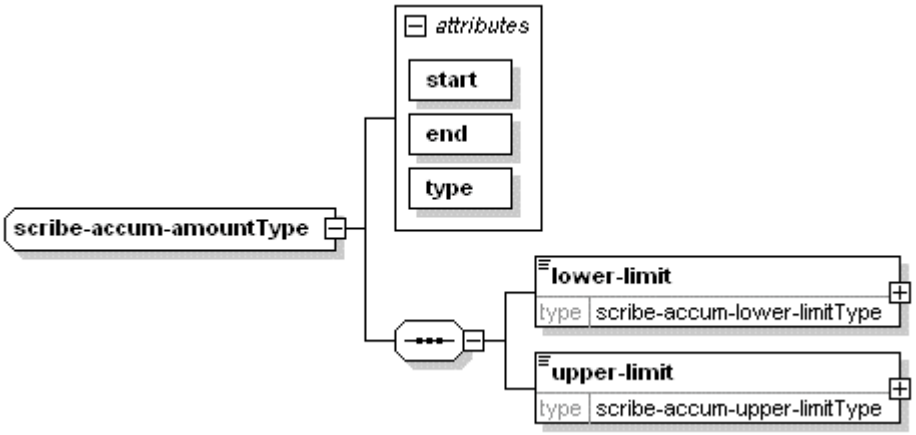


children sampling-key sampling-interval number-of-samples sampling-start

used by element supplementary-metadataType/sampling-

scribe-accum-amountType

diagram



children lower-limit upper-limit

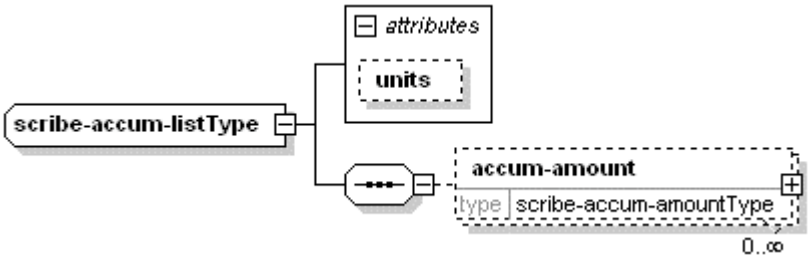
used by element scribe-accum-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		
type	scribe-accum-	required		

scribe-accum-listType

diagram



children [accum-amount](#)

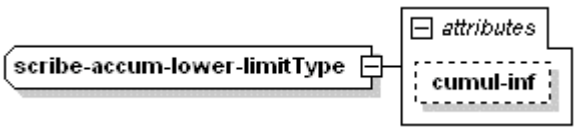
used by element scribe-

attributes

Name	Type	Use	Default	Fixed
units	scribe-accum-		mm	

scribe-accum-lower-limitType

diagram



type properties: extension of **xsd:decimal**

base: xsd:decimal

used by element scribe-accum-

attributes	Name	Type	Use	Default	Fixed
	cumul-inf	**xsd:decimal**	optional		

scribe-accum-upper-limitType

diagram

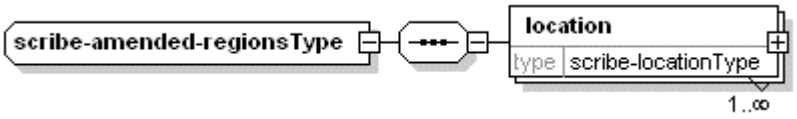
type extension of **xsd:decimal**
properties base xsd:decimal

used by element scribe-accum-

attributes	Name	Type	Use	Default	Fixed
	cumul-sup	**xsd:decimal**	optional		

scribe-amended-regionsType

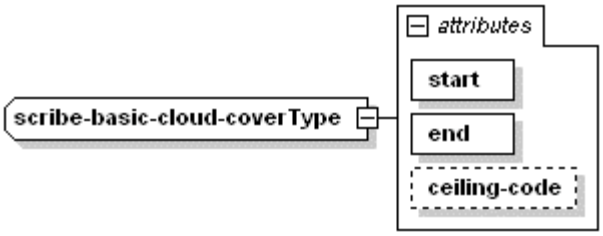
diagram



children location
used by element productType/amended

scribe-basic-cloud-coverType

diagram



type extension of scribe-basic-simple-cloud-coverType

properties base scribe-basic-simple-cloud-coverType

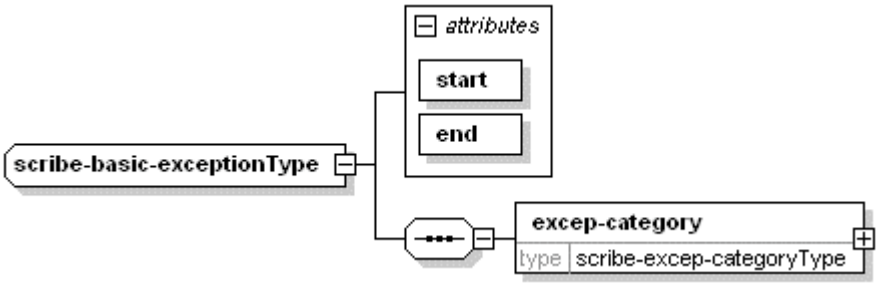
used by element scribe-cloud-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		
ceiling-code	scribe-cloud-	optional		

scribe-basic-exceptionType

diagram



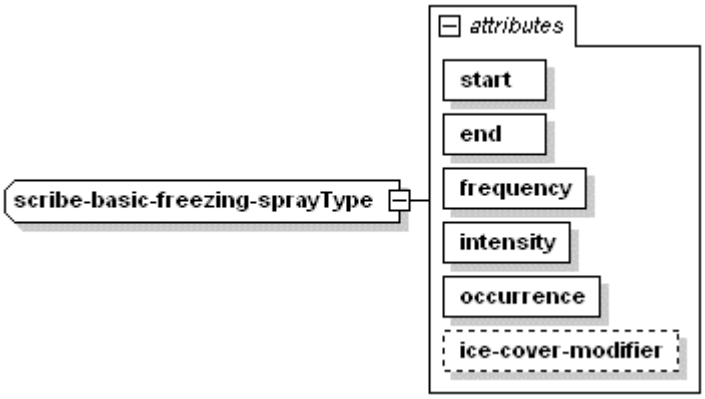
children excep-category

used by complexTypes scribe-cloud-cover-exceptionType scribe-freezing-spray-exceptionType scribe-precipitation-event-exceptionType scribe-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-basic-freezing-sprayType

diagram

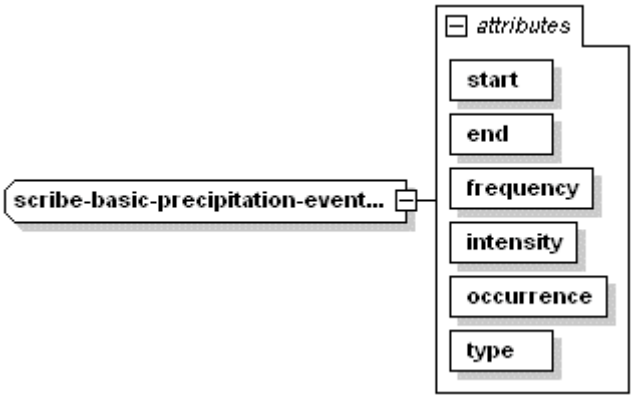


used by element scribe-freezing-spray-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	frequency	scribe-freezing-spray-frequencyType	required		
	intensity	scribe-freezing	required		

scribe-basic-precipitation-eventType

diagram

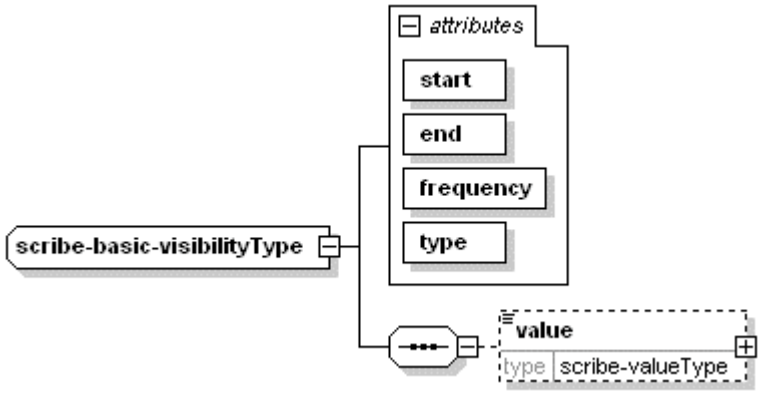


used by element scribe-precipitation-event-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	frequency	scribe-precipitation-frequencyType	required		
	intensity	scribe-	required		

scribe-basic-visibilityType

diagram



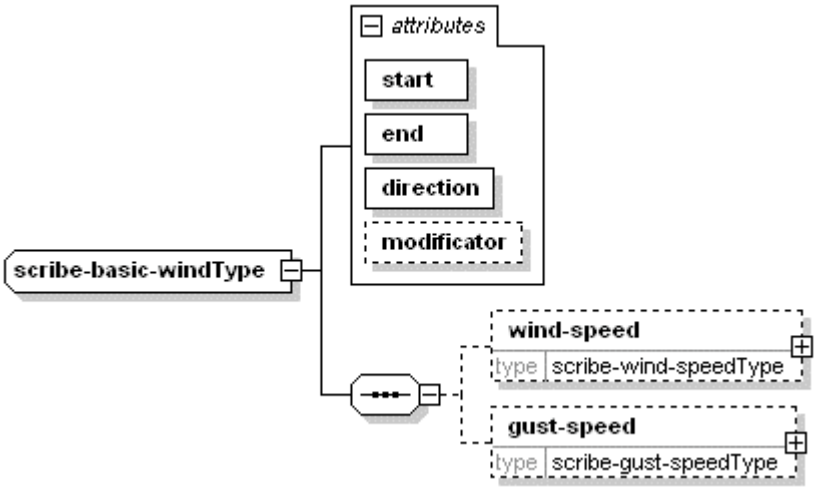
children value

used by element scribe-visibility-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	frequency	scribe-visibility-frequencyTyp	required		

scribe-basic-windType

diagram



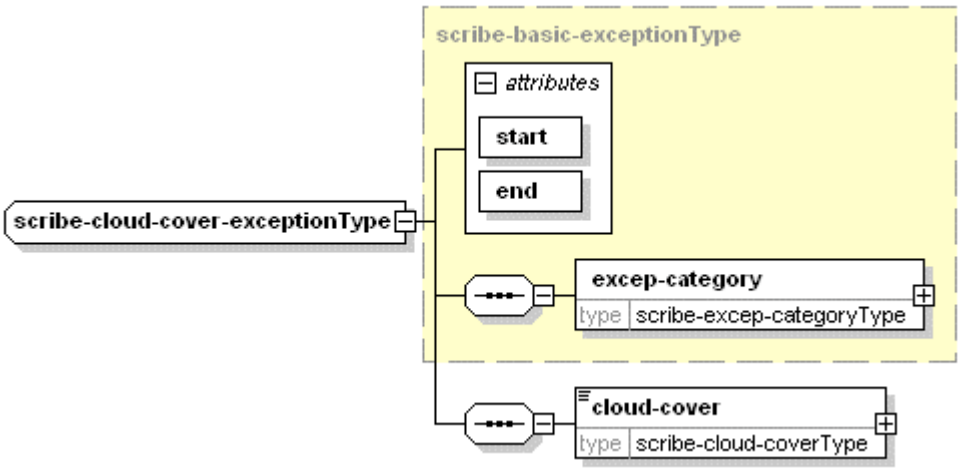
children wind-speed gust-speed

used by element scribe-wind-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	direction	scribe-wind-directionType	required		
	modificator	scribe-wind-	optional		

scribe-cloud-cover-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

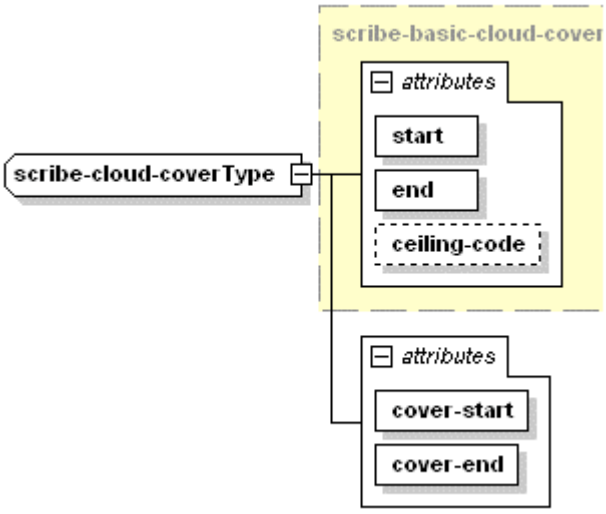
children excep-category cloud-cover

used by element scribe-cloud-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-cloud-coverType

diagram



type extension of scribe-basic-cloud-coverType

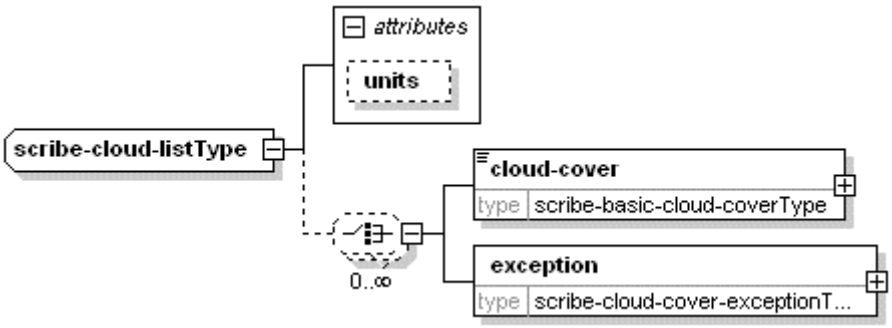
properties base scribe-basic-cloud-coverType

used by element scribe-cloud-cover-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	ceiling-code	scribe-cloud-cover-ceiling-codeType	optional		
	cover-start	**xsd:nonNegativeInt**	required		

scribe-cloud-listType

diagram



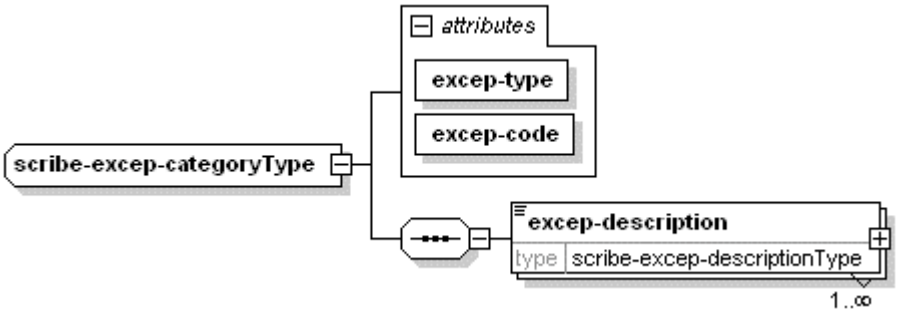
children cloud-cover exception

used by element scribe-

attributes	Name	Type	Use	Default	Fixed
	units	scribe-cloud-		deci	

scribe-excep-categoryType

diagram



children excep-description

used by element scribe-basic-

attributes	Name	Type	Use	Default	Fixed
	excep-type	scribe-excep-typeType	required		
	excep-code	scribe-excep-	required		

scribe-excep-descriptionType

diagram

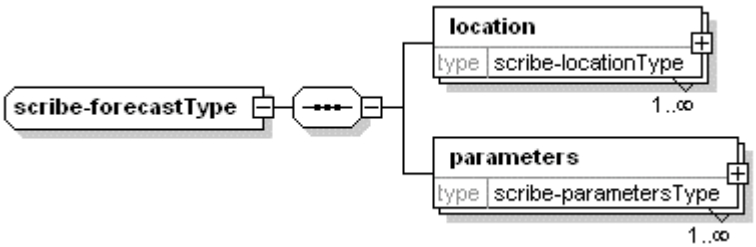
type extension of **xsd:string**
properties base xsd:string

used by element scribe-excep-

attributes	Name	Type	Use	Default	Fixed
	lang	scribe-	required		

scribe-forecastType

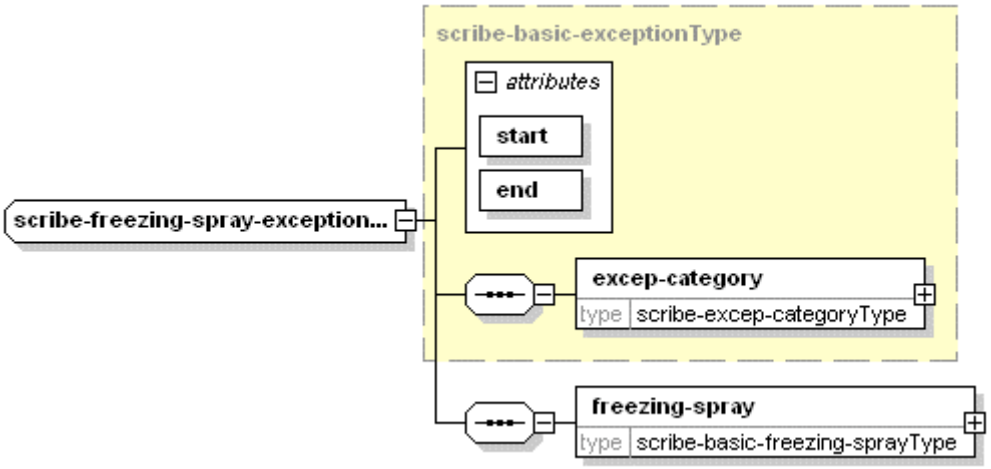
diagram



children location parameters
used by element forecastType/meteocode

scribe-freezing-spray-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

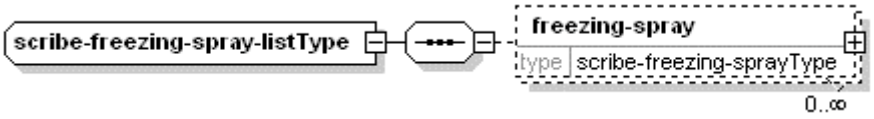
children excep-category freezing-spray

used by element scribe-freezing-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-freezing-spray-listType

diagram

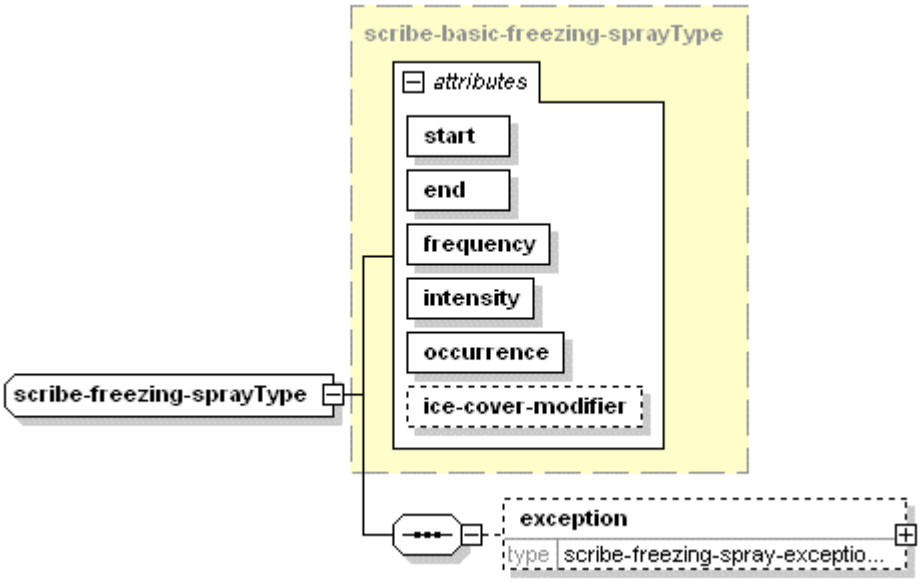


children freezing-spray

used by element scribe-

scribe-freezing-sprayType

diagram



type extension of scribe-basic-freezing-sprayType

properties base scribe-basic-freezing-sprayType

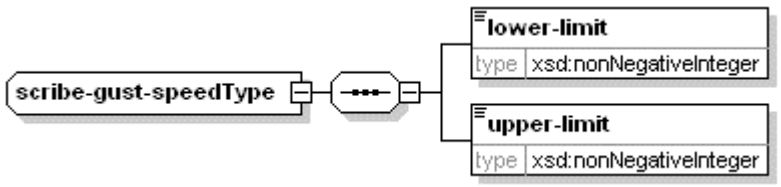
children exception

used by element scribe-freezing-spray-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	frequency	scribe-freezing-spray-frequencyType	required		
	intensity	scribe-freezing	required		

scribe-gust-speedType

diagram

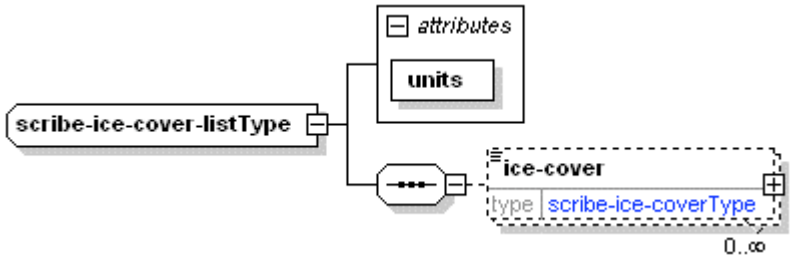


children lower-limit upper-limit

used by element scribe-basic-

scribe-ice-cover-listType

diagram



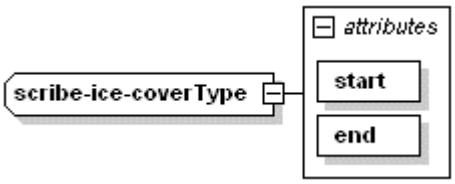
children ice-cover

used by element scribe-

attributes	Name	Type	Use	Default	Fixed
	units	**xsd:string**	required		%

scribe-ice-coverType

diagram



type extension of scribe-simple-probabilityType

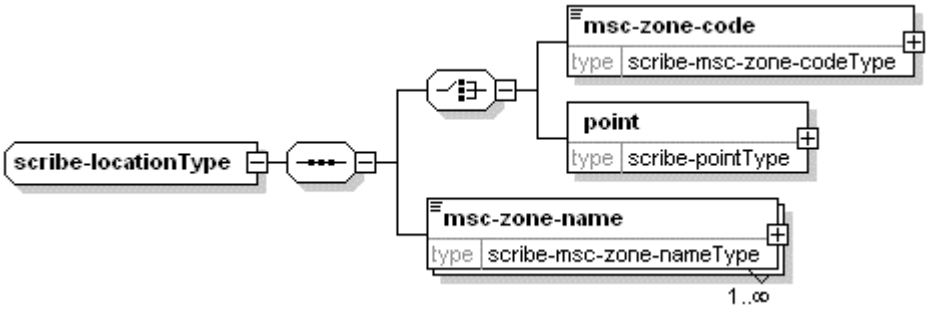
properties base scribe-simple-probabilityType

used by element scribe-ice-cover-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-locationType

diagram

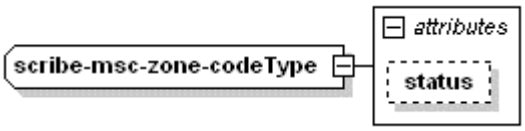


children msc-zone-code point msc-zone-name

used by elements scribe-amended-regionsType/location scribe-

scribe-msc-zone-codeType

diagram



type extension of **xsd:string**

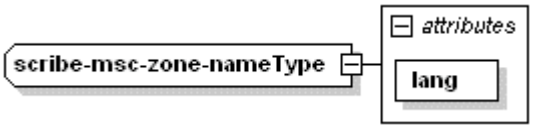
properties base xsd:string

used by element scribe-locationType/msc-

attributes	Name	Type	Use	Default	Fixed
	status	scribe-msc-			

scribe-msc-zone-nameType

diagram



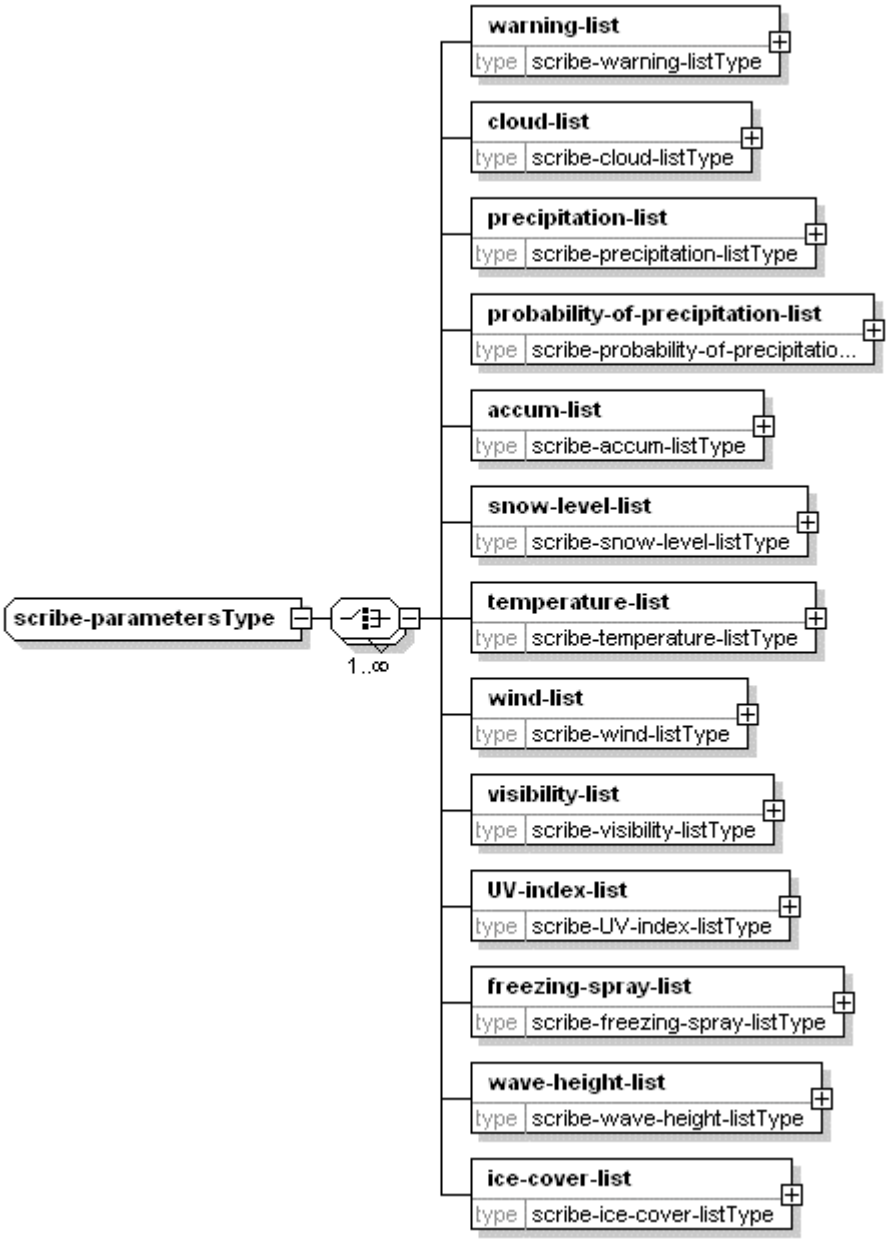
type extension of **xsd:string**

properties base xsd:string

used by element scribe-locationType/msc-

attributes	Name	Type	Use	Default	Fixed
	lang	scribe-	required		

scribe-parametersType

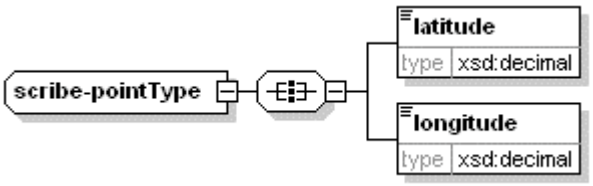


warning-list cloud-list precipitation-list probability-of-precipitation-list accum-list snow-level-list temperature-list wind-list visibility-list UV-index-list freezing-spray-list wave-height-list ice-cover-list

element scribe-

scribe-pointType

diagram

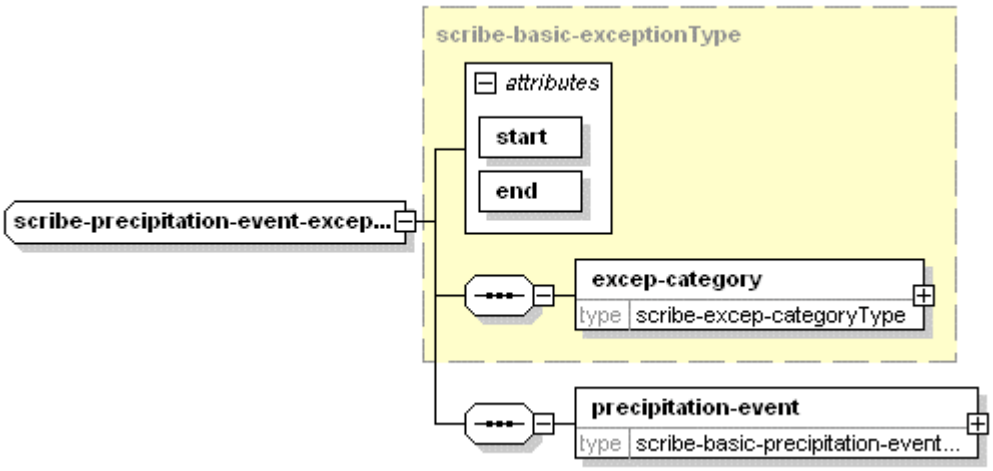


children latitude longitude

used by element scribe-

scribe-precipitation-event-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

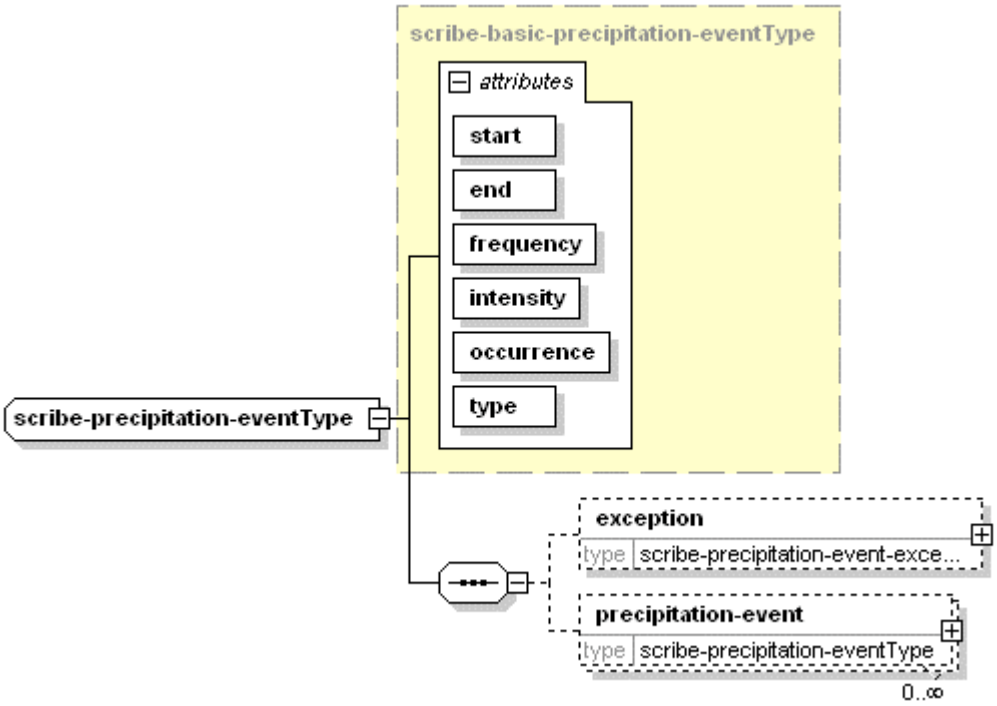
children excep-category precipitation-event

used by element scribe-precipitation-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-precipitation-eventType

diagram



type extension of scribe-basic-precipitation-eventType

properties base scribe-basic-precipitation-eventType

children exception precipitation-event

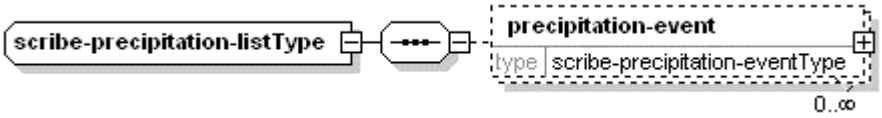
used by elements scribe-precipitation-listType/precipitation-event scribe-precipitation-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		
frequency	scribe-precipitation-frequencyType	required		
intensity	scribe-	required		

scribe-precipitation-listType

diagram

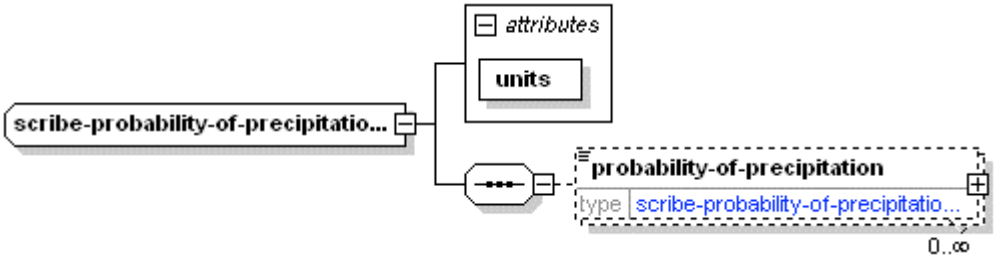


children [precipitation-event](#)

used by element scribe-

scribe-probability-of-precipitation-listType

diagram



children [probability-of-precipitation](#)

used by element scribe-parametersType/probability-of-

attributes

Name	Type	Use	Default	Fixed
units	**xsd:string**	required		%

scribe-probability-of-precipitationType

diagram

type extension of [scribe-simple-probabilityType](#)

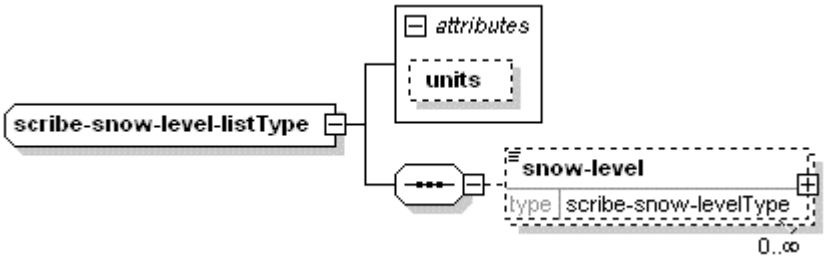
properties base scribe-simple-probabilityType

used by element scribe-probability-of-precipitation-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-snow-level-listType

diagram



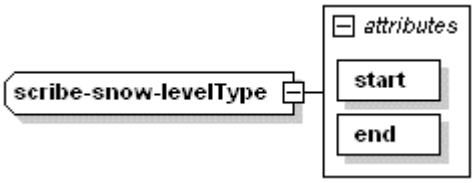
children snow-level

used by element scribe-

attributes	Name	Type	Use	Default	Fixed
	units	scribe-snow-		m	

scribe-snow-levelType

diagram



type extension of **xsd:nonNegativeInteger**

properties base xsd:nonNegativeInteger

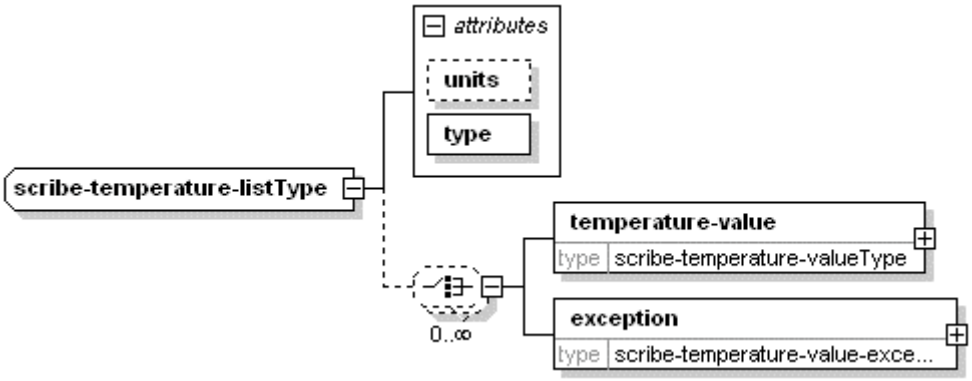
used by element scribe-snow-level-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		

scribe-temperature-listType

diagram



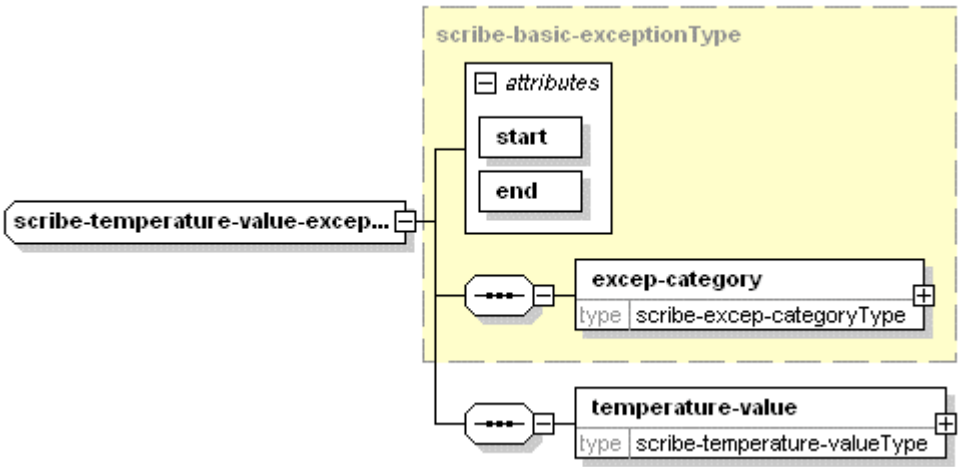
children temperature-value exception

used by element scribe-

attributes	Name	Type	Use	Default	Fixed
	units	scribe-temperature-unitsType		celsius	

scribe-temperature-value-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

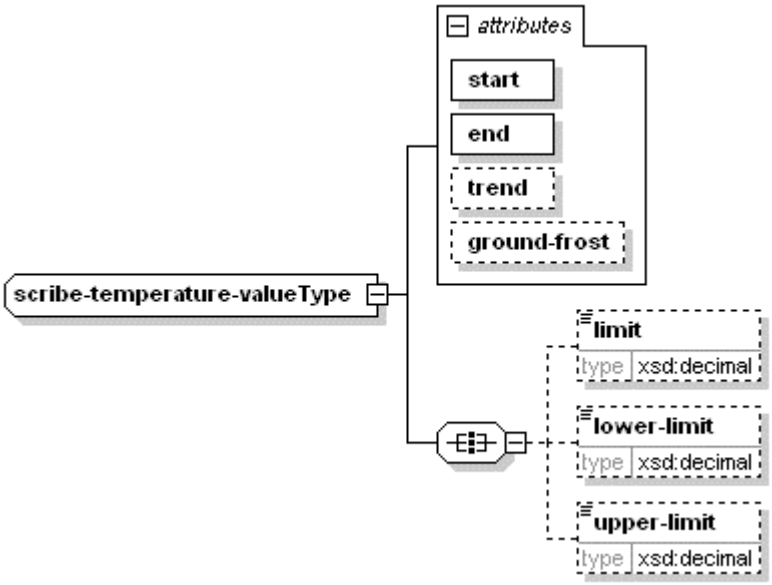
children excep-category temperature-value
used by element scribe-temperature-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		

scribe-temperature-valueType

diagram



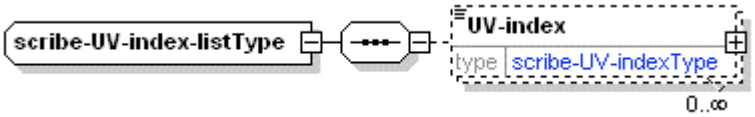
children limit lower-limit upper-limit

used by elements scribe-temperature-listType/temperature-value scribe-temperature-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	trend	scribe-temperature-trendType			

scribe-UV-index-listType

diagram

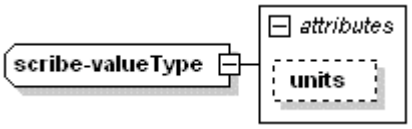


children UV-index

used by element scribe-

scribe-valueType

diagram



type extension of **xsd:decimal**

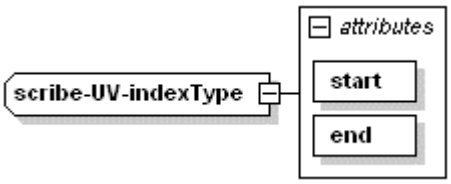
properties base xsd:decimal

used by element scribe-basic-

attributes	Name	Type	Use	Default	Fixed
	units	scribe-value-		NM	

scribe-UV-indexType

diagram



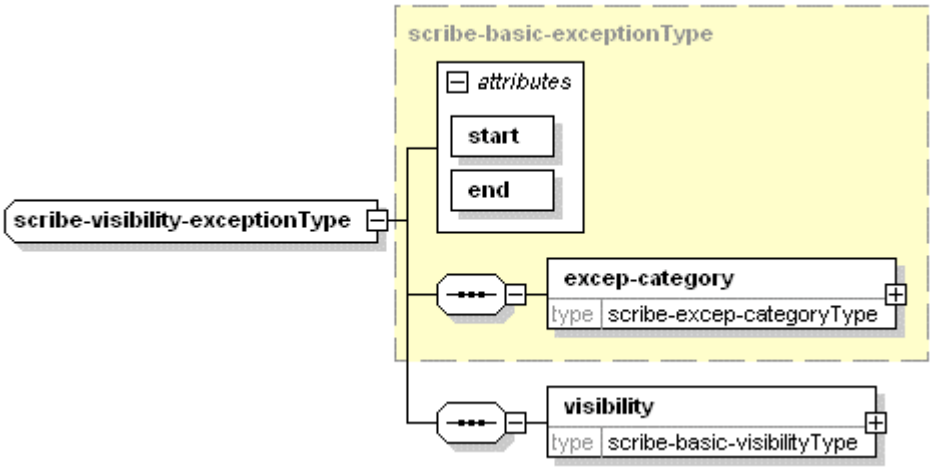
type extension of **xsd:decimal**
properties base xsd:decimal

used by element scribe-UV-index-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-visibility-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

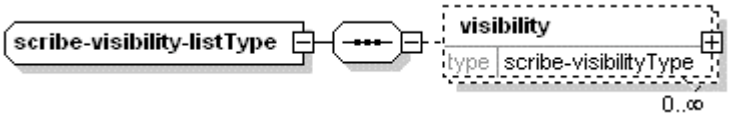
children excep-category visibility

used by element scribe-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		

scribe-visibility-listType

diagram

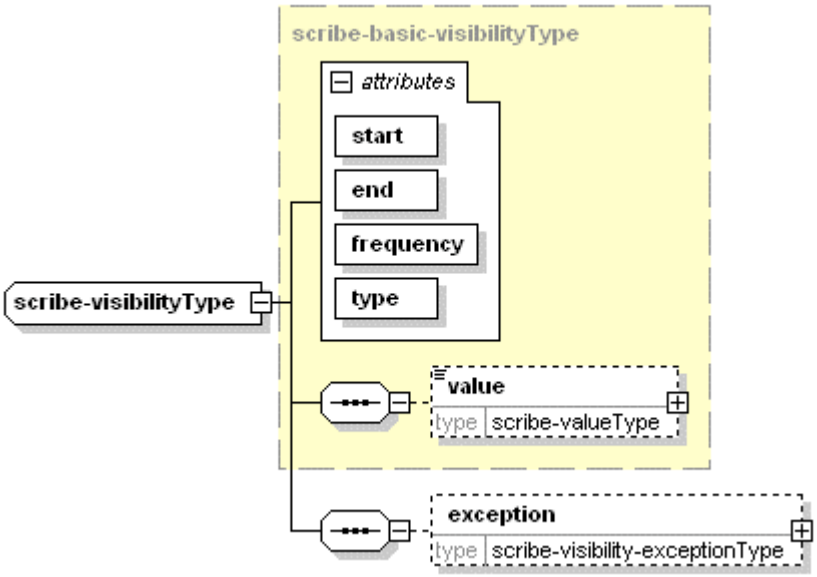


children [visibility](#)

used by element scribe-

scribe-visibilityType

diagram



type extension of [scribe-basic-visibilityType](#)

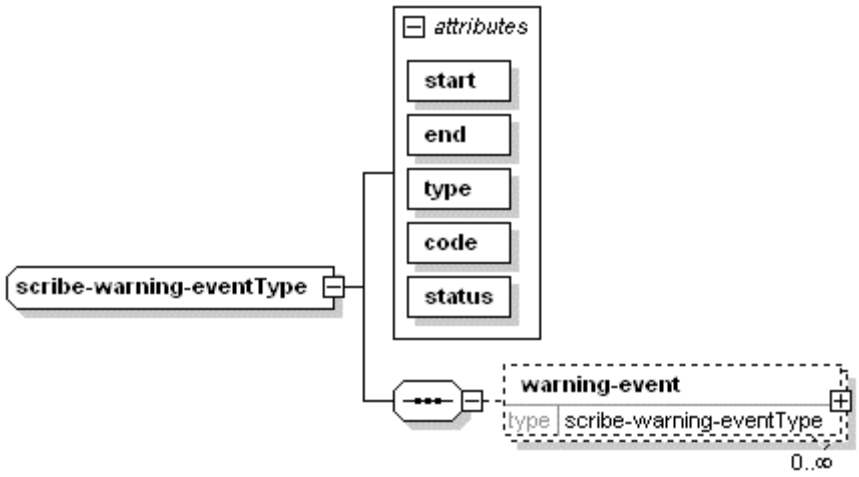
properties base scribe-basic-visibilityType

children value exception
used by element scribe-visibility-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	frequency	scribe-visibility-frequencyTyp	required		

scribe-warning-eventType

diagram



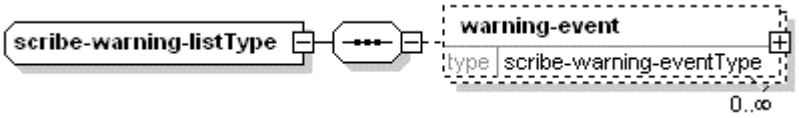
children warning-event

used by elements scribe-warning-listType/warning-event scribe-warning-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	type	scribe-warning-typeType	required		
	code	scribe-	required		

scribe-warning-listType

diagram

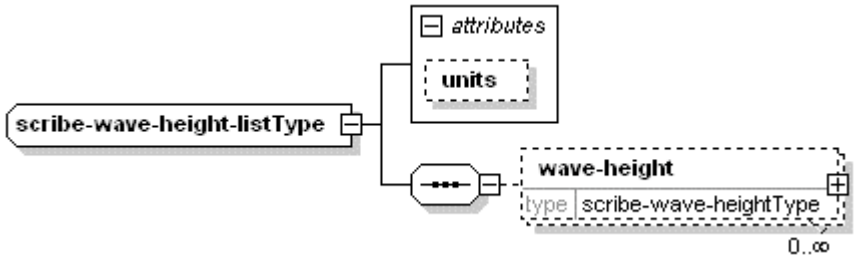


children warning-event

used by element scribe-

scribe-wave-height-listType

diagram



children [wave-height](#)

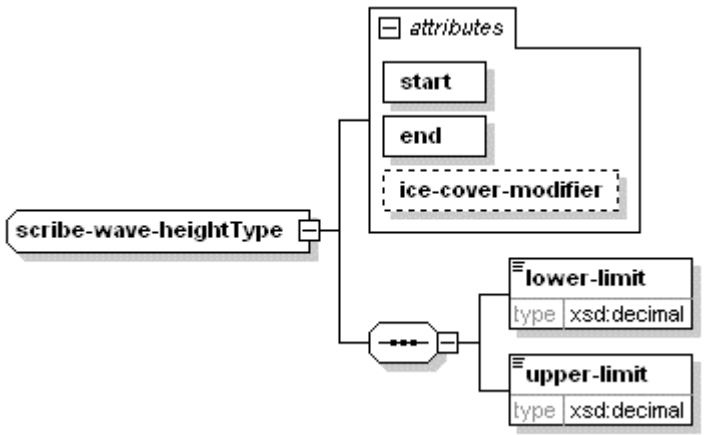
used by element scribe-

attributes

Name	Type	Use	Default	Fixed
units	scribe-wave-		m	

scribe-wave-heightType

diagram



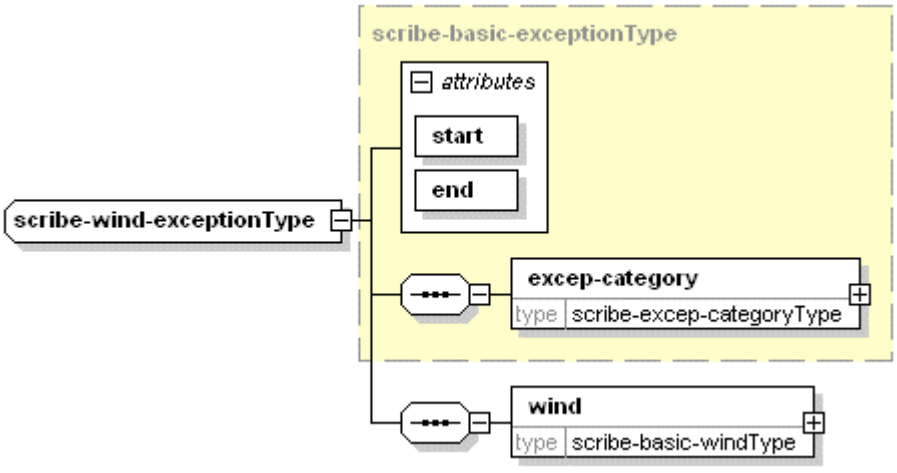
children [lower-limit](#) [upper-limit](#)

used by element scribe-wave-height-

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	ice-cover-modifier	scribe-wave-height-ice-	optional		

scribe-wind-exceptionType

diagram



type extension of scribe-basic-exceptionType

properties base scribe-basic-exceptionType

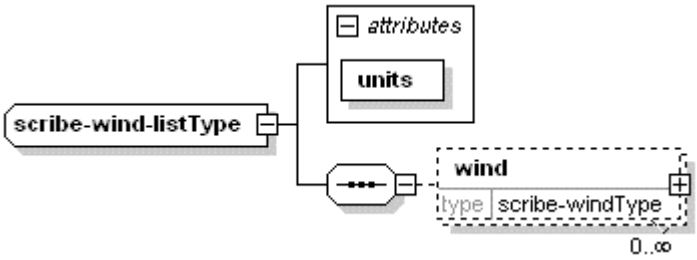
children excep-category wind
used by element scribe-

attributes

Name	Type	Use	Default	Fixed
start	**xsd:dateTime**	required		
end	**xsd:dateTime**	required		

scribe-wind-listType

diagram



children wind

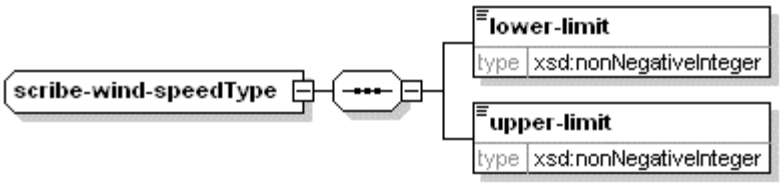
used by element scribe-

attributes

Name	Type	Use	Default	Fixed
units	scribe-wind-	required		

scribe-wind-speedType

diagram

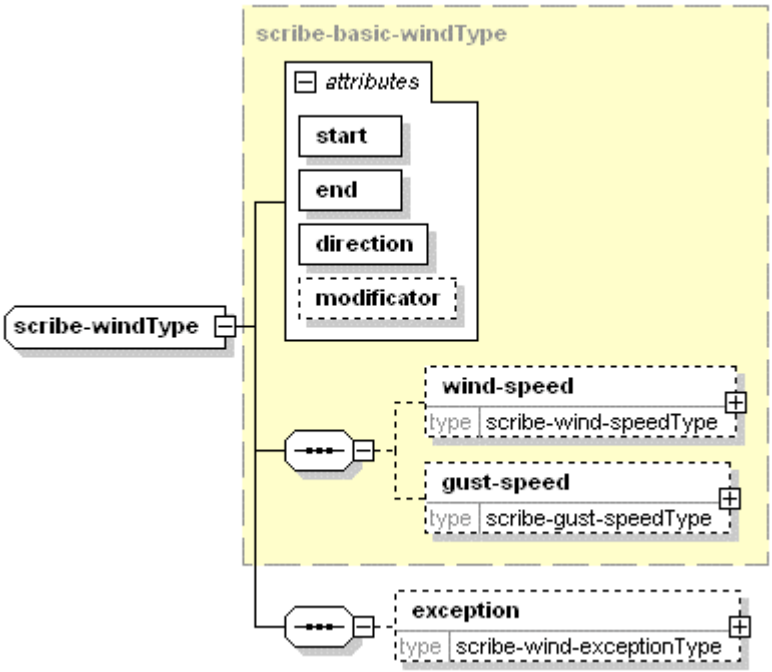


children lower-limit upper-limit

used by element scribe-basic-

scribe-windType

diagram



type extension of scribe-basic-windType

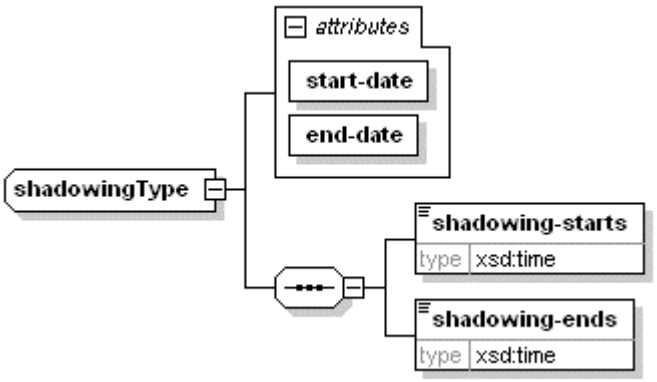
properties base scribe-basic-windType

children wind-speed gust-speed exception

attributes	Name	Type	Use	Default	Fixed
	start	**xsd:dateTime**	required		
	end	**xsd:dateTime**	required		
	direction	scribe-wind-directionType	required		
	modificator		optional		

shadowingType

diagram



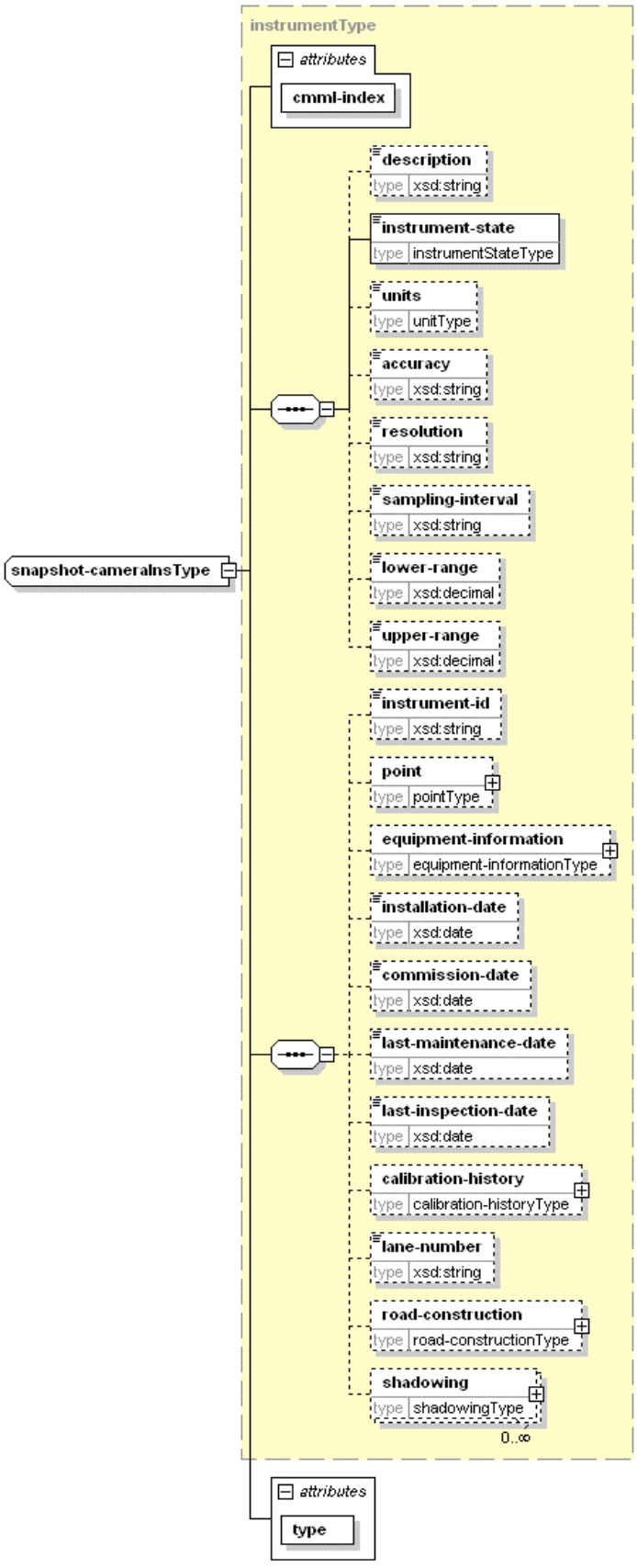
children shadowing-starts shadowing-ends

used by element instrumentType/sha

attributes	Name	Type	Use	Default	Fixed
	start-date	**xsd:gMonthDay**	required		
	end-date	**xsd:gMonthDay**	required		

snapshot-cameraInsType

diagram


snapshot-cameraInsType
instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
attributes
type

type extension of instrumentType

properties base instrumentType

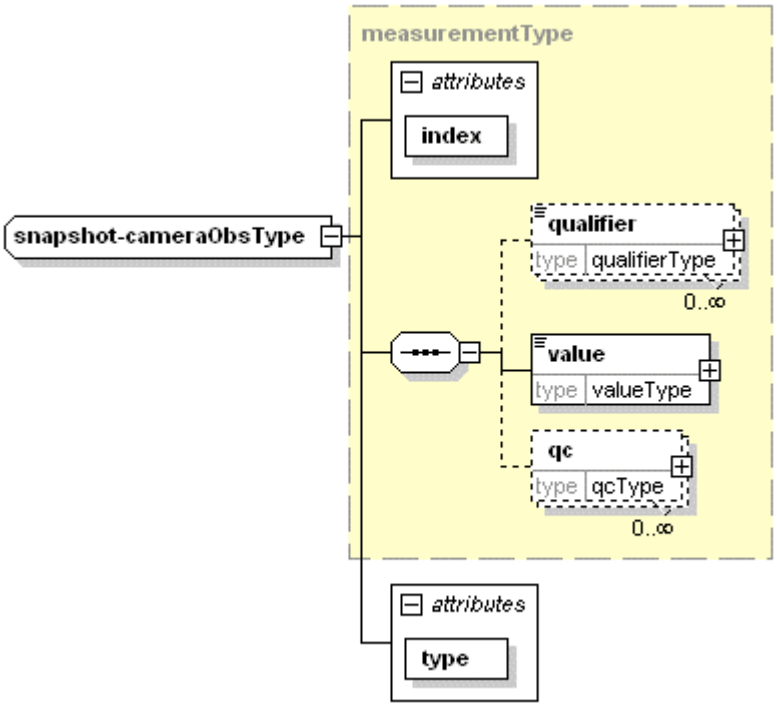
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-metadataType/snapshot-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	snapshot-	required		

snapshot-cameraObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

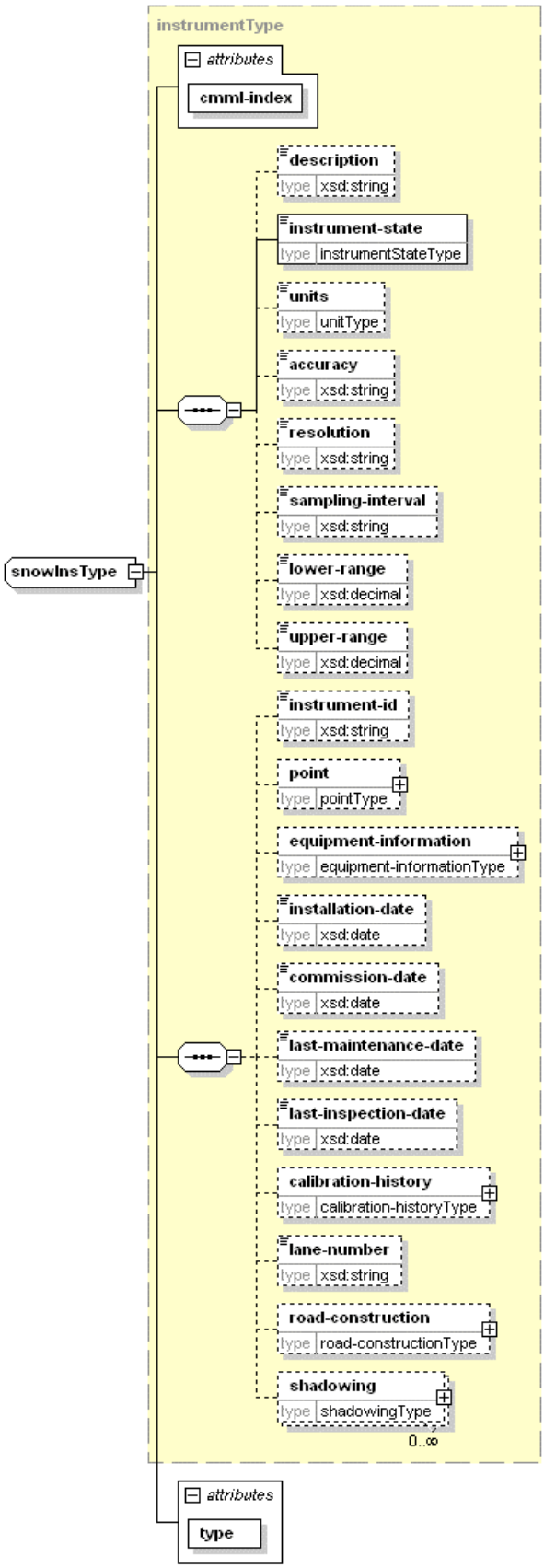
used by element observationType/snapsh

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	snapshot-	required		

snowInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
snowIns Type
attributes
type

type extension of instrumentType

properties base instrumentType

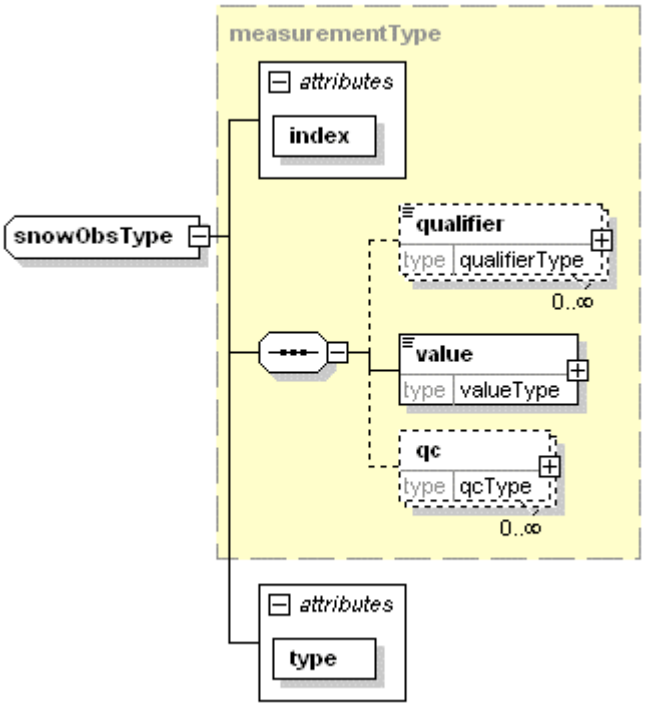
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-metadataType/snow-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	snowTypeTyp	required		

snowObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

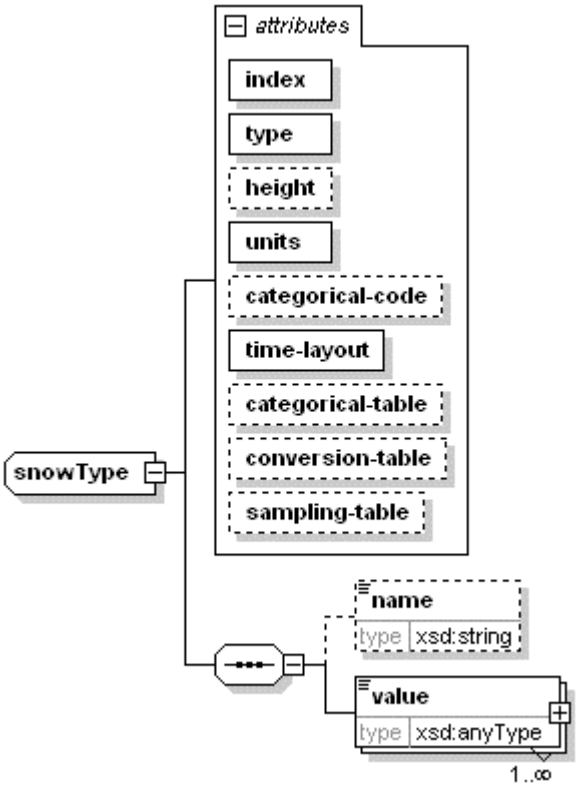
used by element observationType

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	snowTypeTyp	required		

snowType

diagram



children [name](#) [value](#)

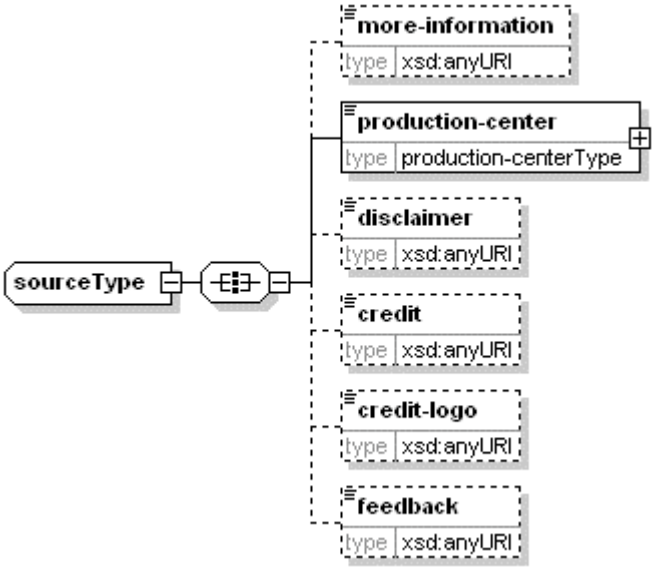
used by element parametersType

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	snowTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttribute	required		

sourceType

diagram

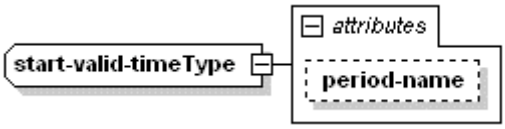


children more-information production-center disclaimer credit credit-logo feedback

used by element headType/so

start-valid-timeType

diagram



type extension of **xsd:dateTime**

properties base xsd:dateTime

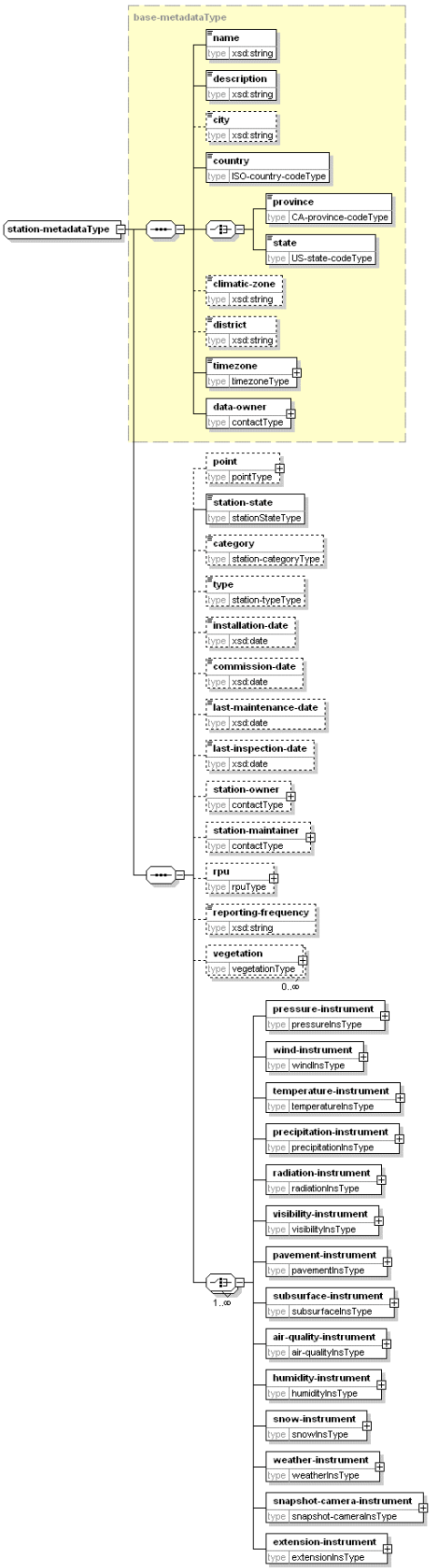
used by element time-

attributes

Name	Type	Use	Default	Fixed
period-name	**xsd:string**	optional		

station-metadataType

diagram


base-metadataType
name
type xsd:string
description
type xsd:string
city
type xsd:string
country
type ISO-country-codeType
province
type CA-province-codeType
state
type US-state-codeType
climatic-zone
type xsd:string
district
type xsd:string
timezone
type timezoneType
data-owner
type contactType
station-metadataType
point
type pointType
station-state
type stationStateType
category
type station-categoryType
type
type station-typeType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
station-owner
type contactType
station-maintainer
type contactType
rpu
type rpuType
reporting-frequency
type xsd:string
vegetation
type vegetationType
0..∞
1..∞
pressure-instrument
type pressureInsType
wind-instrument
type windInsType
temperature-instrument
type temperatureInsType
precipitation-instrument
type precipitationInsType
radiation-instrument
type radiationInsType
visibility-instrument
type visibilityInsType
pavement-instrument
type pavementInsType
subsurface-instrument
type subsurfaceInsType
air-quality-instrument
type air-qualityInsType
humidity-instrument
type humidityInsType
snow-instrument
type snowInsType
weather-instrument
type weatherInsType
snapshot-camera-instrument
type snapshot-cameraInsType
extension-instrument
type extensionInsType

type extension of base-metadataType

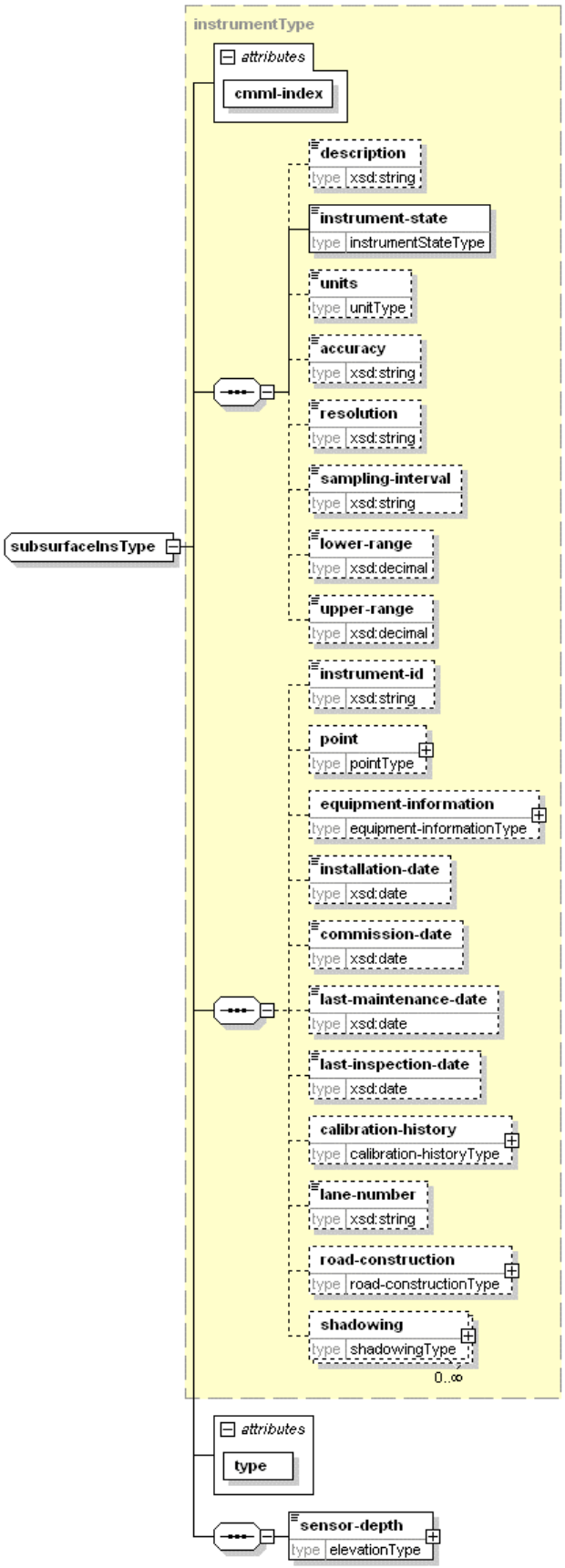
properties base base-metadataType

children name description city country province state climatic-zone district timezone data-owner point station-state category type installation-date commission-date last-maintenance-date last-inspection-date station-owner station-maintainer rpu reporting-frequency vegetation pressure-instrument wind-instrument temperature-instrument precipitation-instrument radiation-instrument visibility-instrument pavement-instrument subsurface-instrument air-quality-instrument humidity-instrument snow-instrument weather-instrument snapshot-camera-instrument extension-instrument

used by element location-

subsurfaceInsType

diagram


subsurfaceInsType
instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
attributes
type
sensor-depth
type elevationType

type extension of instrumentType

properties base instrumentType

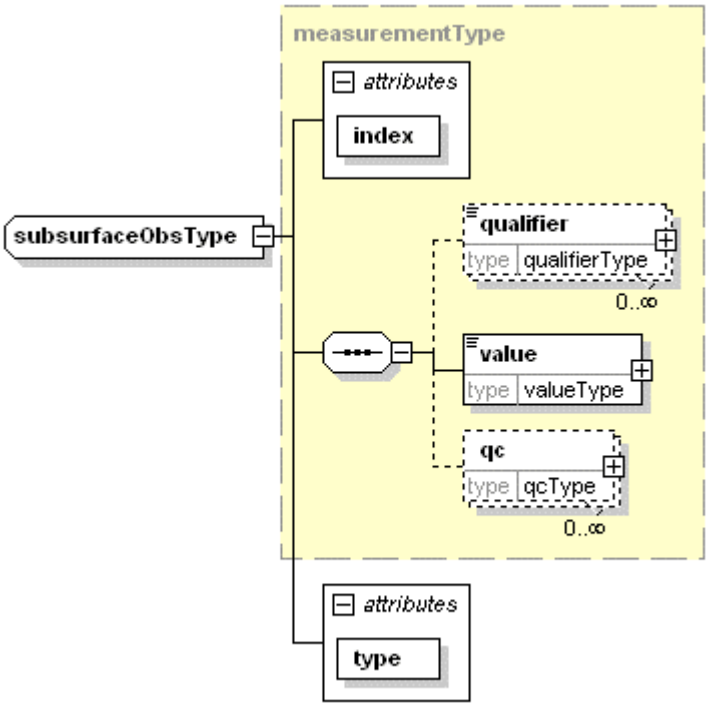
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing sensor-depth

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	subsurfaceTy	required		

subsurfaceObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

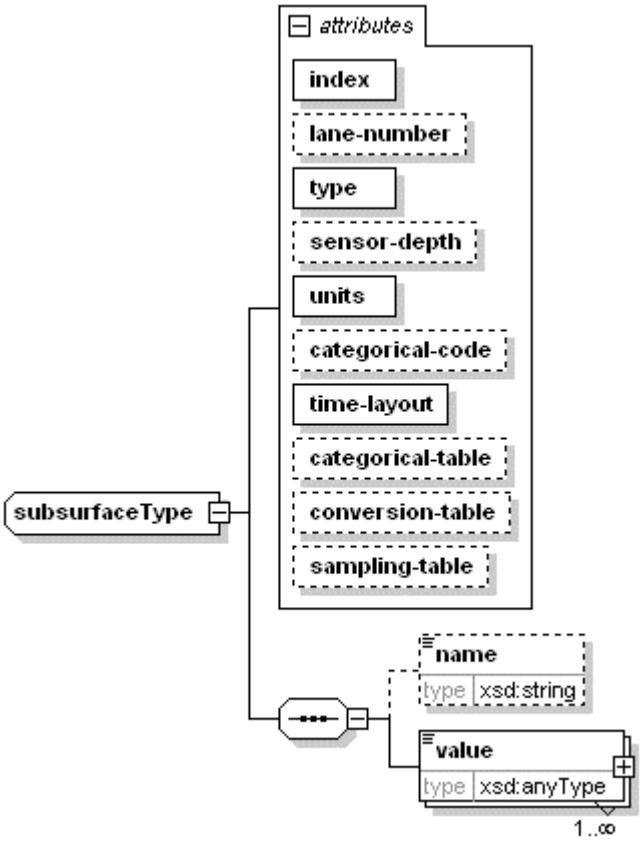
used by element observationType/sub

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	subsurfaceTy	required		

subsurfaceType

diagram



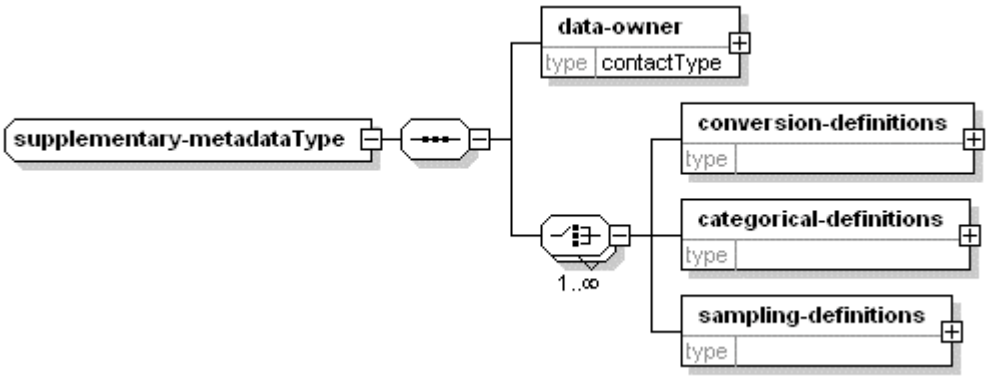
children [name](#) [value](#)

used by element parametersType/sub

attributes	Name	Type	Use	Default	Fixed
	index	**xsd:nonNegativeInteger**	required		
	lane-number	**xsd:nonNegativeInteger**	optional	1	
	type	subsurfaceTypeType	required		
	sensor-depth	**xsd:nonNegativeInteger**	optional	5	
	units	unitType	required		
	categorical-code	**xsd:string**	optional		
	time-layout	time-layoutAttribute	required		

supplementary-metadataType

diagram

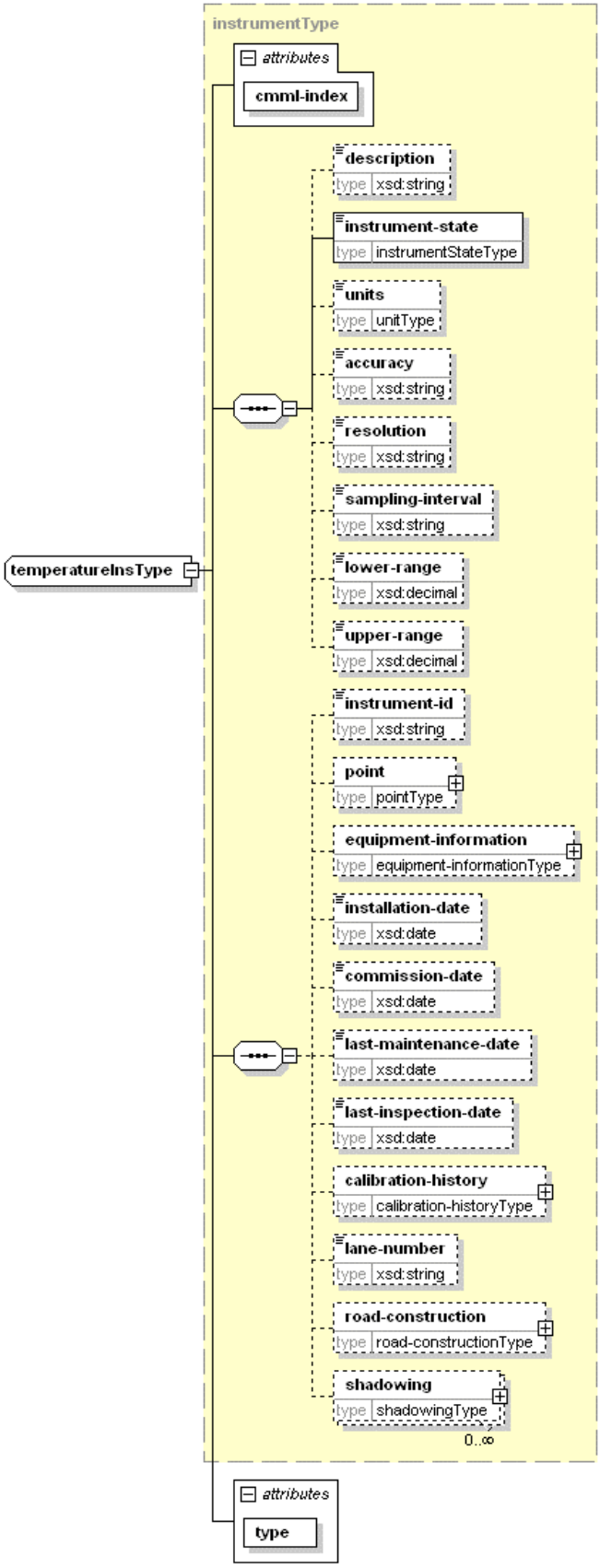


children data-owner conversion-definitions categorical-definitions sampling-definitions

used by element metadataType/supplementar

temperatureInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
temperatureInsType
attributes
type

type extension of instrumentType

properties base instrumentType

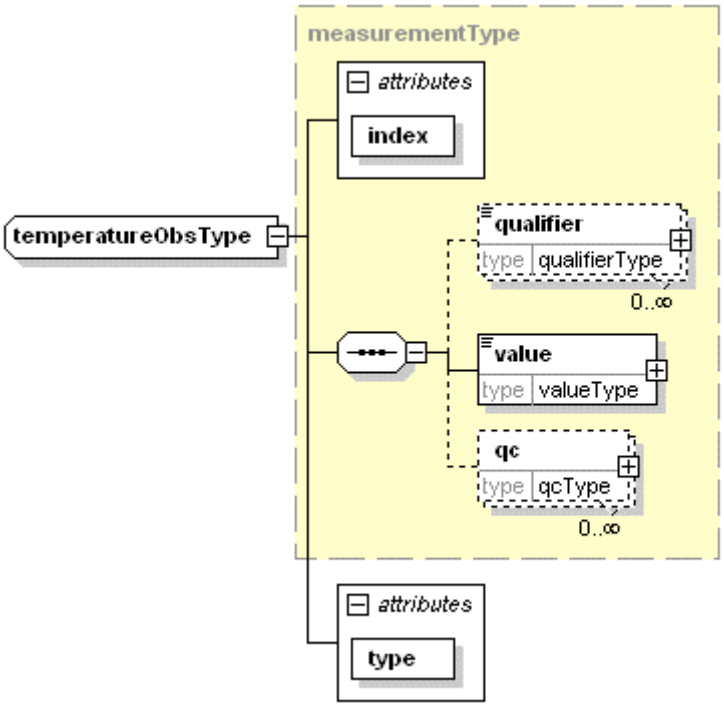
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	temperatureT	required		

temperatureObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

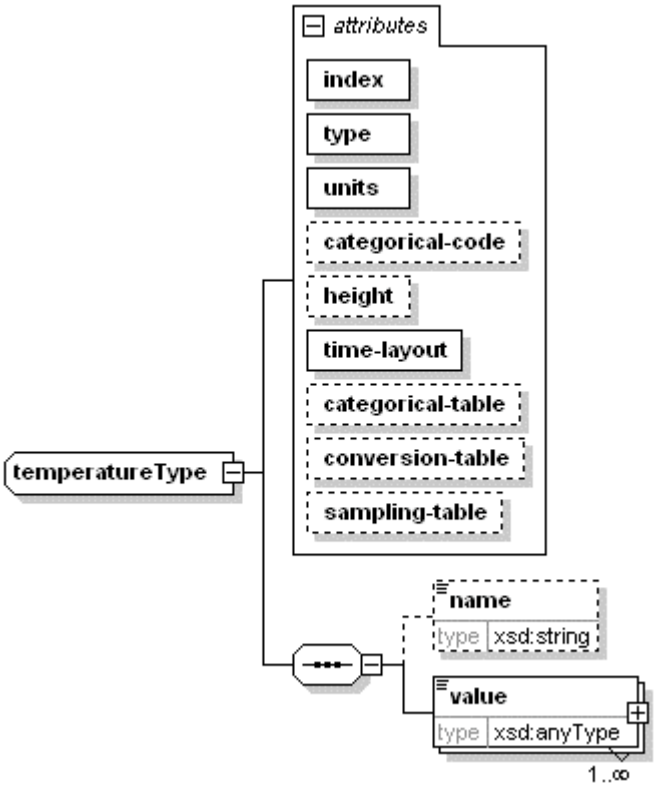
used by element observationType/tem

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	temperatureT	required		

temperatureType

diagram



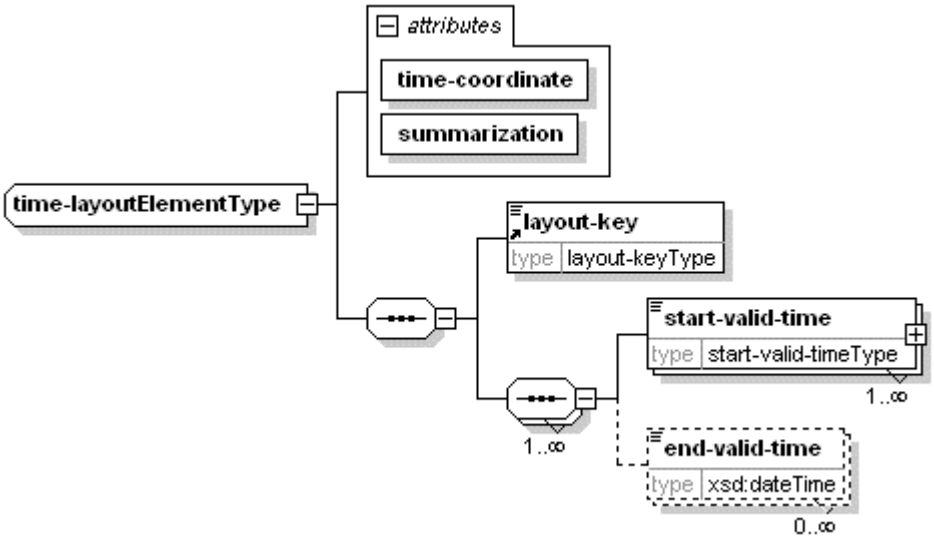
children [name](#) [value](#)

used by element parametersType/tem

attributes	Name	Type	Use	Default	Fixed
	index	**xsd:nonNegativeInteger**	required		
	type	temperatureTypeType	required		
	units	unitType	required		
	categorical-code	**xsd:string**	optional		
	height	**xsd:nonNegativeInteger**	optional		
	time-layout	time-layoutAttribute	required		

time-layoutElementType

diagram



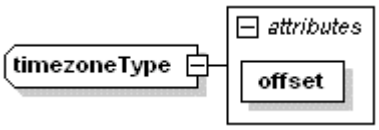
children layout-key start-valid-time end-valid-time

used by element pavement-

attributes	Name	Type	Use	Default	Fixed
	time-coordinate	time-	required		

timezoneType

diagram



type extension of timezonetypeType

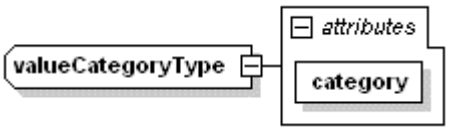
properties base timezonetypeType

used by element base-

attributes	Name	Type	Use	Default	Fixed
	offset	offsetType	required		

valueCategoryType

diagram



type extension of **xsd:string**

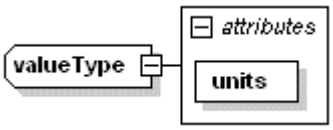
properties base xsd:string

used by element categorical-

attributes	Name	Type	Use	Default	Fixed
	category	non-	required		

valueType

diagram



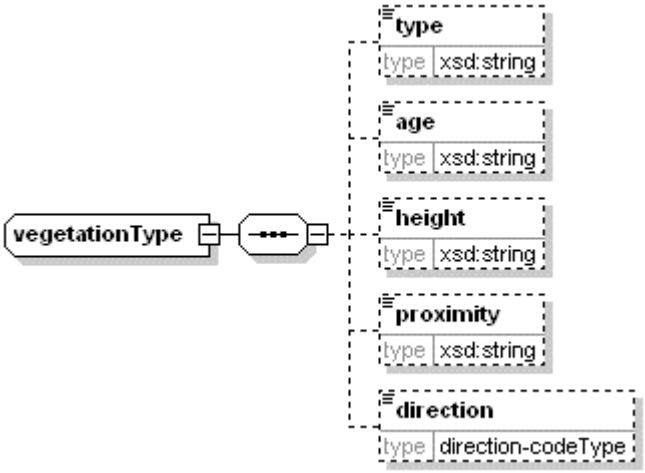
properties mixed true

used by element measurementTyp

attributes	Name	Type	Use	Default	Fixed
	units	unitType	required		

vegetationType

diagram

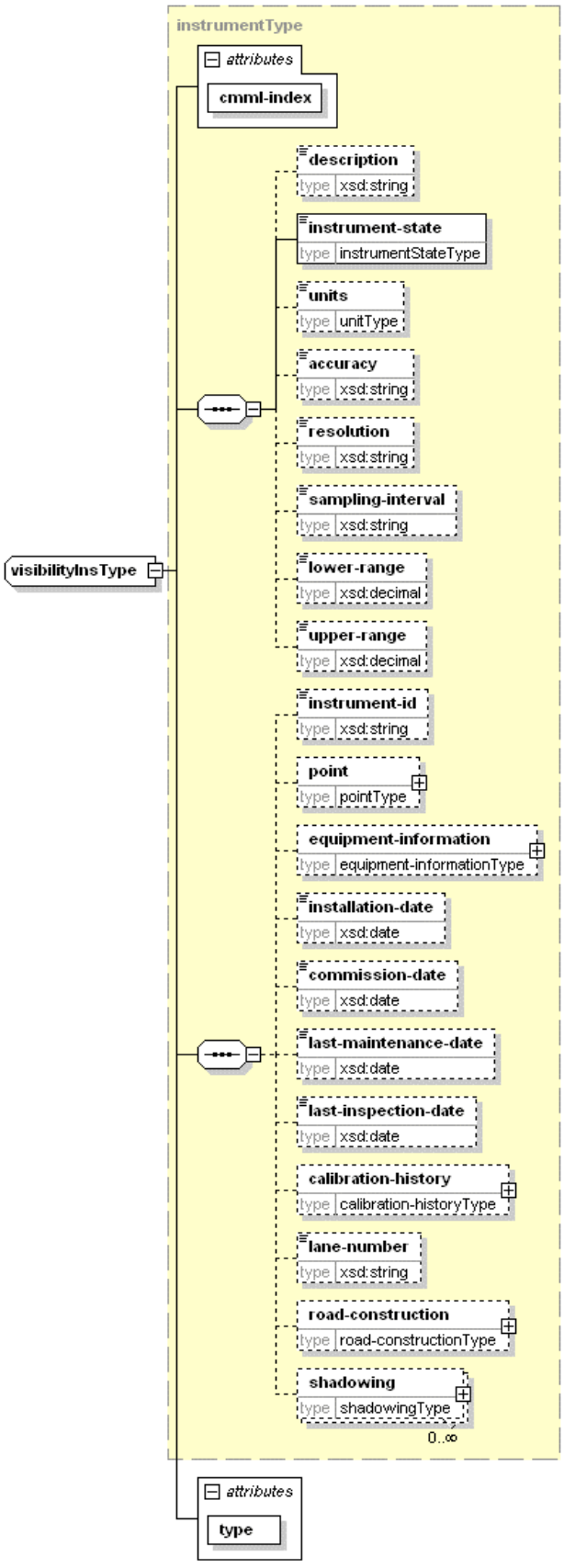


children type age height proximity direction

used by element station-

visibilityInsType

diagram


visibilityInsType
instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
attributes
type

type extension of instrumentType

properties base instrumentType

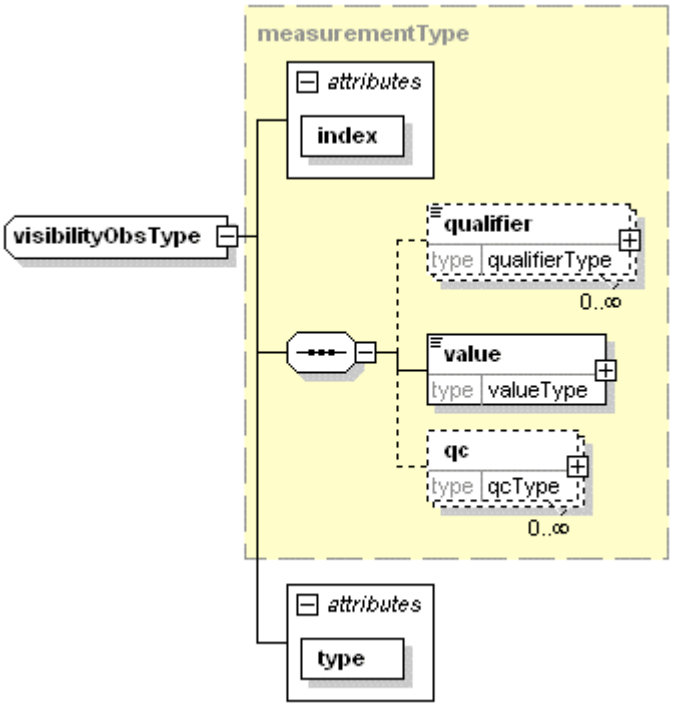
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-metadataType/visibility-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	visibilityTypeT	required		

visibilityObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

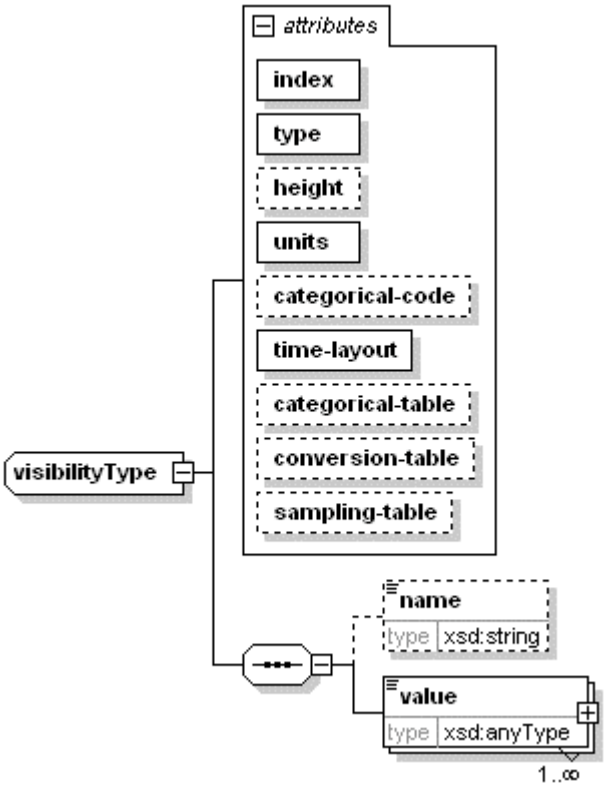
used by element observationType/vi

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	visibilityTypeT	required		

visibilityType

diagram



children name value

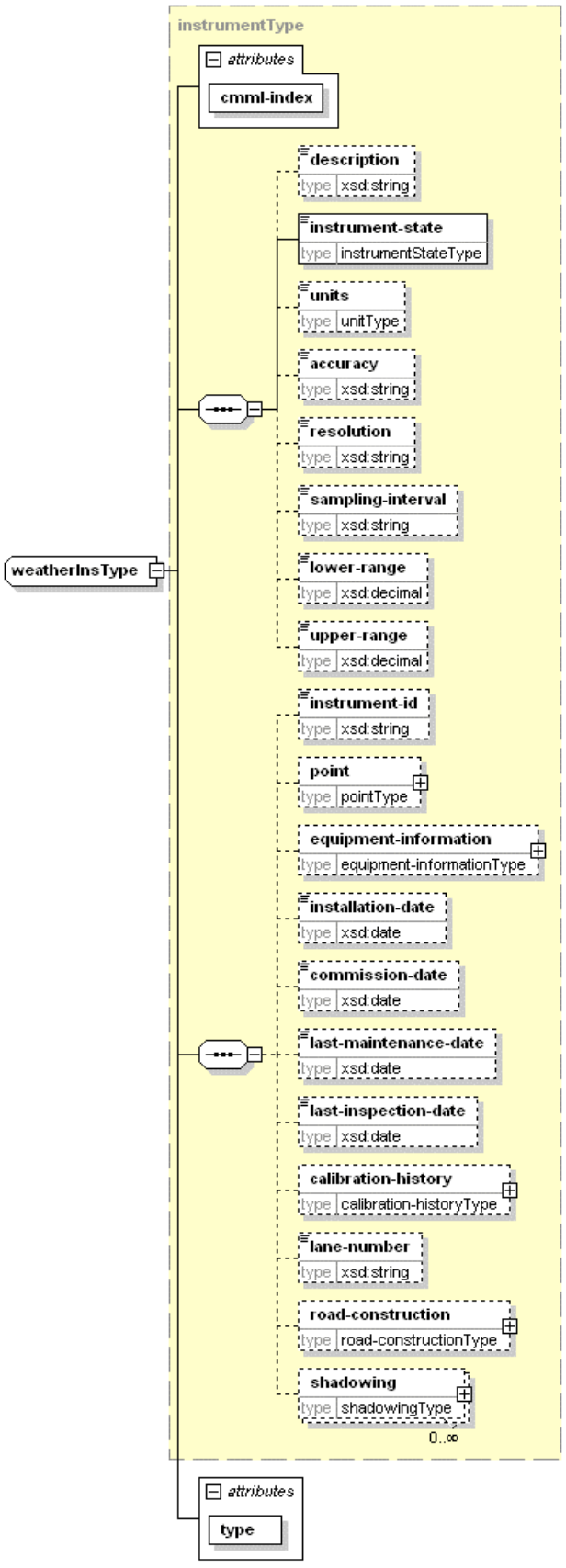
used by element parametersType/vi

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	visibilityTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttribute	required		

weatherInsType

diagram


instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
weatherInsType
attributes
type

type extension of instrumentType

properties base instrumentType

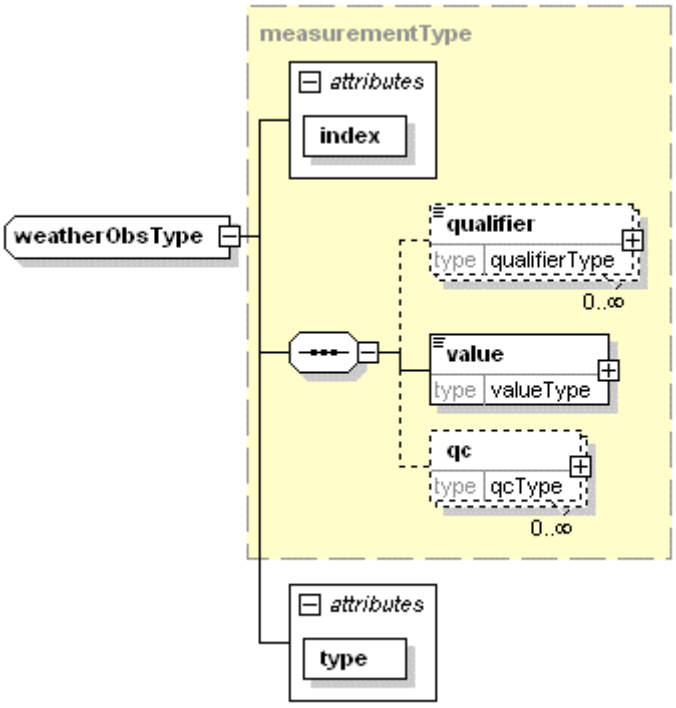
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	weatherTypeT	required		

weatherObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

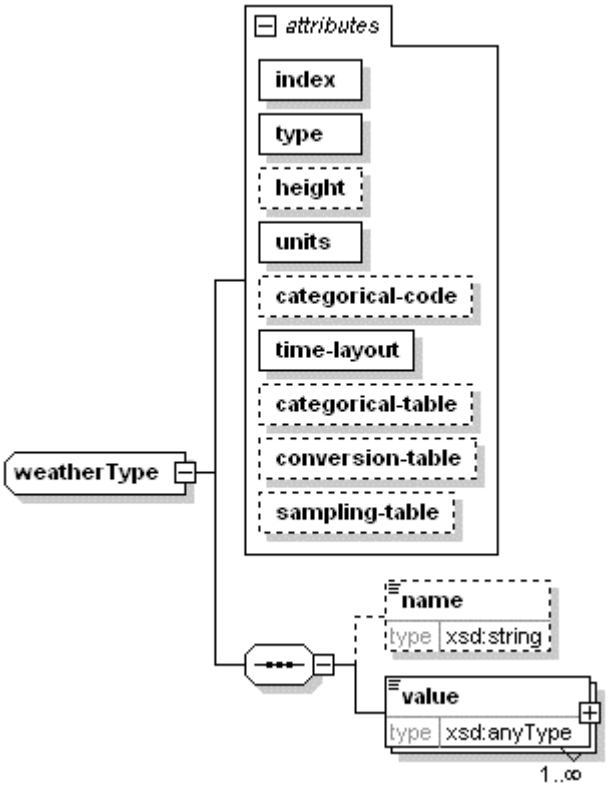
used by element observationType/w

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	weatherTypeT	required		

weatherType

diagram



children [name](#) [value](#)

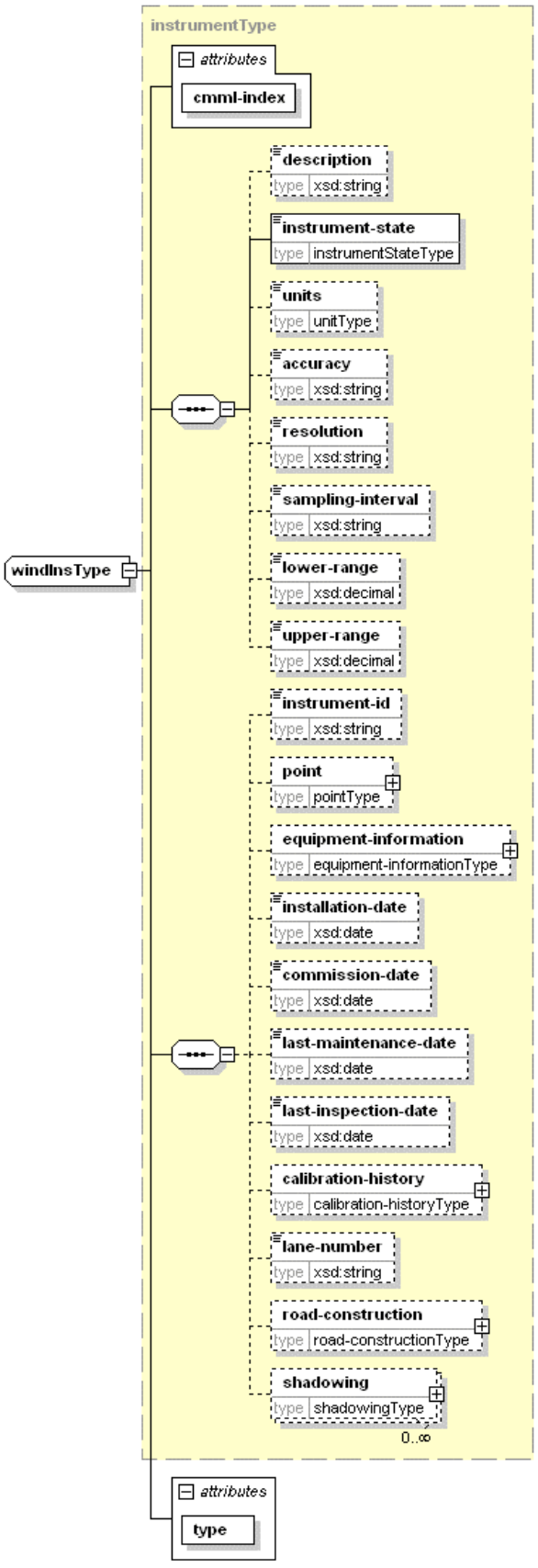
used by element parametersType/

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	weatherTypeType	required		
height	**xsd:nonNegativeInteger**	optional		
units	unitType	required		
categorical-code	**xsd:string**	optional		
time-layout	time-layoutAttribute	required		

windInsType

diagram


windInsType
instrumentType
attributes
cmml-index
description
type xsd:string
instrument-state
type instrumentStateType
units
type unitType
accuracy
type xsd:string
resolution
type xsd:string
sampling-interval
type xsd:string
lower-range
type xsd:decimal
upper-range
type xsd:decimal
instrument-id
type xsd:string
point
type pointType
equipment-information
type equipment-informationType
installation-date
type xsd:date
commission-date
type xsd:date
last-maintenance-date
type xsd:date
last-inspection-date
type xsd:date
calibration-history
type calibration-historyType
lane-number
type xsd:string
road-construction
type road-constructionType
shadowing
type shadowingType
0..∞
attributes
type

type extension of instrumentType

properties base instrumentType

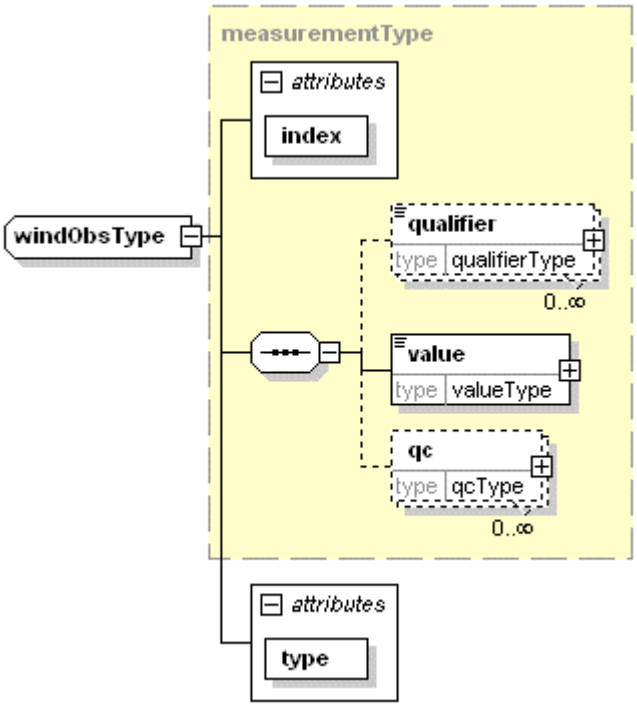
children description instrument-state units accuracy resolution sampling-interval lower-range upper-range instrument-id point equipment-information installation-date commission-date last-maintenance-date last-inspection-date calibration-history lane-number road-construction shadowing

used by element station-metadataType/wind-

attributes	Name	Type	Use	Default	Fixed
	cmml-index	**xsd:nonNegativeInteger**	required		
	type	windTypeTyp	required		

windObsType

diagram



type extension of measurementType

properties base measurementType

children qualifier value qc

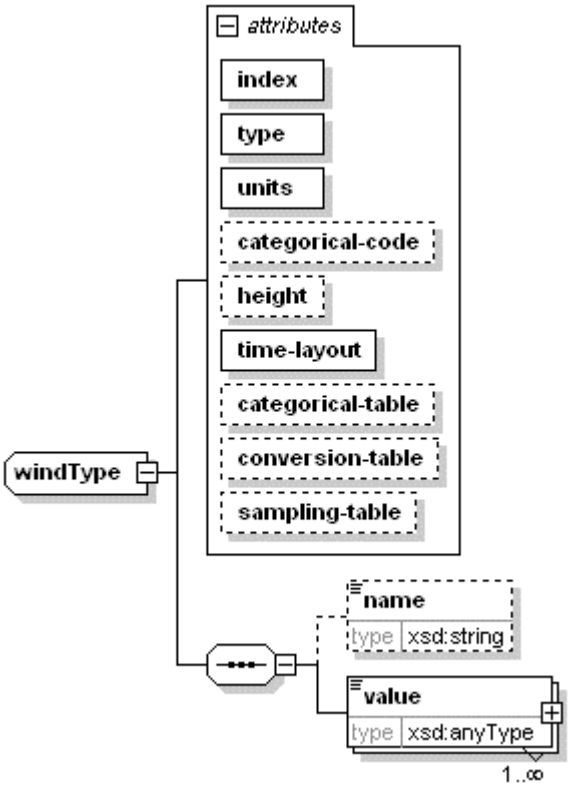
used by element observationType

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	windTypeTyp	required		

windType

diagram



children [name](#) [value](#)

used by element parametersTyp

attributes

Name	Type	Use	Default	Fixed
index	**xsd:nonNegativeInteger**	required		
type	windTypeType	required		
units	unitType	required		
categorical-code	**xsd:string**	optional		
height	**xsd:nonNegativeInteger**	optional		
time-layout	time-layoutAttribute	required		

Simple Types

air-qualityTypeType

type restriction of **xsd:string**

used by attributes air-qualityType/@type, air-qualityObsType/@type, air-

bridge-or-overpass-materialType

type restriction of **xsd:string**

used by elements bridgeType/material

calibrationCommentType

type **xsd:string**

used by element calibrationType/co

CA-province-codeType

type restriction of **xsd:string**

used by element base-

categoryType

type restriction of **xsd:string**

used by element productType/cat

datumType

type restriction of **xsd:string**

used by attribute elevationType/@

direction-codeType

type restriction of **xsd:string**

used by elements roadwayType/aspect

earthworkType

type restriction of **xsd:string**

used by element roadType/eart

elevation-unitsType

type restriction of **xsd:string**

used by attribute elevationType/

emailType

type restriction of **xsd:string**

used by element contactType/

fieldType

type restriction of **xsd:string**

used by element productType/

humidityTypeType

type restriction of **xsd:string**

used by attributes humidityType/@type humidityObsType/@type

identifiertypeType

type restriction of **xsd:string**

used by attribute identifierType/

instrumentStateType

type restriction of **xsd:string**

used by element basic-

ip-addressType

type restriction of **xsd:string**

used by element rpuType/ip-

ISO-country-codeType

type restriction of **xsd:string**

used by element base-

layout-keyType

type restriction of **xsd:string**

used by element layout-

measurement-categoryType

type restriction of **xsd:string**

used by attribute gc-flagType/@associated-

measurement-typeType

type restriction of **xsd:string**

used by attribute gc-flagType/@associated-

non-emptyString

type restriction of **xsd:string**

used by element contactType/name
attributes parametersType/@applicable-location valueCategoryType/@category

offsetType

type restriction of **xsd:decimal**

used by attribute timezoneType/

operational-modeType

type restriction of **xsd:string**

used by attribute productType/@operatio

origintypeType

type restriction of **xsd:string**

used by attribute originType/@

pavementTypeType

type restriction of **xsd:string**

used by attributes pavementType/@type pavementObsType/@type

phone-numberType

type restriction of **xsd:string**

used by elements rpuType/phone-number

physical-statusTypeType

type restriction of **xsd:string**

used by attributes physical-statusType/@type physical-statusObsType/@type

precipitationTypeType

type restriction of **xsd:string**

used by attributes precipitationType/@type precipitationObsType/@type

pressureTypeType

type restriction of **xsd:string**

used by attributes pressureType/@type pressureObsType/@type

provinceType

type restriction of **xsd:string**

used by attributes cityType/@province nws-

qc-flagtypeType

type restriction of **xsd:string**

used by attribute qc-

qc-flagvalueType

type restriction of **xsd:string**

used by attribute gc:

radiationTypeType

type restriction of **xsd:string**

used by attributes radiationType/@type radiationObsType/@type

radius-unitsType

type restriction of **xsd:string**

used by attribute radiusType/@radiu

scribe-accum-typeType

type restriction of **xsd:string**

used by attribute scribe-accum-

scribe-accum-unitsType

type restriction of **xsd:string**

used by attribute scribe-accum-

scribe-basic-simple-cloud-coverType

type restriction of **xsd:nonNegativeInteger**

used by complexType scribe-basic-cloud-

scribe-cloud-cover-ceiling-codeType

type restriction of **xsd:positiveInteger**

used by attribute scribe-basic-cloud-

scribe-cloud-unitsType

type restriction of **xsd:string**

used by attribute scribe-cloud-

scribe-excep-codeType

type restriction of **xsd:string**

used by attribute scribe-excep-

scribe-excep-typeType

type restriction of **xsd:string**

used by attribute scribe-excep-

scribe-freezing-spray-frequencyType

type restriction of **xsd:string**

used by attribute scribe-basic-freezing-

scribe-freezing-spray-ice-cover-modifierType

type restriction of **xsd:string**

used by attribute scribe-basic-freezing-sprayType/@ice-

scribe-freezing-spray-intensityType

type restriction of **xsd:string**

used by attribute scribe-basic-freezing-

scribe-freezing-spray-occurType

type restriction of **xsd:string**

used by attribute scribe-basic-freezing-

scribe-langType

type restriction of **xsd:string**

used by attributes scribe-msc-zone-nameType/@lang scribe-excep-

scribe-msc-zone-code-statusType

type restriction of **xsd:string**

used by attribute scribe-msc-zone-

scribe-precipitation-frequencyType

type restriction of **xsd:string**

used by attribute scribe-basic-precipitation-

scribe-precipitation-intensityType

type restriction of **xsd:string**

used by attribute scribe-basic-precipitation-

scribe-precipitation-occurType

type restriction of **xsd:string**

used by attribute scribe-basic-precipitation-

scribe-precipitation-typeType

type restriction of **xsd:string**

used by attribute scribe-basic-precipitation-

scribe-simpe-probabilityType

type restriction of **xsd:nonNegativeInteger**

used by complexTypes scribe-ice-coverType scribe-probability-of-

scribe-snow-level-unitsType

type restriction of **xsd:string**

used by attribute scribe-snow-level-

scribe-statusType

type restriction of **xsd:string**

used by element productType/s

scribe-temperature-ground-frostType

type restriction of **xsd:string**

used by attribute scribe-temperature-

scribe-temperature-trendType

type restriction of **xsd:string**

used by attribute scribe-temperature-

scribe-temperature-typeType

type restriction of **xsd:string**

used by attribute scribe-temperature-

scribe-temperature-unitsType

type restriction of **xsd:string**

used by attribute scribe-temperature-

scribe-typeType

type restriction of **xsd:string**

used by element productType/

scribe-value-unitsType

type restriction of **xsd:string**

used by attribute scribe-

scribe-visibility-frequencyType

type restriction of **xsd:string**

used by attribute scribe-basic-

scribe-visibility-typeType

type restriction of **xsd:string**

used by attribute scribe-basic-

scribe-warning-codeType

type restriction of **xsd:string**

used by attribute scribe-warning-

scribe-warning-statusType

type restriction of **xsd:string**

used by attribute scribe-warning-

scribe-warning-typeType

type restriction of **xsd:string**

used by attribute scribe-warning-

scribe-wave-height-ice-cover-modifierType

type restriction of **xsd:string**

used by attribute scribe-wave-heightType/@ice-

scribe-wave-height-unitsType

type restriction of **xsd:string**

used by attribute scribe-wave-height-

scribe-wind-directionType

type restriction of **xsd:string**

used by attribute scribe-basic-

scribe-wind-modificatorsType

type restriction of **xsd:string**

used by attribute scribe-basic-

scribe-wind-unitsType

type restriction of **xsd:string**

used by attribute scribe-wind-

slopeType

type **xsd:decimal**

used by element roadwayType/

snapshot-cameraTypeType

type restriction of **xsd:string**

used by attributes snapshot-cameraObsType/@type snapshot-

snowTypeType

type restriction of **xsd:string**

used by attributes snowType/@type snowObsType/@type

stateType

type restriction of **xsd:string**

station-categoryType

type restriction of **xsd:string**

used by element station-

stationStateType

type restriction of **xsd:string**

used by element station-

station-typeType

type restriction of **xsd:string**

used by element station-

subsurfaceTypeType

type restriction of **xsd:string**

used by attributes subsurfaceType/@type subsurfaceObsType/@type

summarizationType

type restriction of **xsd:string**

used by attributes time-layoutElementType/@summarization cityType/@summarization

summaryType

type restriction of **xsd:string**

used by element gcType/sum

surfaceType

type restriction of **xsd:string**

used by element roadwayType/s

temperatureTypeType

type restriction of **xsd:string**

used by attributes temperatureType/@type temperatureObsType/@type

time-coordinateType

type restriction of **xsd:string**

used by attribute time-

time-layoutAttributeType

type restriction of **xsd:string**

used by attributes

pressureType/@time-layout
temperatureType/@time-layout
radiationType/@time-layout
windType/@time-layout
precipitationType/@time-layout
visibilityType/@time-layout

timeUnitsType

type restriction of **xsd:string**

timezonetypeType

type restriction of **xsd:string**

used by complexType timezoneT

unitType

type restriction of **xsd:string**

used by element basic-instrumentType/units
attributes valueType/@units qualifierType/@units sampling-tableType/sampling-interval/@units conversion-tableType/@units categorical-tableType/@units extensionType/@units physical-statusType/@units

US-state-codeType

type restriction of **xsd:string**

used by element base-

visibilityTypeType

type restriction of **xsd:string**

used by attributes visibilityType/@type visibilityObsType/@type

weatherTypeType

type restriction of **xsd:string**

used by attributes weatherType/@type weatherObsType/@type

windTypeType

type restriction of **xsd:string**

used by attributes windType/@type windObsType/@type

Appendix D Valid Head Types

category types			
forecast	analysis	observation	statistics
metadata			

Table D-1: Valid types for category

field types	
meteorological	hydrological
oceanographical	land surface
space	

Table D-2: Valid types for field

operational-mode types			
official	developmental	experimental	test

Table D-3: Valid types for operational-mode

product status values		
English	**French**[3]	**Description**[4]
active	actif	Product is issued for the current season.
inactive season	saison inactive	Product is not issued for the current season.
temporarily inactive	inactif temporairement	Product is temporarily not issued.

Table D-4: Valid types for product status

[3] The French values are not available in this CMML schema version

[4] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

product type values		
English	**French**[5]	**Description**[6]
regular	régulier	Product is issued on normal issue time.
modification	modification	Product is issued out of the regular issue time to indicate a modification from the regular issue (revised forecast).

Table D-5: Valid types for product type

[5] The French values are not available in this CMML schema version

[6] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

Appendix E
Valid Forecast Types

Note: Double exclamation ("!!") marked types are supported by NTCIP 1204 v02.17

pavement-forecast air-quality types			
carbon-monoxide!!	carbon-dioxide!!	nitrous-oxide!!	nitrogen-dioxide!!
sulfur-dioxide!!	ozone!!	small-particulate!!	

Table E-6: Valid types for pavement-forecast air-quality

pavement-forecast datum types		
station-reference-level	mean-sea-level	pavement-surface

Table E-7: Valid pavement-forecast datum types

pavement-forecast elevation-units types		
cm	in	ft
m		

Table E-8: Valid pavement-forecast elevation-units types

pavement-forecast humidity types		
relative-humidity!!	average-relative-humidity	maximum-relative-humidity
relative-humidity-at-minimum-temperature	relative-humidity-at-maximum-temperature	

Table E-9: Valid types for pavement-forecast humidity

pavement-forecast identifiertype types		
client	network	

Table E-10: Valid pavement-forecast identifiertype types

pavement-forecast origintype types		
station	region	

Table E-11: Valid pavement-forecast origintype types

pavement-forecast pavement types			
sensor-location!!	type!!	elevation!!	solar-energy!!
sensor-type!!	temperature!!	temperature-at-2-to-10-cm-depth!!	salinity!!
freeze-point!!	black-ice!!	sensor-error!!	water-depth!!
conductivity!!	ice-thickness!!	average-temperature	average-conductivity
conductivity-code	average-conductivity-compensated	conductivity-code-compensated	surface-state
error-status	surface-status!!	water-or-ice-thickness	

Table E-12: Valid types for pavement-forecast pavement

pavement-forecast physical-status types		
door-open!!	battery-minimum-voltage	battery-maximum-voltage

Table E-13: Valid types for pavement-forecast physical-status

pavement-forecast precipitation types			
water-depth!!	moisture-on-sensor!!	rate!!	situation!!
start-time!!	end-time!!	total-over-10minutes	total-over-hour!!
total-over-3hours!!	total-over-6hours!!	total-over-12hours!!	total-over-24hours!!
situation-WMO4680	situation-WMO4680-over-	situation-WMO4680-over-	temporal-dispersion

	15minutes	hour	
coverage	probability	rainfall	qualifier

Table E-14: Valid types for pavement-forecast precipitation

pavement-forecast pressure types	
atmospheric!!	average-atmospheric

Table E-15: Valid types for pavement-forecast pressure

pavement-forecast radiation types			
total-sun!!	cloud-situation!!	instantaneous-terrestrial-radiation!!	instantaneous-solar-radiation!!
total-radiation!!	total-radiation-period!!	average-energy-long-wave-up	average-energy-short-wave-down
average-energy-long-wave-down	average-energy-short-wave-up	average-albedo	average-net-solar
average-net-infrared	average-sky-temperature	average-ground-temperature	average-net-total-radiation

Table E-16: Valid types for pavement-forecast radiation

pavement-forecast snow types			
adjacent-snow-depth!!	roadway-unpacked-snow-depth!!	roadway-packed-snow-depth!!	snowfall-accumulation-rate!!
roadway-snow-depth	roadway-maximum-snow-depth	roadway-minimum-snow-depth	distance-between-sensor-and-snow
maximum-distance-between-sensor-and-snow	minimum-distance-between-sensor-and-snow	snowfall	

Table E-17: Valid types for pavement-forecast snow

pavement-forecast subsurface types			
sensor-location!!	type!!	temperature!!	moisture!!
sensor-error!!	average-temperature	sensor-depth!!	

Table E-18: Valid types for pavement-forecast subsurface

pavement-forecast summarization types		
none	mean	medium
mode	maximum	minimum

Table E-19: Valid pavement-forecast summarization types

pavement-forecast temperature types			
air-temperature!!	wet-bulb!!	dew-point!!	maximum-air-temperature-over-24hours!!
minimum-air-temperature-over-24hours!!	average-air-temperature	average-dew-point	minimum-air-temperature
dew-point-at-minimum-temperature	maximum-air-temperature	dew-point-at-maximum-temperature	air-temperature-at-maximum-relative-humidity
dew-point-at-maximum-relative-humidity			

Table E-20: Valid types for pavement-forecast temperature

pavement-forecast time-coordinate types		
UTC	local	

Table E-21: Valid pavement-forecast time-coordinate types

pavement-forecast unit types			
km/h	unitless	W/m2	kg/kg
mm/h	mS	%	V
bitmap	m/s	degF	degC
K	deg	mm	cm
m	km	in	ft

statute-miles	ppm	ppb	h
min	s	mb	string
code	micrograms/m3	milli-mhos/10cm	image

Table E-22: Valid pavement-forecast unit types

pavement-forecast visibility types	
distance!!	situation!!

Table E-23: Valid types for pavement-forecast visibility

pavement-forecast wind types			
average-direction!!	direction!!	speed!!	situation!!
maximum-speed!!	direction-at-maximum-speed!!	average-scalar-speed-last-2minutes	average-vectorial-speed-last-2minutes
average-direction-last-2minutes	standard-deviation-of-direction-last-2minutes	average-scalar-speed-over-10minutes	average-vectorial-speed-over-10minutes
average-direction-over-10minutes	standard-deviation-of-direction-over-10minutes	standard-deviation-of-direction-over-60minutes	average-scalar-speed-over-60minutes
average-vectorial-speed-over-60minutes	average-speed!!		

Table E-24: Valid types for pavement-forecast wind

pavement-forecast weather types		
condition	alert	cloud-coverage

Table E-25: Valid types for pavement-forecast weather

meteocode-forecast accumulation types		
English	**French**[7]	**Description**[8]
ice pellet	grésil	
snow	neige	
rain	pluie	
freezing rain	pluie verglaçante	

Table E-26: Valid values for meteocode-forecast accumulation types

meteocode-forecast exception codes		
English	**French**[9]	**Description**[10]
area	zone	
period	période	
region	région	
sector	secteur	
topo	topo	Topographic feature
city	ville	

Table E-27: Valid values for meteocode-forecast exception codes

meteocode-forecast exception types

[7] The French values are not available in this CMML schema version

[8] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

[9] The French values are not available in this CMML schema version

[10] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

English	French[1]	Description[2]
except	sauf	Weather element value for a specific location that differs from the main conditions.
only	seulement	Weather element that applies only to a specific location.
mainly	surtout	N/A

Table E-28: Valid values for meteocode-forecast exception types

meteocode-forecast freezing spray frequency		
English	**French[11]**	**Description[12]**
continuous	continu	Freezing spray present continously
occasional	occasionnel	Freezing spray present at times

Table E-29: Valid types for meteocode-forecast freezing spray frequency

meteocode-forecast freezing spray intensity		
English	**French[1]**	**Description[2]**
heavy	fort	
moderate	modéré	
light	faible	

Table E-30: Valid types for meteocode-forecast freezing spray intensity

meteocode-forecast freezing spray occurrence

[11] The French values are not available in this CMML schema version

[12] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

English	French[1]	Description[2]
certain	certain	
possible	possible	
risk	risque	Risk: less than 50% chance of occurence

Table E-31: Valid types for meteocode-forecast freezing spray occurrence

meteocode-forecast freezing spray ice cover modifier		
English	**French[13]**	**Description[14]**
open water	en eaux libres	
outside ice edge	à l'extérieur de la limite des glaces	
ice covered	couvert de glace	

Table E-32: Valid types for meteocode-forecast freezing spray ice cover modifier

meteocode-forecast msc zone code status		
English	**French[1]**	**Description[2]**
active	actif	Region forecast issued for the current season
active last season	actif dernière saison	Last region forecast issued for the current season
active last temporarily	actif dernier temporairement	Last region forecast issued before a temporary closing period
inactive season	saison inactive	Region forecast not issued for the current season

[13] The French values are not available in this CMML schema version

[14] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

temporarily inactive	inactif temporairement	Region forecast not issued for a temporary period

Table E-33: Valid values for meteocode-forecast msc zone code status

meteocode-forecast precipitation frequency		
English	**French**[1]	**Description**[2]
brief	bref	Precipitations that are not continuous
few	peu	Precipitations that are not continuous
frequent	frequent	Precipitations that are not continuous
occasional	occasionnel	Precipitations that are not continuous
continuous	continu	Precipitations that fall continuously

Table E-34: Valid types for meteocode-forecast precipitation frequency

meteocode-forecast precipitation intensity		
English	**French**[15]	**Description**[16]
heavy	fort	
moderate	modéré	
nil	nil	
light	faible	
very light	très faible	Future development.

Table E-35: Valid types for meteocode-forecast precipitation intensity

[15] The French values are not available in this CMML schema version

[16] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

meteocode-forecast precipitation occurrence		
English	**French**[1]	**Description**[2]
certain	certain	
possible	possible	
risk	risque	Risk: less than 50% chance of occurence

Table E-36: Valid types for meteocode-forecast precipitation occurrence

meteocode-forecast precipitation types		
English	**French**[1]	**Description**[2]
hail	grêle	
blizzard	blizzard	
blowing snow	poudrerie	
waterspout	trombe marine	
ice cristal	cristaux de glace	
ice pellet	grésil	
drizzle	bruine	
rain	pluie	
shower	averses	
snow	neige	
wet snow	neige fondante	
snow squall	bourrasque de neige	
flurries	averses de neige	
wet snow flurries	averses de neige fondante	
thunderstorm	orages	
freezing drizzle	bruine verglaçante	
freezing rain	pluie verglaçante	

Table E-37: Valid types for meteocode-forecast precipitation types

meteocode-forecast temperature types		
English	**French**[17]	**Description**[18]
air	température de l'air	Surface air temperature
dew-point	point de rosée	Dew-point temperature
climatology	climatologie	Climatological air temperature
sea-surface	température à la surface de la mer	Sea surface temperature

Table E-38: Valid values for meteocode-forecast temperature type

meteocode-forecast temperature ground-frost		
English	**French**	**Description**[1]
frost	gel	
widespread frost	gel généralisé	
ground frost	gel au sol	
risk of ground frost	risque de gel au sol	

Table E-39: Valid values for meteocode-forecast temperature ground-frost

meteocode-forecast temperature trend		
English	**French**[19]	**Description**[20]
fall	baisse	

[17] The French values are not available in this CMML schema version

[18] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

[19] The French values are not available in this CMML schema version

[20] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

rise	hausse	
interpolated	interpolé	Interpolated temperature values
max	max	
min	min	
intermediate point	point intermédiaire	Additional temperature values used to describe the evolution of changes.
stationary	stationnaire	

Table E-40: Valid types for meteocode-forecast temperature trend

meteocode-forecast wave height ice cover modifier		
English	**French[1]**	**Description[2]**
open water	en eaux libres	
outside ice edge	au-delà de la limite des glaces	
ice covered	couvert de glace	

Table E-41: Valid types for meteocode-forecast wave-height ice cover modifier

meteocode-forecast visibility types		
English	**French[21]**	**Description[22]**
fog banks	bancs de brouillard	
ice fog banks	bancs de brouillard glacé	
fog	brouillard	

[21] The French values are not available in this CMML schema version

[22] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

areas of fog	brouillard par endroits	
ice fog	brouillard glace	
mist	brume	
areas of mist	brume par endroits	
haze	brume sèche	
foggy	brumeux	
fog patches	brumeux par endroits	
blowing dust	chasse-poussière	
smoke	fumée	
sea smoke	fumée de mer	
fog patches	nappes de brouillard	
ice fog patches	nappes de brouillard glacé	
precipitation	précipitations	Due to precipitation
blowing snow	poudrerie	
drifting snow	poudrerie basse	
local drifting snow	poudrerie par endroits	
local blowing snow	poudrerie haute par endroits	
smog	smog	

Table E-42: Valid types for meteocode-forecast visibility

meteocode-forecast visibility frequency		
English	**French**[23]	**Description**[24]

[23] The French values are not available in this CMML schema version

continuous	continu	Spacial or temporal coverage near 100%
occasional	occasionnel	Spacial or temporal coverage 26% to 50%

Table E-43: Valid types for meteocode-forecast visibility frequency

meteocode-forecast warning types		
English	**French**[1]	**Description**[2]
warning	avertissement	
advisory	avis	

Table E-44: Valid types for meteocode-forecast warning type

meteocode-forecast warning code		
English	**French**[1]	**Description**[2]
arctic air	air arctique	Arctic outflow
blizzard	blizzard	
snow squall	bourrasques de neige	
freezing drizzle	bruine verglaçante	
blowind dust	chasse-poussière	
gale	coup de vent	
others	divers	Weather warning
freezing spray	embrun verglaçant	

[24] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

widespread frost	gel generalisé	
ground frost	gel au sol	
hail	grêle	Hail storm
ice pellet	grésil	
humidex	humidex	
squall line	ligne de grain	
snow	neige	
heavy snow	neige abondante	
heavy snow and blowing snow	neige abondante et poudrerie	
snow and ice pellet	neige et grésil	
snow and blowing snow	neige et poudrerie	
nil	nil	
storm surge	onde de tempête	
marine thunderstorm	orage marin	
severe thunderstorm	orage violent	
hurricane	ouragan	
heavy rain	pluie abondante	
rain and freezing drizzle	pluie et bruine verglaçante	
freezing rain	pluie verglaçante	
blowing snow	poudrerie	
air quality	qualité de l'air	
flash freeze	refroidissement soudain	
wind chill	refroidissement éolien	

winter storm	tempête hivernale	
tropical storm	tempête tropicale	
tornado	tornade	
waterspout	trombe marine	
heat wave	vague de chaleur	
cold wave	vague de froid	
marine winds	vents marins	
suêtes winds	vents suêtes	
storm winds	vents de tempête	
strong winds	vents violents	
wreckhouse winds	vents wreckhouse	

Table E-45: Valid values for meteocode-forecast warning codes

meteocode-forecast warning status		
English	**French**[25]	**Description**[26]
cancelled	annulé	
downgraded	abaissé	
issued	émis	
in effect	en vigueur	
end	fin	

[25] The French values are not available in this CMML schema version

[26] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

upgraded	haussé	
maintained	maintenu	
updated	mis à jour	
nil	nil	

Table E-46: Valid values for meteocode-forecast warning status

meteocode-forecast wind direction		
English	**French**[1]	**Description**[2]
east	est	
nil	nil	
north	nord	
northeast	nord-est	
northwest	nord-ouest	
west	ouest	
easterly	du secteur est	
northerly	du secteur nord	
northeasterly	du secteur nord-est	
northwesterly	du secteur nord-ouest	
westerly	du secteur ouest	
southerly	du secteur sud	
southeasterly	du secteur sud-est	
southwesterly	du secteur sud-ouest	
south	sud	
southeast	sud-est	

southwest	sud-ouest	
variable	variable	From any direction

Table E-47: Valid values for meteocode-forecast wind direction

meteocode-forecast wind modificators		
English	**French**[27]	**Description**[28]
onshore	vers la côte	
offshore	de la côte	
inflow	de la mer	
outflow	de la terre	

Table E-48: Valid values for meteocode-forecast wind modificators

meteocode-forecast accum-units types		
English	**French**[29]	**Description**[30]
cm	cm	Centimeter
hndin	hndin	Hundred of inches
in	in	Inch
mm	mm	Millimeters

Table E-49: Valid unit types for meteocode-forecast accumulation

[27] The French values are not available in this CMML schema version

[28] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

[29] The French values are not available in this CMML schema version

[30] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

meteocode-forecast cloud-units types		
English	**French**[1]	**Description**[2]
deci	deci	Tenth
octo	octo	Eighth
percent	pourcent	Percent

Table E-50: Valid unit types for meteocode-forecast cloud

meteocode-forecast snow-level-units types		
English	**French**[1]	**Description**[2]
m	m	Meter

Table E-51: Valid unit types for meteocode-forecast snow level

meteocode-forecast temperature-unit types		
English	**French**[31]	**Description**[32]
celsius	celsius	Celsius
fahrenheit	fahrenheit	Fahrenheit

Table E-52: Valid unit types for meteocode-forecast temperature

meteocode-forecast value-units types		
English	**French**[1]	**Description**[2]
m	m	Meter
mi	mi	Mile
km	km	Kilometer
NM	MN	Nautical mile

Table E-53: Valid unit types for meteocode-forecast visibility value

[31] The French values are not available in this CMML schema version

[32] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

meteocode-forecast wave-height-units types		
English	**French**[1]	**Description**[2]
m	m	Meter
ft	ft	Feet

Table E-54: Valid unit types for meteocode-forecast wave height

meteocode-forecast wind-units types		
English	**French**[1]	**Description**[2]
kmh	kmh	Kilometer per hour
kt	nd	Knot
msec	msec	Meter per second
mph	mph	Mile per hour

Table E-55: Valid unit types for meteocode-forecast wind

Meteocode-forecast cloud-cover-ceiling-code values		
English	**French**[33]	**Description**[34] (All heights are above ground)
1	1	Height from 0 to 199 feet.
2	2	Height from 200 to 499 feet.
3	3	Height from 500 to 999 feet.
4	4	Height from 1000 to 2999 feet.
5	5	Height from 3000 to 4999 feet.
6	6	Height from 5000 to 7999 feet.
7	7	Height from 8000 to 11999 feet.
8	8	Height from 12000 to 19999 feet.
9	9	Height of and above 20000 feet.

Table E-56: Valid values for meteocode-forecast cloud cover ceiling-code

[33] The French values are not available in this CMML schema version

[34] When the Description in the tables is not filled it is either not applicable or the term is auto descriptive

Appendix F Valid Observation Types

air-quality types: refer to Table E-6 in Appendix E

datum types: refer to Table E-7 in Appendix E

elevation-units types: refer to Table E-8 in Appendix E

humidity types: refer to Table E-9 in Appendix E

identifiertype types: refer to Table E-10 in Appendix E

origintype types: refer to Table E-11 in Appendix E

pavement types: refer to Table E-12 in Appendix E

physical-status types: refer to Table E-13 in Appendix E

precipitation types: refer to Table E-14in Appendix E

pressure types: refer to Table E-15 in Appendix E

radiation types: refer to Table E-16 in Appendix E

snow types: refer to Table E-17 in Appendix E

subsurface types: refer to Table E-18 in Appendix E

temperature types: refer to Table E-20 in Appendix E

unit types: refer to Table E-22 in Appendix E

visibility types: refer to Table E-23 in Appendix E

weather types: refer to Table E-25 in Appendix E

wind types: refer to Table E-24in Appendix E

measurement-category types			
pressure	wind	temperature	precipitation
radiation	visibility	pavement	subsurface
air-quality	physical-status	humidity	weather

snow	snapshot-camera		

Table F-57: Valid types for measurement-category

qc-flagtype types			
presence	integrity	range	temporal
inter-variable	spatial		

Table F-58: Valid types for qc-flagtype

qc-flagvalue types			
missing	error	doubtful	inconsistency
estimated	corrected		

Table F-59: Valid types for qc-flagvalue

qualifier types			
conversion-table	lane-number	sampling-table	categorical-table
height	name		

Table F-60: Valid types for qualifier

snapshot-camera types		
camera-location[!!]	camera-error[!!]	filename[!!]
image[!!]		

Table F-61: Valid types for snapshot-camera

summary types			
accepted/passed	error	missing	doubtful
inconsistency	corrected	estimated	

Table F-62: Valid types for (QC) summary

timezone types			
ADT	AST	CDT	CST

EDT	EST	MDT	MST
NDT	NST	PDT	PST
AKST	AKDT	HAST	HADT
SST			

Table F-63: Valid types for timezone

Appendix G Valid Metadata Types

Air-quality-sensor types: refer to Table E-6 in Appendix E .

Bridge or Overpass Material			
steel	PCC(solid)	PCC(hollow)	other

Table G-64 Valid bridge-or-overpass-material values.

Earthwork		
cut	fill	neutral

Table G-65 Valid earthwork values.

Humidity-sensor-types: refer to Table E-9 in Appendix E .

Instrument state types		
active-operational	active-not-reporting	active-qc-failure
active-element-missing	inactive-uninstalled	inactive-retired
inactive-suppressed	inactive-scheduled-maintenance	inactive-unscheduled-maintenance

Table G-66 Valid instrument state qualifier values.

Pavement-sensor types: refer to Table E-12 in Appendix E .

Physical-status-sensor types: refer to Table E-13 in Appendix E .

Precipitation-sensor types: refer to Table E-14 in Appendix E .

Pressure-sensor types: refer to Table E-15 in Appendix E .

Radiation-sensor types: refer to Table E-16 in Appendix E .

Snapshot-camera-sensor types: refer to Table F-61 in 0.

Snow-sensor types: refer to Table E-17 in Appendix E .

States	
on	off

Table G-67 Valid state values.

Station Categories		
permanent	mobile	transportable

Table G-68 Valid station-category values.

Station state types		
active-operational	active-testing	active-suppressed
active-not-reporting	inactive-uninstalled	inactive-retired
inactive-suppressed	inactive-scheduled-maintenance	inactive-unscheduled-maintenance

Table G-69 Valid station state qualifier values.

Station Types		
automatic	staffed	unknown

Table G-70 Valid station-type values.

Subsurface-sensor types: refer to Table E-18 in Appendix E .

Surface types			
PCC	asphalt	asphalt over PCC	other

Table G-71 Valid surface values.

Temperature-sensor types: refer to Table E-20 in Appendix E .

Time Units		
h	Min	s

Table G-72 Valid timeUnits values.

Units: refer to Table E-22 in Appendix E .

Visibility-sensor types: refer to Table E-23 in Appendix E .

Weather-sensor types: refer to Table E-25 in Appendix E .

Wind-sensor types: refer to Table E-24 in Appendix E .

Appendix H Schema Organization

XSD File Structure

The indentation shows the relationship between xsd files. Example: The parameters.xsd schema file has a reference which enables it to use any of the type definitions defined in the attribute_list.xsd schema file.

```
cmml.xsd (top level)
   ↳ head.xsd
   ↳ data.xsd
         ↳ forecast.xsd
               ↳ scribe-forecast.xsd
                     ↳ scribe-location.xsd
                     ↳ scribe-parameters.xsd
                           ↳ scribe-prediction.xsd
                                 ↳ scribe-attribute_list.xsd
               ↳ time_layout.xsd
               ↳ parameters.xsd
         ↳ observation-series.xsd
               ↳ observation.xsd
                     ↳ measurement.xsd
                           ↳ qc.xsd
         ↳ metadata.xsd
               ↳ location-metadata.xsd
                     ↳ instrument.xsd
                           ↳ attribute_list.xsd
                           ↳ location.xsd
                                 ↳ origin.xsd
               ↳ supplementary-metadata.xsd
```

Type Definition Location

Complex Type	Definition Location
air-qualityInsType	instrument.xsd
air-qualityObsType	measurement.xsd
air-qualityType	parameters.xsd
areaType	location.xsd
base-metadataType	location-metadata.xsd
basic-instrumentType	instrument.xsd
bridgeType	instrument.xsd
calibration-historyType	instrument.xsd
calibrationType	instrument.xsd
categorical-tableType	supplementary-metadata.xsd
circleType	location.xsd

Complex Type	Definition Location
cityType	location.xsd
cmmlType	cmml.xsd
contactType	location-metadata.xsd
conversion-tableType	supplementary-metadata.xsd
creation-dateType	head.xsd
dataType	data.xsd
elevationType	location.xsd
equipment-informationType	instrument.xsd
extensionInsType	instrument.xsd
extensionType	parameters.xsd
forecast-locationType	location.xsd
forecastType	forecast.xsd
headType	head.xsd
humidityInsType	instrument.xsd
humidityObsType	measurement.xsd
humidityType	parameters.xsd
identifierType	origin.xsd
instrumentType	instrument.xsd
linestringType	location.xsd
location-metadataType	location-metadata.xsd
locationType	location.xsd
measurementType	measurement.xsd
messageType	qc.xsd
metadataType	metadata.xsd
nws-zoneType	location.xsd
observation-seriesType	observation-series.xsd
observationType	observation.xsd
originType	origin.xsd
overpassType	instrument.xsd
parametersType	parameters.xsd
pavement-forecastType	forecast.xsd
pavementInsType	instrument.xsd
pavementObsType	measurement.xsd
pavementType	parameters.xsd
physical-statusInsType	instrument.xsd
physical-statusObsType	measurement.xsd
physical-statusType	parameters.xsd
pointType	location.xsd
polygonType	location.xsd
precipitationInsType	instrument.xsd
precipitationObsType	measurement.xsd
precipitationType	parameters.xsd
pressureInsType	instrument.xsd
pressureObsType	measurement.xsd
pressureType	parameters.xsd
production-centerType	head.xsd
productType	head.xsd
qc-flagType	qc.xsd
qcType	qc.xsd
qualifierType	measurement.xsd
radiationInsType	instrument.xsd

Complex Type	Definition Location
radiationObsType	measurement.xsd
radiationType	parameters.xsd
radiusType	location.xsd
rectangleType	location.xsd
region-metadataType	location-metadata.xsd
road-constructionType	instrument.xsd
roadType	instrument.xsd
roadwayType	instrument.xsd
rpuType	location-metadata.xsd
sampling-tableType	supplementary-metadata.xsd
scribe-accum-amountType	scribe-prediction.xsd
scribe-accum-listType	scribe-parameters.xsd
scribe-accum-lower-limitType	scribe-prediction.xsd
scribe-accum-upper-limitType	scribe-prediction.xsd
scribe-amended-regionsType	head.xsd
scribe-basic-cloud-coverType	scribe-prediction.xsd
scribe-basic-exceptionType	scribe-prediction.xsd
scribe-basic-freezing-sprayType	scribe-prediction.xsd
scribe-basic-precipitation-eventType	scribe-prediction.xsd
scribe-basic-visibilityType	scribe-prediction.xsd
scribe-basic-windType	scribe-prediction.xsd
scribe-cloud-cover-exceptionType	scribe-prediction.xsd
scribe-cloud-coverType	scribe-prediction.xsd
scribe-cloud-listType	scribe-parameters.xsd
scribe-excep-categoryType	scribe-prediction.xsd
scribe-excep-descriptionType	scribe-prediction.xsd
scribe-forecastType	scribe-forecast.xsd
scribe-freezing-spray-exceptionType	scribe-prediction.xsd
scribe-freezing-spray-listType	scribe-parameters.xsd
scribe-freezing-sprayType	scribe-prediction.xsd
scribe-gust-speedType	scribe-prediction.xsd
scribe-ice-cover-listType	scribe-parameters.xsd
scribe-ice-coverType	scribe-prediction.xsd
scribe-locationType	scribe-location.xsd
scribe-msc-zone-codeType	scribe-location.xsd
scribe-msc-zone-nameType	scribe-location.xsd
scribe-parametersType	scribe-parameters.xsd
scribe-pointType	scribe-location.xsd
scribe-precipitation-event-exceptionType	scribe-prediction.xsd
scribe-precipitation-eventType	scribe-prediction.xsd
scribe-precipitation-listType	scribe-parameters.xsd
scribe-probability-of-precipitation-listType	scribe-parameters.xsd
scribe-probability-of-precipitationType	scribe-prediction.xsd
scribe-snow-level-listType	scribe-parameters.xsd
scribe-snow-levelType	scribe-prediction.xsd
scribe-temperature-listType	scribe-parameters.xsd
scribe-temperature-value-exceptionType	scribe-prediction.xsd
scribe-temperature-valueType	scribe-prediction.xsd
scribe-UV-index-listType	scribe-parameters.xsd
scribe-UV-indexType	scribe-prediction.xsd
scribe-valueType	scribe-prediction.xsd

Complex Type	Definition Location
scribe-visibility-exceptionType	scribe-prediction.xsd
scribe-visibility-listType	scribe-parameters.xsd
scribe-visibilityType	scribe-prediction.xsd
scribe-warning-eventType	scribe-prediction.xsd
scribe-warning-listType	scribe-parameters.xsd
scribe-wave-height-listType	scribe-parameters.xsd
scribe-wave-heightType	scribe-prediction.xsd
scribe-wind-exceptionType	scribe-prediction.xsd
scribe-wind-listType	scribe-parameters.xsd
scribe-wind-speedType	scribe-prediction.xsd
scribe-windType	scribe-prediction.xsd
shadowingType	instrument.xsd
snapshot-cameraInsType	instrument.xsd
snapshot-cameraObsType	measurement.xsd
snowInsType	instrument.xsd
snowObsType	measurement.xsd
snowType	parameters.xsd
sourceType	head.xsd
start-valid-timeType	time_layout.xsd
station-metadataType	location-metadata.xsd
subsurfaceInsType	instrument.xsd
subsurfaceObsType	measurement.xsd
subsurfaceType	parameters.xsd
supplementary-metadataType	supplementary-metadata.xsd
temperatureInsType	instrument.xsd
temperatureObsType	measurement.xsd
temperatureType	parameters.xsd
time-layoutElementType	time_layout.xsd
timezoneType	location-metadata.xsd
valueCategoryType	supplementary-metadata.xsd
valueType	measurement.xsd
vegetationType	location-metadata.xsd
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Glossary

CMML	Canadian Meteorological Markup Language
DMF	Data Management Framework
DWML	Digital Weather Markup Language
EC	Environment Canada
ESS	Environmental Sensor Station
IP	Internet Protocol
MTQ	Ministry of Transports Quebec
NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
NWS	National Weather Service
PTC	Provinces and Territories of Canada
QC	Quality Control
RPU	Remote Processing Unit
RWIN	Road Weather Information Network
RWIS	Road Weather Information System
RWISC	Road Weather Information System for Canada
RWML	Road Web Markup Language
UTC	Universal Coordinated Time
WMO	World Meteorological Organization
XML	Extensible Markup Language

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