# WaterML2.0 part 2 - XML Encoding

| **WaterML 2.0 part 2 UML** | **WaterML 2.0 part 2 XML** |
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| ConversionGroup | part2:ConversionGroup |
| Conversion | part2:Conversion |
| ConversionTable | part2:ConversionTable |
| TableTuple | part2:TableTuple |
| ConversionEquation | part2 ConversionEquation |
| ConversionPeriod | part2:ConversionPeriod |
| GaugingObservation | om:OM\_Observation\* |
| Gauging | part2:Gauging |
| ObservationProcess | part2:ObservationProcess |
| RangeGroup | part2:RangeGroup |
| RangeTable | part2:RangeTable |
| RangeEntry | part2:RangeEntry |
| Collection | part2:Collection |
| SectionObservation | om:OM\_Observation\* |
| \* The specialisation of OM\_Observation is provided through Schematron rather than a specialised XML type. | |

* 1. Requirements class: XML encoding

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| **Requirements Class** | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-rules | |
| Dependency | <http://www.opengis.net/spec/waterml/2.0/req/xsd-xml-rules> |
| **Requirement** | **/xml-rules**  The XML encodings shall conform to the XML encoding rules specified in WaterML2.0 part 1. |

* 1. Requirements class: Collections XML

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| **Requirements Class** | |
| <http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-collection> | |
| Dependency | http://www.opengis.net/spec/req/waterml/part2/1.0/xml-rules |
| **Requirement** | **/extends-part1**  The WaterML2.0 part 2 Collection type shall specialize the WaterML2.0 part 1 Collection (http://schemas.opengis.net/waterml/2.0/waterml2.xsd) by adding support for conversion, gauging and cross-section members. |
| **Requirement** | **/valid**  The XML instance document shall be valid according to the XML grammar specified in http://schemas.opengis.net/waterml/part2/1.0/collection.xsd. |

The follow example collection instances show the use of the collection schema type:

* Collection with gauging members: <http://schemas.opengis.net/waterml/part2/1.0/examples/collection-gaugings.xml>
* Collection with conversion members: <http://schemas.opengis.net/waterml/part2/1.0/examples/collection-conversions.xml>
* Collection with range-value members: <http://schemas.opengis.net/waterml/part2/1.0/examples/collection-range-values.xml>
  1. Requirements class: Conversions XML

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| **Requirements Class** | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-conversions | |
| Dependency | http://www.opengis.net/spec/req/waterml/part2/1.0/xml-rules |
| **Requirement** | **/valid**  The XML instance document shall be valid according to the XML grammar specified in http://schemas.opengis.net/waterml/part2/1.0/conversion.xsd. |
| **Requirement** | **/monitoring-point**  All Conversion objects within a ConversionGroup shall inherit the monitoringPoint property. Additionally all Conversions within a ConversionGroup shall have the same monitoringPoint property. |

The follow example collection instances show the use of the conversion schema type:

* A conversion group with multiple applicable periods: <http://schemas.opengis.net/waterml/part2/1.0/examples/conversion-group-periods-linked.xml>
* A full conversion table: <http://schemas.opengis.net/waterml/part2/1.0/examples/conversion-full-table.xml>
  1. Requirements class: RangeValues XML

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| **Requirements Class** | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-range-values | |
| **Requirement** | **/valid**  The XML instance document shall be valid according to the XML grammar specified in http://schemas.opengis.net/waterml/part2/1.0/rangeValues.xsd. |
| **Requirement** | **/range-definition**  The rangeDefinition xlink:href attribute shall use an HTTP URL that links to a vocabulary term indicating the type of range value that is being encoded. E.g. ‘percent of time height exceeded’ or ‘flood levels’. |

The following example shows how a range value may be used to encode the precent of time height exceeded for ranges of stream height: http://schemas.opengis.net/waterml/part2/1.0/examples/range-groups-example.xml

* 1. Requirements class: Gaugings XML

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| **Requirements Class** | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-gaugings | |
| Dependency | <http://www.opengis.net/spec/waterml/2.0/req/xsd-feature-of-interest-monitoring-point> |
| **Requirement** | **/observation-type**  A Gauging Observation shall be encoded using the OM\_Observation type, with restrictions defined in this requirements class. |
| **Requirement** | **/result**  The ‘result’ property of the OM\_Observation element shall be a ‘Gauging’ type. |
| **Requirement** | **/observed-property**  The ‘observedProperty’ property of the OM\_Observation element shall be reference a vocabulary term that defines both the input and the outputProperties that are being observed. |
| **Requirement** | **/feature-of-interest**  The ‘featureOfInterest’ property of the OM\_Observation element shall be reference a MonitoringPoint (WaterML2.0 part 1) or reference one using xlink. |
| **Requirement** | **/observation-conditions**  The Observation Conditions type shall be encoded using the om:parameter property of OM\_Observation. The ‘name’ attribute xlink:href (of om:NamedValue) shall be set to ‘http://opengis.net/def/waterml/part2/1.0/gauging-conditions’. This is shown in the encoding examples. |

* 1. Requirements class: Section Observation

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| **Requirements Class** | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-section-observation | |
| **Requirement** | **/observation-type**  A SectionObservation shall be encoded using the OM\_Observation type, with restrictions defined in this requirements class. |
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# Media Types for any data encoding(s)

A section describing the MIME-types to be used is mandatory for any standard involving data encodings. If no suitable MIME type exists in http://www.iana.org/assignments/media-types/index.html then this section may be used to define a new MIME type for registration with IANA.

Annex A: Conformance Class Abstract Test Suite (Normative)

Conformance Class: XML Encoding

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-rules | |
| Dependency | [http://www.opengis.net/spec/waterml/2.0/conf/xsd-xml-rules](http://www.opengis.net/spec/WaterML/2.0/conf/xsd-encoding-rules) | |
| **Test** | /conf/xml-rules | |
| Requirement | /req/xml-rules |
| Test purpose | Verify that the XML instance conforms to the common XML encoding rules as specified by WaterML2.0 part 1 XML encoding. |
| Test method | Execute all conformance tests specified by [http://www.opengis.net/spec/waterml/2.0/conf/xsd-xml-rules](http://www.opengis.net/spec/WaterML/2.0/conf/xsd-encoding-rules). |

Conformance Class: Collections XML

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-collection | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-collection | |
| Dependency | <http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules> | |
| **Test** | /conf/xml-collection/extends-part1 | |
| Requirement | /req/xml-collection/extends-part1 |
| Test purpose | Verify that the XML Collection type extends the WaterML2.0 part 1 collection type. |
| Test method | Inspect XML Schema to ensure Collection type extends the CollectionType specified by <http://schemas.opengis.net/waterml/2.0/collection.xsd>. |
| **Test** | /conf/xml-collection/valid | |
| Requirement | /req/xml-collection/valid |
| Test purpose | Verify that the XML instance document is a valid collection. |
| Test method | Validate the XML instance document using the XML Schema document: http://schemas.opengis.net/waterml/part2/1.0/collection.xsd. |

Conformance Class: Conversions XML

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-conversions | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-conversions | |
| Dependency | <http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules> | |
| **Test** | /conf/xml-conversion/valid | |
| Requirement | /req/xml-collection/valid |
| Test purpose | Verify that the XML instance is valid. |
| Test method | Validate the XML instance document using the XML Schema document: <http://schemas.opengis.net/waterml/part2/1.0/conversions.xsd>. |

Conformance Class: Range Values XML

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-range-values | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-range-values | |
| Dependency | <http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules> | |
| **Test** | /conf/xml-range-values/valid | |
| Requirement | /req/xml-range-values/valid |
| Test purpose | Verify that the XML instance is valid. |
| Test method | Validate the XML instance document using the XML Schema document: http://schemas.opengis.net/waterml/part2/1.0/rangeValues.xsd |
| **Test** | /conf/xml-range-values/range-definition | |
| Requirement | /req/xml-range-values/range-definition |
| Test purpose | Verify that the definition of the range values is specified in the range group. |
| Test method | Verify the RangeGroup/rangeDefinition/@xlink:href value is a valid vocabulary term. |

Conformance Class: Gaugings XML

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-gaugings | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-gaugings | |
| Dependency | <http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules> | |
| **Test** | /conf/xml-gaugings/observation-type | |
| Requirement | /req/xml-gaugings/observation-type |
| Test purpose | Verify that the XML instance is a valid OM\_Observation type. |
| Test method | Validate the XML instance document using the O&M XML Schema document: <http://schemas.opengis.net/om/2.0/observation.xsd> |
| **Test** | /conf/xml-gaugings/result | |
| Requirement | /req/xml-gaugings/result |
| Test purpose | Verify that the child element of the OM\_Observation result property is a ‘Gauging’. |
| Test method | Validate the XML instance document the ‘result’ test in the Schematron file at gauging-observation.sch. |
| **Test** | /conf/xml-gaugings/observed-property | |
| Requirement | /req/xml-gaugings/observed-property |
| Test purpose | Verify that the input and output property have been defined using the observedProperty xlink:href attribute. |
| Test method | Inspect the vocabulary after resolving the HTTP URL in the OM\_Observation/observedProperty/@xlink:href attribute. Ensure sufficient definition is provided to define both the input and output properties. |
| **Test** | /conf/xml-gaugings/feature-of-interest | |
| Requirement | /req/xml-gaugings/feature-of-interest |
| Test purpose | Verify that a Monitoring Point has been specified as the feature of interest of the OM\_Observation. |
| Test method | Validate the XML instance document the ‘featureOfInterest test in the Schematron file at gauging-observation.sch. |
| **Test** | /conf/xml-gaugings/observation-conditions | |
| Requirement | /req/xml-gaugings/observation-conditions |
| Test purpose | Verify observation conditions are being encoded using the om:parameter property with the specified vocabulary term ‘http://opengis.net/def/waterml/part2/1.0/gauging-conditions’. |
| Test method | Inspect the om:parameter entries and ensure that any entries using the ObservationConditions type has set the om:name/@xlink:href to ‘http://opengis.net/def/waterml/part2/1.0/gauging-conditions’. |

Conformance Class: Section Observation XML

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| **Conformance Class** | | |
| http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-section-observation | | |
| Requirements | http://www.opengis.net/spec/req/waterml/part2/1.0/req/xml-section-observation | |
| Dependency | <http://www.opengis.net/spec/req/waterml/part2/1.0/conf/xml-rules> | |
| **Test** | /conf/xml-gaugings/section-observation | |
| Requirement | /req/xml-gaugings/section-observation |
| Test purpose | Verify that the XML instance uses a valid OM\_Observation type to encod a section observation. |
| Test method | Validate the XML instance document using the O&M XML Schema document: <http://schemas.opengis.net/om/2.0/observation.xsd> |

Annex <insert Annex number>: Revision history

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| --- | --- | --- | --- | --- |
| Date | Release | Author | Paragraph modified | Description |
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Annex <insert annex number>: Bibliography

<A Bibliography, if present, shall appear as the last annex. >