## A.2 Conformance classes – Logical Model

### A.2.1 Conformance class: 8.2 GeoSciML Core Abstract

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| **Conformance Class** | /conf/gsml4-core | |
| **Requirements** | /req/gsml4-core | |
| **Dependency** | Urn:iso:dis:iso:19156:clause:A.1.1 | |
| **Test** | **/conf/gsml4-core/uml-entity-name** | |
| **Requirement** | /req/gsml4-core/uml-entity-name |
| **Test purpose** | Ensure that the names used in the target implementation matches the names in the logical model |
| **Test method** | Visual inspection that, when possible, name used in the target implementation matches the names in the logical model. |
| **Test type** |  |
| **Test** | **/conf/gsml4-core/uml-cardinality** | |
| **Requirement** | /req/gsml4-core/uml-cardinality |
| **Test purpose** | Ensure that the cardinalities of the properties are the same as the logical model |
| **Test method** | Visually inspect the target implementation and validate that all properties have the same cardinality as the one expressed in the logical model. |
| **Test type** |  |
| **Test** | **/conf/gsml4-core/uml-abstract** | |
| **Requirement** | /req/gsml4-core/uml-abstract |
| **Test purpose** | Ensure that target implementation does not allow materialisation of abstract classes |
| **Test method** | Visually inspect the target implementation and validate that no classifiers (Feature, Type or Datatype) marked as abstract can be materialised. |
| **Test type** | Capability |
| **Test** | **/conf/gsml4-core/uml-polymorphism** | |
| **Requirement** | /req/gsml4-core/uml-polymorphism |
| **Test purpose** | Ensure that target implementation has mechanisms to allow type substitutions for property values. |
| **Test method** | Visually check the target implementation for properties that have value types at the head of substitution group also accept subtypes as valid values |
| **Test type** | Capability |
| **Test** | **/conf/gsml4-core/quantities-uom** | |
| **Requirement** | /req/gsml4-core/quantities-uom |
| **Test purpose** | Ensure that quantities have a governed units of measure |
| **Test method** | Visually check that the target implementation has a mechanism to enforce a unit of measure from a governed source. |
| **Test type** | Capability |
| **Test** | **/conf/gsml4-core/codelist** | |
| **Requirement** | /req/gsml4-core/codelist |
| **Test purpose** | Ensure that vocabulary are governed |
| **Test method** | Visually check that the target implementation has a mechanism to enforce a vocabulary from a governed source |
| **Test type** | Capability |

### A.2.1 Conformance class: Portrayal Abstract Class

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| **Conformance Class** | /conf/gsml4-portrayal | |
| **Requirements** | /req/gsml4-portrayal | |
| **Dependency** | /conf/gsml4-core | |
| **Test** | /conf/gsml4-portrayal/geomtype | |
| **Requirement** | /req/gsml4-portrayal/geomtype |
| **Test purpose** | Ensure that the target implementation only allow a single geometry per instance |
| **Test method** | Visual inspection that the target implementation has a mechanism to limit a single geometry per instance |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/string** | |
| **Requirement** | /req/gsml4-portrayal/string |
| **Test purpose** | Ensure that human readable string are allowed in all properties of type CharacterString |
| **Test method** | Visual inspection that the target implementation does not prevent human readable string (by ensuring that property data types are used) |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/formal-syntax** | |
| **Requirement** | /req/gsml4-portrayal/formal-syntax |
| **Test purpose** | Ensure that string can use formal syntax |
| **Test method** | Visual inspection that the target implementation can accommodate a documented formal syntax that will allow parsing of the content. |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/datetime** | |
| **Requirement** | /req/gsml4-portrayal/datetime |
| **Test purpose** | Ensure that all representation of date and time uses ISO8601 |
| **Test method** | Visual inspection that the target implementation has mechanism or rules to enforce the usage of ISO8601 date and time |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/uri** | |
| **Requirement** | /req/gsml4-portrayal/uri |
| **Test purpose** | Ensure that all properties ending in URI contain a URI |
| **Test method** | Check that the target implementation enforce the content to RFC 3986 |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**user-defined | |
| **Requirement** | /req/gsml4-portrayal/user-defined |
| **Test purpose** | Ensure that user defined properties conform to GML Simple Feature Level 0 |
| **Test method** | Check that the target implementation enforce user defined properties to be conform to GML Simple Feature Level 0 |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**geologicunitview-identifier-unique | |
| **Requirement** | /req/gsml4-portrayal/geologicunitview-identifier-unique |
| **Test purpose** | Ensure that the identifier is unique for the dataset |
| **Test method** | Check that the target implementation implement a unique key constrain or mechanism to ensure that identifier property is unique. |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**geologicunitview-representativeLithology | |
| **Requirement** | /req/gsml4-portrayal/geologicunitview-representativeLithology |
| **Test purpose** | Ensure that the geologic unit view representative lithology come from a controlled vocabulary |
| **Test method** | Check that the target implementation implements a mechanism to ensure that the term comes from a controlled vocabulary |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**geologicunitview-representativeAge | |
| **Requirement** | /req/gsml4-portrayal/geologicunitview-representativeAge |
| **Test purpose** | Ensure that the geologic unit view representative age come from a controlled vocabulary |
| **Test method** | Check that the target implementation implements a mechanism to ensure that the term comes from a controlled vocabulary |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**geologicunitview-representativeOlderAge | |
| **Requirement** | /req/gsml4-portrayal/geologicunitview-representativeOlderAge |
| **Test purpose** | Ensure that the geologic unit view representative older age come from a controlled vocabulary |
| **Test method** | Check that the target implementation implements a mechanism to ensure that the term comes from a controlled vocabulary |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**geologicunitview-representativeYoungerAge | |
| **Requirement** | /req/gsml4-portrayal/geologicunitview-representativeYoungerAge |
| **Test purpose** | Ensure that the geologic unit view representative older age come from a controlled vocabulary |
| **Test method** | Check that the target implementation implements a mechanism to ensure that the term comes from a controlled vocabulary |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**boreholeview-elevationSrs | |
| **Requirement** | /req/gsml4-portrayal/boreholeview-elevationSrs |
| **Test purpose** | Ensure that the elevation is using a valid SRS |
| **Test method** | Check that the target implementation implements a proper CRS reference to a EPSG vertical datum |
| **Test type** |  |
| **Test** | **/conf/gsml4-portrayal/**contactview-contacttype | |
| **Requirement** | /req/gsml4-portrayal/contactview-contacttype |
| **Test purpose** | Ensure that the contact’s contact type come from a controlled vocabulary |
| **Test method** | Check that the target implementation implements mechanism to ensure that the term comes from a controlled vocabulary. |
| **Test type** |  |

### A.2.1 Conformance class: GeoSciML Basic Logical Model

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| **Conformance Class** | /conf/gsml4-basic | |
| **Requirements** | /req/gsml4-basic | |
| **Dependency** | /conf/gsml4-core | |
| **Test** | /conf/gsml4-basic/geologicfeature-purpose | |
| **Requirement** | /req/gsml4-basic/geologicfeature-purpose |
| **Test purpose** | Ensure that the target implementation enforces the purpose property to be restricted to the values provided in Table 2 (instance, typicalNorm, definingNorm) |
| **Test method** | Visual inspection that the target implementation has a mechanism to limit the property value to those provided in Table 2 |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/geologicfeature-history | |
| **Requirement** | /req/gsml4-basic/geologicfeature-history |
| **Test purpose** | Ensure that the age of a GeologicFeature is described using the geologicHistory property only and through a GeologicRelation to a GeologicEvent |
| **Test method** | Visual inspection that the target implementation has a mechanism to prevent the usage of a GeologicRelation to a GeologicEvent to describe the age of the GeologicFeature |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/compositonPart-proportion | |
| **Requirement** | /req/gsml4-basic/compositonPart-proportion |
| **Test purpose** | Ensure that proportion are expressed relative to a whole |
| **Test method** | Visual inspection that the target implementation has a mechanism that restriction the Quantity unit of measure to be relative to a whole (like %) |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/geologicevent-non-null | |
| **Requirement** | /req/gsml4-basic/geologicevent-non-null |
| **Test purpose** | Ensure that a GeologicEvent instance has either a olderAgeNamedAge or youngerNamedAge as a non-null value |
| **Test method** | Visual inspection that the target implementation has a mechanism to prevent a GeologicEvent to have both olderAgeNamedAge or youngerNamedAge equals to null. |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/plane-pol-dip-az-not-null | |
| **Requirement** | /req/gsml4-basic/plane-pol-dip-az-not-null |
| **Test purpose** | Ensure that a GSML\_PlanarOrientation instance has either polarity, azimuth or dip as a non-null value |
| **Test method** | Visual inspection that the target implementation has a mechanism to prevent a GSML\_PlanarOrientation to have all polarity, azimuth or dip equal to null. |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/plane-pol-dip-az-range | |
| **Requirement** | /req/gsml4-basic/plane-pol-dip-az-range |
| **Test purpose** | Ensure that the GSML\_PlanarOrientation azimuth is a real value in the range [0,360[ |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain a GSML\_PlanarOrientation azimuth in the range [0,360[ |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/plane-dip-degree | |
| **Requirement** | /req/gsml4-basic/plane-dip-degree |
| **Test purpose** | Ensure that the GSML\_PlanarOrientation dip report the angle of a structure from the horizontal as a positive value. |
| **Test method** | Visual inspection that the target implementation has proper documentation on how to map dip measurement to the target implementation. |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/plane-dip-range | |
| **Requirement** | /req/gsml4-basic/plane-dip-range |
| **Test purpose** | Ensure that the GSML\_PlanarOrientation dip is a real value in the range [0,90[ |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain a GSML\_PlanarOrientation dip in the range [0,90[ |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/linear-trend-plunge-not-null | |
| **Requirement** | /req/gsml4-basic/linear-trend-plunge-not-null |
| **Test purpose** | Ensure that a GSML\_LinearOrientation instance has either trend or plunge as a non-null value |
| **Test method** | Visual inspection that the target implementation has a mechanism to prevent a GSML\_LinearOrientation to have both trend and plunge equals to null. |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/linear-plunge-range | |
| **Requirement** | /req/gsml4-basic/linear-plunge-range |
| **Test purpose** | Ensure that a GSML\_LinearOrientation plunge is a value in the range [0,360[ |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain a GSML\_LinearOrientation plunge in the range [0,360[ |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/linear-trend-degree | |
| **Requirement** | /req/gsml4-basic/linear-trend-degree |
| **Test purpose** | Ensure that a GSML\_LinearOrientation trend is expressed in degree from the geographical north |
| **Test method** | Visual inspection that the target implementation has documentation regarding how to express trend |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/linear-az-range | |
| **Requirement** | /req/gsml4-basic/linear-az-range |
| **Test purpose** | Ensure that a GSML\_LinearOrientation azimuth is a real value in the range [0,360[ |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain a GSML\_LinearOrientation trend in the range [0,360[ |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/quantity\_range\_order | |
| **Requirement** | /req/gsml4-basic/quantity\_range\_order |
| **Test purpose** | Ensure that a GSML\_QuantityRange lowerValue is less or equal to upperValue |
| **Test method** | Visual inspection that the target implementation has a mechanism to constain lowerValue to be less or equal to upperValue. |
| **Test type** |  |
| **Test** | /conf/gsml4-basic/quantity-range-repeat | |
| **Requirement** | /req/gsml4-basic/quantity-range-repeat |
| **Test purpose** | Ensure that a GSML\_QuantityRange lowerValue and upperValue matches the quantities in the “value” property |
| **Test method** | Visual inspection that the target implementation has a mechanism to constain lowerValue to match value[0] and upperValue to match value[1] |
| **Test type** |  |

### A.2.1 Conformance class: GeoSciML Extension Logical Model

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| **Conformance Class** | /conf/gsml4-extension | |
| **Requirements** | /req/gsml4-extension | |
| **Dependency** | /conf/gsml4-basic | |
| **Test** | /conf/gsml4-extension/geologicfeature-history | |
| **Requirement** | /req/gsml4-extension/geologicfeature-history |
| **Test purpose** | Ensure that the target implementation restricts GeologicEvent describing the age of GeologicUnit to geologicHistory property |
| **Test method** | Visual inspection that the target implementation has a mechanism to limit GeologicEvent describing age of GeologicFeature to geologicHistory. |
| **Test type** |  |
| **Test** | /conf/gsml4-extension/particle-shape | |
| **Requirement** | /req/gsml4-extension/particle-shape |
| **Test purpose** | Ensure that the target implementation restricts ParticleGeometryDescription particle-shape property to contain a value that is appropriate for the kind of compound material |
| **Test method** | Visual inspection that the target implementation has documentation or mechanism to constrain the values. |
| **Test type** |  |
| **Test** | /conf/gsml4-extension/contact-chronoboundary | |
| **Requirement** | /req/gsml4-extension/contact-chronoboundary |
| **Test purpose** | Ensure that the target implementation restricts ContactDescription::correlatesWith value to an instance of GeochronologicBondary only when ContactDescription::contactType is ChronostratigraphicBoundary |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain the value of correlatesWith |
| **Test type** |  |
| **Test** | /conf/gsml4-extension/contact-boundary | |
| **Requirement** | /req/gsml4-extension/contact-boundary |
| **Test purpose** | Ensure that the target implementation restricts the number of GeologicRelation to GeologicUnit, representing the two units that share a contact, to 2 and only 2 |
| **Test method** | Visual inspection that the target implementation has a mechanism to constrain the number GeologicRelation to 2 when the target feature is a GeologicUnit and the role is “contact” |
| **Test type** |  |
| **Test** | /conf/gsml4-extension/slipComponents-slip | |
| **Requirement** | /req/gsml4-extension/slipComponents-slip |
| **Test purpose** | Ensure that the target implementation constrains either heave, horizontalSlip or throw properties of SlipComponent to bear a non-null value |
| **Test method** | Visual inspection that the target implementation has a mechanism to enforce at least one of heave, horizontalSlip or throw to have a non-null value. |
| **Test type** |  |

### A.2.1 Conformance class: GeoSciML Time-Scale Logical Model

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| **Conformance Class** | /conf/gsml4-timescale | |
| **Requirements** | /req/gsml4-timescale | |
| **Dependency** | /conf/gsml4-basic | |
| **Test** | /conf/gsml4-timescale/member-timeordinalera | |
| **Requirement** | /req/gsml4-timescale/member-timeordinalera |
| **Test purpose** | Ensure that the target implementation restricts |
| **Test method** | Visual inspection that the target implementation has a mechanism |
| **Test type** |  |
| **Test** | /conf/gsml4-timescale/group-timeordinalera | |
| **Requirement** | /req/gsml4-timescale/group-timeordinalera |
| **Test purpose** | Ensure that the target implementation restricts |
| **Test method** | Visual inspection that the target implementation has a mechanism |
| **Test type** |  |

### A.2.1 Conformance class: GeoSciML Borehole Logical Model

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| **Conformance Class** | /conf/gsml4-borehole | |
| **Requirements** | /req/gsml4-borehole | |
| **Dependency** | /conf/gsml4-basic | |
| **Dependency** | (add depency to O&M conf classes) | |
| **Test** | /conf/gsml4-borehole/ uom-boreholeDiameter | |
| **Requirement** | /req/gsml4-borehole/uom-boreholeDiameter |
| **Test purpose** | Ensure that the target implementation enforces the presence of a non-null units of measurement for DillingDetails::boreholeDiameter |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure that DillingDetails::boreholeDiameter is not null. |
| **Test type** |  |
| **Test** | /conf/gsml4-borehole/uom-intervalBegin | |
| **Requirement** | /req/gsml4-borehole/uom-intervalBegin |
| **Test purpose** | Ensure that the target implementation enforces the presence of a non-null units of measurement for DillingDetails::intervalBegin |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure that DillingDetails::intervalBegin is not null. |
| **Test type** |  |
| **Test** | /conf/gsml4-borehole/uom-intervalBegin | |
| **Requirement** | /req/gsml4-borehole/uom-intervalBegin |
| **Test purpose** | Ensure that the target implementation enforces the presence of a non-null units of measurement for DillingDetails::intervalBegin |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure that DillingDetails::intervalBegin is not null. |
| **Test type** |  |
| **Test** | /conf/gsml4-borehole/uom-intervalEnd | |
| **Requirement** | /req/gsml4-borehole/uom-intervalEnd |
| **Test purpose** | Ensure that the target implementation enforces the presence of a non-null units of measurement for DillingDetails::intervalEnd |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure that DillingDetails::intervalEnd is not null. |
| **Test type** |  |
| **Test** | /conf/gsml4-borehole/drill-interval-1D | |
| **Requirement** | /req/gsml4-borehole/drill-interval-1D |
| **Test purpose** | Ensure that the target implementation enforces the presence a 1D geometry for DrillingDetail::interval |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure DrillingDetail::interval is a 1D geometry |
| **Test type** |  |
| **Test** | /conf/gsml4-borehole/drill-interval-1D-CRS | |
| **Requirement** | /req/gsml4-borehole/drill-interval-1D-CRS |
| **Test purpose** | Ensure that the target implementation enforces DillingDetails::intervalEnd geometries CRS to be a valid vertical datum |
| **Test method** | Visual inspection that the target implementation has a mechanism to ensure that DillingDetails::intervalEnd datum is a valid vertical datum. |
| **Test type** |  |