

# ISO 19136:2007-09 (E)

## Geographic information - Geography Markup Language (GML)

---

<b>Contents</b>		<b>Page</b>
Foreword .....		vi
Introduction .....		vii
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Conformance .....</b>	<b>1</b>
2.1	Conformance requirements .....	1
2.2	Conformance classes related to GML application schemas .....	2
2.3	Conformance classes related to GML profiles .....	2
2.4	Conformance classes related to GML documents .....	4
2.5	Conformance classes related to software implementations .....	4
<b>3</b>	<b>Normative references .....</b>	<b>4</b>
<b>4</b>	<b>Terms and symbols .....</b>	<b>5</b>
4.1	Terms and definitions .....	5
4.2	Symbols and abbreviated terms .....	12
<b>5</b>	<b>Conventions .....</b>	<b>13</b>
5.1	XML namespaces .....	13
5.2	Versioning .....	14
5.3	Deprecated parts of previous versions of GML .....	14
5.4	UML notation .....	14
5.5	XML Schema .....	16
<b>6</b>	<b>Overview of the GML schema .....</b>	<b>16</b>
6.1	GML schema .....	16
6.2	GML application schemas .....	16
<b>and GML application schemas .....</b>		<b>17</b>
6.4	Organization of this International Standard .....	18
6.5	Deprecated and experimental schema components .....	19
<b>7</b>	<b>GML schema -- General rules and base schema components .....</b>	<b>20</b>
7.1	GML model and syntax .....	20
7.2	gmlBase schema components .....	22
<b>8</b>	<b>GML schema -- Xlinks and basic types .....</b>	<b>33</b>
8.1	Xlinks -- Object associations and remote properties .....	33
8.2	Basic types .....	34
<b>9</b>	<b>GML schema -- Features .....</b>	<b>43</b>
9.1	General concepts .....	43
9.3	Features .....	43
9.4	Standard feature properties .....	44
9.5	Geometry properties .....	46
9.6	Topology properties .....	48
9.7	Temporal properties .....	48
9.8	Defining application-specific feature types .....	49
9.9	Feature collections .....	50
9.10	Spatial reference system used in a feature or feature collection .....	52

10	GML schema -- Geometric primitives .....	52
10.1	General concepts .....	52
10.2	Abstract geometric primitives .....	58
10.3	Geometric primitives (0-dimensional) .....	59
10.4	Geometric primitives (1-dimensional) .....	60
10.5	Geometric primitives (2-dimensional) .....	72
10.6	Geometric primitives (3-dimensional) .....	81
11	GML schema -- Geometric complex, geometric composites and geometric aggregates ....	83
11.1	Overview .....	83
11.2	Geometric complex and geometric composites .....	84
11.3	Geometric aggregates .....	86
12	GML schema -- Coordinate reference systems schemas .....	91
12.1	Overview .....	91
12.2	Reference systems .....	93
12.3	Coordinate reference systems .....	95
12.4	Coordinate systems .....	103
12.5	Datums .....	110
12.6	Coordinate operations .....	117
13	GML schema -- Topology .....	129
13.1	General concepts .....	129
13.2	Abstract topology .....	130
13.3	Topological primitives .....	130
13.4	Topological collections .....	135
13.5	Topology complex .....	137
14	GML schema -- Temporal information and dynamic features .....	139
14.1	General concepts .....	139
14.2	Temporal schema .....	140
14.3	Temporal topology schema .....	148
14.4	Temporal reference systems .....	151
14.5	Representing dynamic features .....	158
15	GML schema -- Definitions and dictionaries .....	162
15.1	Overview .....	162
15.2	Dictionary schema .....	162
16	GML schema -- Units, measures and values .....	165
16.1	Introduction .....	165
16.2	Units schema .....	165
16.3	Measures schema .....	171
16.4	Value objects schema .....	172
17	GML schema -- Directions .....	179
17.1	Direction schema .....	179
17.2	direction, DirectionPropertyType .....	179
17.3	DirectionVectorType .....	180
17.4	DirectionDescriptionType .....	180
18	GML schema -- Observations .....	181
18.1	Observations .....	181
18.2	Observation schema .....	182
19	GML schema -- Coverages .....	185
19.1	The coverage model and representations .....	185
19.2	Grids schema .....	188
19.3	Coverage schema .....	191
20	Profiles .....	205

20.1	Profiles of GML and application schemas .....	205
20.2	Definition of profile .....	205
20.3	Relation to application schema .....	205
20.4	Rules for elements and types in a profile .....	206
20.5	Rules for referencing GML profiles from application schemas .....	207
20.6	Recommendations for application schemas using GML profiles .....	207
20.7	Summary of rules for GML profiles .....	208
21	Rules for GML application schemas .....	208
21.1	Instances of GML objects .....	208
21.2	GML application schemas .....	209
21.3	Schemas defining Features and Feature Collections .....	212
21.4	Schemas defining spatial geometries .....	213
21.5	Schemas defining spatial topologies .....	214
21.6	Schemas defining time .....	215
21.7	Schemas defining coordinate reference systems .....	215
21.8	Schemas defining coverages .....	216
21.9	Schemas defining observations .....	218
21.10	Schemas defining dictionaries and definitions .....	219
21.11	Schemas defining values .....	220
21.12	GML profiles of the GML schema .....	220
Annex A (normative) Abstract test suites for GML application schemas, GML profiles and GML documents .....		223
Annex B (normative) Abstract test suite for software implementations .....		238
Annex C (informative) GML schema .....		242
Extensions .....		244
Annex E (normative) UML-to-GML application schema encoding rules .....		309
Annex F (normative) GML-to-UML application schema encoding rules .....		329
Annex G (informative) Guidelines for subsetting the GML schema .....		339
Annex H (informative) Default styling .....		352
Annex I (informative) Backwards compatibility with earlier versions of GML .....		363
Annex J (informative) Modularization and dependencies .....		380
Bibliography .....		382
Index .....		384