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**Information technology — Database  
languages — SQL multimedia and  
application packages —**

**Part 3:  
Spatial**

*Technologies de l'information — Langages de bases de données —  
Multimédia SQL et paquetages d'application —*

*Partie 3: Spatial*



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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

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- *Part 1: Framework*
- *Part 2: Full-Text*
- *Part 3: Spatial*
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- *Part 6: Data Mining*
- *Part 7: History*

Annexes A to E and the Bibliography of this part of ISO/IEC 13249 are for information only.

## Introduction

ISO/IEC 13249 defines multimedia and application-specific types and their associated routines using the features for the creation of user-defined types specified in ISO/IEC 9075, "Information technology - Database languages – SQL".

The organization of this part of ISO/IEC 13249 is as follows:

Clause 1, "Scope", specifies the scope of this part of ISO/IEC 13249.

Clause 2, "Normative references", identifies additional standards that, through reference in this part of ISO/IEC 13249, constitute provisions of this part of ISO/IEC 13249.

Clause 3, "Terms and definitions, notations, and conventions", defines the notations and conventions used in this part of ISO/IEC 13249.

Clause 4, "Concepts", presents concepts used in the definition of this part of ISO/IEC 13249.

Clause 5, "Geometry Types", defines the geometry supertype.

Clause 6, "Point Types", defines primitive 0-dimensional geometry types.

Clause 7, "Curve Types", defines primitive 1-dimensional geometry types.

Clause 8, "Surface Types", defines primitive 2-dimensional geometry types.

Clause 9, "Solid Types", defines primitive 3-dimensional geometry types.

Clause 10, "Geometry Collection Types", defines the geometry collection types.

Clause 11, "Topology-Geometry", defines node, edge, and face topology-geometry primitives.

Clause 12, "Topology-Network", defines node and link topology-network primitives.

Clause 13, "General Routines", defines the routines to determine shortest path in directed or undirected graphs.

Clause 14, "Spatial Reference System Type", defines the user-defined type to manage spatial reference systems.

Clause 15, "Linear Referencing Types", defines user-defined types to manage linear referencing.

Clause 16, "Angle and Direction Types", defines the angles and direction types.

Clause 17, "Support Types", defines supporting types and routines used by this part of ISO/IEC 13249.

Clause 18, "Support Routines", defines supporting functions and procedures used by this part of ISO/IEC 13249.

Clause 19, "SQL/MM Spatial Information Schema" defines the SQL/MM Spatial Information Schema.

Clause 20, "SQL/MM Spatial Definition Schema" defines the SQL/MM Spatial Definition Schema.

Clause 21, "SQL/MM Linear Referencing Information and Definition Schemas" defines the SQL/MM Linear Referencing Information and Definition Schemas.

Clause 22, "Status Codes", defines the SQLSTATE codes used in this part of ISO/IEC 13249.

Clause 23, "Conformance", defines the criteria for conformance to this part of ISO/IEC 13249.

Annex A, "Implementation-defined elements", is an informative Annex. It lists those features for which the body of this part of ISO/IEC 13249 states that the syntax or meaning or effect on the database is partly or wholly implementation-defined, and describes the defining information that an implementer shall provide in each case.

Annex B, "Implementation-dependent elements", is an informative Annex. It lists those features for which the body of this part of ISO/IEC 13249 states explicitly that the meaning or effect on the database is implementation-dependent.

Annex C, "Deprecated features", is an informative Annex. It lists features that the responsible Technical Committee intend will not appear in a future revised version of this part of ISO/IEC 13249.

Annex D, "Incompatibilities with ISO/IEC 13249-3:2006", is an informative Annex. It lists incompatibilities with the previous version of this part of ISO/IEC 13249-3.

Annex E, "Geometry Type Hierarchy", is an informative Annex. It visually describes the inheritance relationship between user-defined types in this part of ISO/IEC 13249.

Bibliography is the last informative Annex. It is a list of selective reading relating to this part of ISO/IEC 13249.

In the text of this part of ISO/IEC 13249, in Clause 5, "Geometry Types", through Clause 20, "SQL/MM Spatial Definition Schema", subclauses begin on a new page. Any resulting blank space is not significant.

The spatial user-defined types defined in this part adhere to the following:

- A spatial user-defined type is generic to spatial data handling. It addresses the need to store, manage and retrieve information based on aspects of spatial data such as geometry, location, and topology.
- A spatial user-defined type does not redefine the database language SQL directly or in combination with another spatial data type.

Implementations of this part of ISO/IEC 13249 may exist in environments that also support geographic information, decision support, data mining, and data warehousing systems.

Application areas addressed by implementations of this part of ISO/IEC 13249 include, but are not restricted to, automated mapping, desktop mapping, facilities management, geoengineering, graphics, linear referencing, location based services, multimedia, and resource management applications.

# Information technology — Database languages — SQL multimedia and application packages —

## Part 3: Spatial

### 1 Scope

This part of ISO/IEC 13249:

- a) defines concepts specific to this part of ISO/IEC 13249,
- b) defines spatial user-defined types and their associated routines.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 9075-1, Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework).

ISO/IEC 9075-2, Information technology — Database languages — SQL — Part 1: Foundation (SQL/Foundation).

ISO/IEC 13249-1, Information technology — Database languages — SQL multimedia and application packages — Part 1: Framework.

ISO 19107, Geographic information — Spatial schema.

ISO 19111, Geographic information — Spatial referencing by coordinates.

ISO 19136, Geographic information — Geography Markup Language.

ISO 19136-2, Geographic information — Geography Markup Language - Extended schemas and encoding rules.

ISO 19148, Geographic information — Linear referencing

IEC 559:1989, Binary floating-point arithmetic for microprocessor systems.