

# INTERNATIONAL STANDARD

ISO/IEC  
19075-2

First edition  
2021-08

---

---

## Information technology — Guidance for the use of database language SQL —

### Part 2: Time-related information

*Technologies de l'information — Recommandations pour l'utilisation  
du langage de base de données SQL —*

*Partie 2: Informations d'horodatage*



Reference number  
ISO/IEC 19075-2:2021(E)

© ISO/IEC 2021



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier; Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

## Contents

Page

Foreword.....	vi
Introduction.....	viii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>2</b>
<b>3 Terms and definitions.....</b>	<b>3</b>
<b>4 Time-related data types, constructs, operators, and predicates.....</b>	<b>4</b>
4.1 Context of time-related specifications.....	4
4.2 Datetime types.....	4
4.3 DateTime literals.....	6
4.4 Interval types.....	7
4.5 Interval literals.....	8
4.6 Periods.....	9
4.7 Operations involving datetimes and intervals.....	10
4.8 Time-related predicates.....	10
4.8.1 Overlaps predicate.....	10
4.8.2 Period predicates.....	11
<b>5 Time-related tables.....</b>	<b>14</b>
5.1 Introduction to time-related tables.....	14
5.2 Application-time period tables.....	14
5.2.1 Introduction to application-time period tables.....	14
5.2.2 Extensions to primary key / unique constraints.....	14
5.2.3 Extensions to referential constraints.....	15
5.2.4 Inserting rows into tables containing an application-time period definition.....	18
5.2.5 Updating rows of tables containing an application-time period definition.....	18
5.2.6 Updating the table between specific points in time.....	19
5.2.7 Deleting rows from tables containing an application-time period definition.....	22
5.2.8 Deleting rows between specific points in time.....	22
5.2.9 Querying tables containing a period definition.....	24
5.2.10 Adding a period definition to a table.....	25
5.3 System-versioned tables.....	26
5.3.1 Introduction to system-versioned tables.....	26
5.3.2 Primary key and referential constraints.....	27
5.3.3 Updating rows in system-versioned tables.....	28
5.3.4 Deleting rows in system-versioned tables.....	29
5.3.5 Querying system-versioned tables.....	29
5.4 Bi-temporal tables.....	30
<b>Bibliography.....</b>	<b>32</b>

**ISO/IEC 19075-2:2021(E)**

<b>Index.....</b>	<b>33</b>
-------------------	-----------

# Tables

Table	Page
1 Fields in datetime values. . . . .	4
2 Mapping of datetime fields to datetime data types. . . . .	5
3 Examples of the datetime data types. . . . .	6
4 Examples of datetime literals. . . . .	6
5 Fields in year-month INTERVAL values. . . . .	7
6 Fields in day-time INTERVAL values. . . . .	7
7 Examples of day-time INTERVAL values. . . . .	8
8 Examples of interval literals. . . . .	8
9 Valid operators involving datetimes and intervals. . . . .	10
10 Example data table emp for primary key with application-time period. . . . .	15
11 Example data table dept for foreign key with application-time period. . . . .	16
12 Example data table emp for foreign key with application-time period. . . . .	16
13 Content of table emp after insert with application-time period. . . . .	18
14 Content of table emp before updating a row. . . . .	18
15 Content of table emp after updating a row. . . . .	19
16 Content of table emp before updating the application-time period of a row. . . . .	19
17 Content of table emp after updating the application-time period of a row. . . . .	19
18 Content of table emp before updating a row for an inner part of a period. . . . .	20
19 Content of table emp after updating a row for an inner part of a period. . . . .	20
20 Content of table emp before updating a row for all of a period. . . . .	20
21 Content of table emp after updating a row for all of a period. . . . .	21
22 Content of table emp before updating the edge of a period of a row. . . . .	21
23 Content of table emp after updating the edge of a period of a row. . . . .	21
24 Content of table emp before deleting an inner part of a period. . . . .	22
25 Content of table emp with application-time period after deleting an inner part of a period. . . . .	23
26 Content of table emp with application-time period before deleting a row. . . . .	23
27 Content of table emp before deleting an edge of a period. . . . .	23
28 Content of table emp after deleting an edge of a period. . . . .	24
29 Content of system-versioned table emp before updating a row. . . . .	28
30 Content of system-versioned table emp after updating a row. . . . .	28
31 Content of system-versioned table emp before deleting a row. . . . .	29
32 Content of system-versioned table emp after deleting a row. . . . .	29

## ISO/IEC 19075-2:2021(E)

### 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.

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) or [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)), or the IEC list of patent declarations received (see [patents.iec.ch](http://patents.iec.ch)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://www.iec.ch/understanding-standards).

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This first edition of ISO/IEC 19075-2 cancels and replaces ISO/IEC TR 19075-2:2015.

This document is intended to be used in conjunction with the following editions of the parts of the ISO/IEC 9075 series:

- ISO/IEC 9075-1, sixth edition or later;
- ISO/IEC 9075-2, sixth edition or later;
- ISO/IEC 9075-3, sixth edition or later;
- ISO/IEC 9075-4, seventh edition or later;
- ISO/IEC 9075-9, fifth edition or later;
- ISO/IEC 9075-10, fifth edition or later;
- ISO/IEC 9075-11, fifth edition or later;
- ISO/IEC 9075-13, fifth edition or later;
- ISO/IEC 9075-14, sixth edition or later;
- ISO/IEC 9075-15, second edition or later;
- ISO/IEC 9075-16, first edition or later.

A list of all parts in the ISO/IEC 19075 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html) and [www.iec.ch/-national-committees](http://www.iec.ch/-national-committees).

## Introduction

The organization of this document is as follows:

- 1) [Clause 1, “Scope”](#), specifies the scope of this document.
- 2) [Clause 2, “Normative references”](#), identifies additional standards that, through reference in this document, constitute provisions of this document.
- 3) [Clause 3, “Terms and definitions”](#), defines the terms and definitions used in this document.
- 4) [Clause 4, “Time-related data types, constructs, operators, and predicates”](#), explains time-related data types, operators, and predicates in SQL.
- 5) [Clause 5, “Time-related tables”](#), explains how time-related tables are used.



# **Information technology — Guidance for the use of database language SQL —**

## **Part 2:**

### **Time-related information**

## **1 Scope**

This document describes the support in SQL for time-related information.

This document discusses the following features of the SQL language:

- Time-related data types
- Operations on time-related data
- Time-related Predicates
- Application-time period tables
- System-versioned tables
- Bi-temporal tables

## ISO/IEC 19075-2:2021(E)

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 2: Foundation (SQL/Foundation)*