

# ISO/IEC 9075-1:2011-12 (E)

## Information technology - Database languages - SQL - Part 1: Framework (SQL/Framework)

---

<b>Contents</b>		<b>Page</b>
Foreword .....		ix
Introduction .....		x
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>3</b>
2.1	ISO and IEC standards .....	3
<b>3</b>	<b>Definitions and use of terms .....</b>	<b>5</b>
3.1	Definitions .....	5
3.1.1	Definitions provided in this standard .....	5
3.2	Use of terms .....	7
3.3	Informative elements .....	7
<b>4</b>	<b>Concepts .....</b>	<b>9</b>
4.1	Caveat .....	9
4.2	SQL-environments and their components .....	9
4.2.1	SQL-environments .....	9
4.2.2	SQL-agents .....	9
4.2.3	SQL-implementations .....	10
4.2.3.1	SQL-clients .....	10
4.2.3.2	SQL-servers .....	10
4.2.4	SQL-client modules .....	10
4.2.5	User identifiers .....	11
4.2.6	Roles .....	11
4.2.7	User mapping concepts .....	11
4.2.8	Routine mapping concepts .....	11
4.2.9	Catalogs and schemas .....	11
4.2.9.1	Catalogs .....	11
4.2.9.2	SQL-schemas .....	12
4.2.9.3	The Information Schema .....	12
4.2.9.4	The Definition Schema .....	12
4.2.10	Foreign servers and descriptors .....	12
4.2.11	Foreign-data wrappers and descriptors .....	13
4.2.12	SQL-data .....	13
4.3	Tables .....	13
4.4	SQL data types .....	14
4.4.1	General data type information .....	14
4.4.2	The null value .....	14
4.4.3	Predefined types .....	15
4.4.3.1	Numeric types .....	15
4.4.3.2	Character string types .....	15
4.4.3.3	Binary string types .....	15
4.4.3.4	Boolean type .....	15
4.4.3.5	Datetime types .....	16
4.4.3.6	Interval types .....	16
4.4.3.7	XML type .....	16
4.4.4	Constructed atomic types .....	16
4.4.4.1	Reference types .....	16
4.4.5	Constructed composite types .....	17

4.4.5.1	Collection types .....	17
4.4.5.2	Fields .....	17
4.4.5.3	Row types .....	17
4.5	Sites and operations on sites .....	17
4.5.1	Sites .....	17
4.5.2	Assignment .....	18
4.5.3	Nullability .....	18
4.6	SQL-schema objects .....	18
4.6.1	General SQL-schema object information .....	18
4.6.2	Descriptors relating to character sets .....	19
4.6.2.1	Character sets .....	19
4.6.2.2	Collations .....	19
4.6.2.3	Transliterations .....	19
4.6.3	Domains and their components .....	20
4.6.3.1	Domains .....	20
4.6.3.2	Domain constraints .....	20
4.6.4	User-defined types .....	20
4.6.4.1	Introduction to user-defined types .....	20
4.6.4.2	Distinct types .....	20
4.6.4.3	Structured types .....	21
4.6.5	Base tables and their components .....	21
4.6.5.1	Base tables .....	21
4.6.5.2	Columns .....	21
4.6.5.3	Periods .....	21
4.6.5.4	Table constraints .....	22
4.6.5.5	Triggers .....	22
4.6.6	View definitions .....	22
4.6.7	Assertions .....	23
4.6.8	SQL-server modules (defined in [ISO9075-4]) .....	23
4.6.9	Schema routines .....	23
4.6.10	Sequence generators .....	23
4.6.11	Privileges .....	23
4.7	Integrity constraints and constraint checking .....	24
4.7.1	Constraint checking .....	24
4.7.2	Determinism and constraints .....	24
4.8	Communication between an SQL-agent and an SQL-server .....	25
4.8.1	Host languages .....	25
4.8.2	Parameter passing and data type correspondences .....	25
4.8.2.1	General parameter passing and data type correspondence information .....	25
4.8.2.2	Data type correspondences .....	26
4.8.2.3	Locators .....	26
4.8.2.4	Status parameters .....	26
4.8.2.5	Indicator parameters .....	26
4.8.3	Descriptor areas .....	26
4.8.4	Diagnostic information .....	27
4.8.5	SQL-transactions .....	27
4.9	Modules .....	28
4.10	Routines .....	28
4.10.1	General routine information .....	28
4.10.2	Type preserving functions .....	29
4.11	SQL-statements .....	29
4.11.1	Classes of SQL-statements .....	29
4.11.2	SQL-statements classified by function .....	29
5.1	Overview .....	31
5.3.1	Data types specified in [ISO9075-2] .....	32
5.3.2	Tables .....	32
5.3.3	Bindings methods .....	32
5.3.3.1	Embedded SQL .....	32
5.3.3.2	Dynamic SQL .....	32
5.3.3.3	Direct invocation of SQL .....	33

5.3.4	SQL-statements specified in [ISO9075-2]	33
5.5.1	SQL-statements specified in [ISO9075-4]	35
6.1	Notation taken from [ISO10646]	37
6.2	Notation provided in this International Standard	37
6.3	Conventions	39
6.3.1	Specification of syntactic elements	39
6.3.2	Specification of the Information and Definition Schemata	39
6.3.3	Use of terms	40
6.3.3.1	Syntactic containment	40
6.3.3.2	Terms denoting rule requirements	41
6.3.3.3	Rule evaluation order	41
6.3.3.4	Conditional rules	42
6.3.3.5	Syntactic substitution	42
6.3.3.6	Other terms	43
6.3.3.7	Exceptions	43
6.3.3.8	General Rules not terminated on exception conditions	44
6.3.4	Descriptors	44
6.3.5.1	New and modified Clauses, Subclauses, and Annexes	46
6.3.5.2	New and modified tables and figures	47
6.3.5.3	Functions	48
6.3.5.4	New and modified Format items	48
6.3.5.5	New and modified paragraphs and rules	48
6.3.5.6	Modified annexes	50
6.3.6	Subclauses used as subroutines	50
6.3.7	Index typography	50
6.3.8	Feature ID and Feature Name	50
7.1	SQL conformance summary	53
7.2	Implementation-defined elements	53
7.3	Implementation-dependent elements	53
7.4	Deprecated features	53
7.5	Incompatibilities with previous versions	53
7.6	SQL feature taxonomy	54
7.7	Defect Reports	54
8	Conformance	55
8.1	Minimum conformance	55
8.2	Conformance to parts	55
8.3	Conformance to features	55
8.4	Extensions and options	56
8.5	SQL flagger	57
8.6	Claims of conformance	58
8.6.1	Requirements for SQL applications	58
8.6.2	Requirements for SQL-implementations	59
	Annex A (informative) Maintenance and interpretation of SQL	61
	Annex B (informative) Implementation-defined elements	63
	Annex C (informative) Implementation-dependent elements	65
	Annex D (informative) Deprecated features	67
	Annex F (informative) SQL feature taxonomy	71
	Index	75
	Tableg	

Table Page 1 Relationships between externally-invoked and SQL-invoked fci hjbYg'&