

# ISO/IEC 9075-4:2011-12 (E)

## Information technology - Database languages - SQL - Part 4: Persistent Stored Modules (SQL/PSM)

---

### Contents

	Page
<b>Foreword .....</b>	<b>ix</b>
<b>Introduction .....</b>	<b>x</b>
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>3</b>
<b>2.1 ISO and IEC standards .....</b>	<b>3</b>
<b>3 Definitions, notations, and conventions .....</b>	<b>5</b>
<b>3.1 Conventions .....</b>	<b>5</b>
<b>3.1.1 Use of terms .....</b>	<b>5</b>
<b>3.1.1.1 Other terms .....</b>	<b>5</b>
<b>4 Concepts .....</b>	<b>7</b>
<b>4.1 SQL-server modules .....</b>	<b>7</b>
<b>4.2 Tables .....</b>	<b>8</b>
<b>4.2.1 Base tables .....</b>	<b>8</b>
<b>4.2.1.1 Temporary tables .....</b>	<b>8</b>
<b>4.2.2 Unique identification of tables .....</b>	<b>8</b>
<b>4.3 SQL-schemas .....</b>	<b>8</b>
<b>4.4 SQL-invoked routines .....</b>	<b>8</b>
<b>4.4.1 Overview of SQL-invoked routines .....</b>	<b>9</b>
<b>4.4.2 Execution of SQL-invoked routines .....</b>	<b>9</b>
<b>4.4.3 Routine descriptors .....</b>	<b>9</b>
<b>4.5 SQL-paths .....</b>	<b>9</b>
<b>4.6 Host parameters .....</b>	<b>9</b>
<b>4.6.1 Status parameters .....</b>	<b>10</b>
<b>4.7 Diagnostics area .....</b>	<b>10</b>
<b>4.8 Condition handling .....</b>	<b>10</b>
<b>4.9 Cursors .....</b>	<b>12</b>
<b>4.9.1 General description of cursors .....</b>	<b>12</b>
<b>4.10 SQL-statements .....</b>	<b>12</b>
<b>4.10.1 Classes of SQL-statements .....</b>	<b>13</b>
<b>4.10.2 SQL-statements classified by function .....</b>	<b>13</b>
<b>4.10.2.1 SQL-schema statements .....</b>	<b>13</b>
<b>4.10.2.2 SQL-control statements .....</b>	<b>13</b>
<b>4.10.2.3 SQL-control declarations .....</b>	<b>14</b>
<b>4.10.2.4 SQL-diagnostics statements .....</b>	<b>14</b>
<b>4.10.3 SQL-statements and transaction states .....</b>	<b>14</b>
<b>4.10.4 SQL-statement atomicity and statement execution contexts .....</b>	<b>14</b>
<b>4.10.5 Embeddable SQL-statements .....</b>	<b>15</b>
<b>4.10.6 Preparable and immediately executable SQL-statements .....</b>	<b>15</b>
<b>4.10.7 Directly executable SQL-statements .....</b>	<b>16</b>
<b>4.10.8 Iterated SQL-statements .....</b>	<b>16</b>
<b>4.10.9 Compound statements .....</b>	<b>16</b>
<b>4.11 Basic security model .....</b>	<b>16</b>
<b>4.11.1 Privileges .....</b>	<b>16</b>
<b>4.12 SQL-sessions .....</b>	<b>17</b>
<b>4.12.1 General description of SQL-sessions .....</b>	<b>17</b>
<b>5 Lexical elements .....</b>	<b>19</b>

5.1	<b>&lt;token&gt; and &lt;separator&gt;</b>	19
5.2	<b>Names and identifiers</b>	21
6	<b>Scalar expressions</b>	25
6.1	<b>&lt;value specification&gt; and &lt;target specification&gt;</b>	25
6.2	<b>&lt;identifier chain&gt;</b>	27
6.3	<b>&lt;next value expression&gt;</b>	29
6.4	<b>&lt;SQL variable reference&gt;</b>	30
7	<b>Query expressions</b>	31
7.1	<b>&lt;table reference&gt;</b>	31
7.2	<b>&lt;query specification&gt;</b>	32
8	<b>Additional common elements</b>	35
8.1	<b>&lt;routine invocation&gt;</b>	35
8.2	<b>&lt;sqlstate value&gt;</b>	37
9	<b>Schema definition and manipulation</b>	39
9.1	<b>&lt;schema definition&gt;</b>	39
9.2	<b>&lt;drop schema statement&gt;</b>	40
9.3	<b>&lt;table definition&gt;</b>	42
9.4	<b>&lt;column definition&gt;</b>	43
9.5	<b>&lt;default clause&gt;</b>	44
9.6	<b>&lt;check constraint definition&gt;</b>	45
9.7	<b>&lt;drop column scope clause&gt;</b>	46
9.8	<b>&lt;drop column definition&gt;</b>	47
9.9	<b>&lt;drop table constraint definition&gt;</b>	48
9.10	<b>&lt;drop table statement&gt;</b>	49
9.11	<b>&lt;view definition&gt;</b>	50
9.12	<b>&lt;drop view statement&gt;</b>	51
9.13	<b>&lt;drop domain statement&gt;</b>	52
9.14	<b>&lt;drop character set statement&gt;</b>	53
9.15	<b>&lt;drop collation statement&gt;</b>	54
9.16	<b>&lt;drop transliteration statement&gt;</b>	55
9.17	<b>&lt;assertion definition&gt;</b>	56
9.18	<b>&lt;drop assertion statement&gt;</b>	57
9.19	<b>&lt;trigger definition&gt;</b>	58
9.20	<b>&lt;drop user-defined ordering statement&gt;</b>	59
9.21	<b>&lt;SQL-server module definition&gt;</b>	60
9.22	<b>&lt;drop module statement&gt;</b>	63
9.23	<b>&lt;drop data type statement&gt;</b>	65
9.24	<b>&lt;SQL-invoked routine&gt;</b>	66
9.25	<b>&lt;drop routine statement&gt;</b>	68
9.26	<b>&lt;drop user-defined cast statement&gt;</b>	69
10	<b>Access control</b>	71
10.1	<b>&lt;grant statement&gt;</b>	71
10.2	<b>&lt;privileges&gt;</b>	73
10.3	<b>&lt;revoke statement&gt;</b>	74
11	<b>SQL-client modules</b>	79
11.1	<b>&lt;externally-invoked procedure&gt;</b>	79
11.2	<b>&lt;SQL procedure statement&gt;</b>	80
12	<b>Data manipulation</b>	83
12.1	<b>&lt;declare cursor&gt;</b>	83
12.2	<b>&lt;open statement&gt;</b>	85
12.3	<b>&lt;fetch statement&gt;</b>	86
12.4	<b>&lt;close statement&gt;</b>	87
12.5	<b>&lt;select statement: single row&gt;</b>	88
12.6	<b>&lt;delete statement: positioned&gt;</b>	89
12.7	<b>&lt;update statement: positioned&gt;</b>	90

12.8	<temporary table declaration> .....	91
13	<b>Additional data manipulation rules</b> .....	93
13.1	<b>Effect of opening a cursor</b> .....	93
14	<b>Control statements</b> .....	95
14.1	<compound statement> .....	95
14.2	<handler declaration> .....	99
14.3	<condition declaration> .....	103
14.4	<SQL variable declaration> .....	104
14.5	<assignment statement> .....	105
14.6	<case statement> .....	110
14.7	<if statement> .....	113
14.8	<iterate statement> .....	115
14.9	<leave statement> .....	116
14.10	<loop statement> .....	117
14.11	<while statement> .....	119
14.12	<repeat statement> .....	121
14.13	<for statement> .....	123
15	<b>Dynamic SQL</b> .....	127
15.1	<prepare statement> .....	127
15.2	<input using clause> .....	130
15.3	<output using clause> .....	131
16	<b>Embedded SQL</b> .....	133
16.1	<embedded SQL host program> .....	133
17	<b>Diagnostics management</b> .....	135
17.1	<get diagnostics statement> .....	135
17.2	<signal statement> .....	138
17.3	<resignal statement> .....	140
18	<b>Information Schema</b> .....	143
18.1	MODULE_COLUMN_USAGE view .....	143
18.2	MODULE_PRIVILEGES view .....	144
18.3	MODULE_TABLE_USAGE view .....	145
18.4	MODULES view .....	146
18.5	PARAMETERS view .....	148
18.6	ROLE_MODULE_GRANTS view .....	149
18.7	ROUTINES view .....	150
18.8	Short name views .....	151
19	<b>Definition Schema</b> .....	153
19.1	MODULE_COLUMN_USAGE base table .....	153
19.2	MODULE_PRIVILEGES base table .....	155
19.3	MODULE_TABLE_USAGE base table .....	157
19.4	MODULES base table .....	158
19.5	ROUTINES base table .....	160
20	<b>Status codes</b> .....	161
20.1	SQLSTATE .....	161
21	<b>Conformance</b> .....	163
21.1	Claims of conformance to SQL/PSM .....	163
21.2	Additional conformance requirements for SQL/PSM .....	163
21.3	Implied feature relationships of SQL/PSM .....	163
	<b>Annex A (informative) SQL Conformance Summary</b> .....	165
	<b>Annex B (informative) Implementation-defined elements</b> .....	171

<b>Annex C (informative) Implementation-dependent elements .....</b>	<b>173</b>
<b>Annex D (informative) Deprecated features .....</b>	<b>175</b>
<b>Annex F (informative) SQL feature taxonomy .....</b>	<b>179</b>
<b>Index .....</b>	<b>183</b>

## Tables

<b>Table</b>	<b>Page</b>
1      <condition information item name>s for use with <get diagnostics statement>.....	135
2      SQL-statement codes.....	136
3      SQLSTATE class and subclass values.....	161
4      Implied feature relationships of SQL/PSM.....	163
5      Syntactic transformations applied before Conformance Rules.....	165
6      Feature taxonomy for optional features.....	179