

INTERNATIONAL STANDARD

ISO/IEC 13249-5

Second edition
2003-11-01

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

Part 5: Still image

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

Partie 5: Image fixe

Reference number
ISO/IEC 13249-5:2003(E)



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2003

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	2
3 Terms and definitions, notations and conventions	3
3.1 Terms and definitions	3
3.1.1 Terms and definitions provided in ISO/IEC 13249-1:2002	3
3.1.2 Terms and definitions provided in this part of ISO/IEC 13249	3
3.1.3 Terms and definitions taken from ISO/IEC 9075-9:2001	4
3.1.4 Terms and definitions taken from ISO/IEC 10918-1:1994	4
3.1.5 Terms and definitions taken from ISO/IEC 15444-1:2000	4
3.2 Notations	4
3.2.1 Notations provided in ISO/IEC 13249-1:2002	4
3.2.2 Notations provided in this part of ISO/IEC 13249	4
3.3 Conventions	4
4 Concepts	5
4.1 Introduction	5
4.2 Concepts taken from ISO/IEC 9075-9:2001	6
4.3 Types representing still images	6
4.3.1 Attributes of the SI_StillImage type	6
4.3.2 Methods of the SI_StillImage type.....	6
4.4 Image features	7
4.4.1 Feature types	8
4.4.2 Assessing the similarity of images	8
4.5 Complementary SQL-invoked regular functions	9
4.6 Auxiliary type SI_Color	11
4.7 The Still Image Information Schema	11
5 Still Image Types	12
5.1 SI_StillImage Types and Routines	12
5.1.1 SI_StillImage Type	12
5.1.2 SI_StillImage Methods	17
5.1.3 SI_setContent Method	22
5.1.4 SI_changeFormat Method	23
5.1.5 SI_Scale Methods.....	24
5.1.6 SI_Resize Methods.....	26
5.1.7 SI_Rotate Method	28
5.1.8 SI_Thumbnail Methods.....	29
5.1.9 SI_InitFeatures method	30
5.1.10 SI_ClearFeatures method	30
5.1.11 SI_Score Methods	31
5.1.12 Functions Complementing SI_StillImage Methods	33
5.1.13 SI_chgContent Function.....	35
5.1.14 SI_convertFormat Function	35
5.1.15 SI_scaleImage Function	35
5.1.16 SI_zoomImage Function	36
5.1.17 SI_resizeImage Function	36
5.1.18 SI_rotateImage Function	37
5.1.19 SI_getThmbnl Function	37
5.1.20 SI_getSizedThmbnl Function.....	37
5.1.21 SI_setImageFrts Function	38

5.1.22	SI_resetImageFtrs Function	38
5.1.23	Functions Complementing Observer Functions of Type SI_StillImage	39
5.1.24	Functions not intended for Public Use	40
6	Feature Types	49
6.1	SI_AverageColor Type and Routines	49
6.1.1	SI_AverageColor Type	49
6.1.2	SI_AverageColor Methods	50
6.1.3	SI_Score Method	51
6.1.4	SI_findAvgClr Function	51
6.1.5	SI_mkAvgClr Function	52
6.1.6	SI_ScoreByAvgClr Function	52
6.2	SI_ColorHistogram Type and Routines	52
6.2.1	SI_ColorHistogram Type	52
6.2.2	SI_ColorHistogram Methods	54
6.2.3	SI_Append Method	56
6.2.4	SI_Score Method	57
6.2.5	SI_findClrHstgr Function	57
6.2.6	SI_mkClrHstgr Function	58
6.2.7	SI_arrayClrHstgr Function	58
6.2.8	SI_appendClrHstgr Function	58
6.2.9	SI_ScoreByClrHstgr Function	59
6.3	SI_PositionalColor Type and Routines	59
6.3.1	SI_PositionalColor Type	59
6.3.2	SI_PositionalColor Method	60
6.3.3	SI_Score Method	61
6.3.4	SI_findPstnlClr Function	62
6.3.5	SI_ScoreByPstnlClr Function	62
6.4	SI_Texture Type and Routines	62
6.4.1	SI_Texture Type	62
6.4.2	SI_Texture Method	63
6.4.3	SI_Score Method	64
6.4.4	SI_findTexture Function	65
6.4.5	SI_ScoreByTexture Function	65
6.5	SI_FeatureList Type and Routines	65
6.5.1	SI_FeatureList Type	65
6.5.2	SI_FeatureList Method	67
6.5.3	SI_setFeature Methods	69
6.5.4	SI_Score Method	71
6.5.5	SI_mkFtrList Function	73
6.5.6	SI_ScoreByFtrList Function	73
6.5.7	Regular Functions Complementing SI_setFeature Methods	74
6.5.8	Regular Functions Complementing Observer Functions of type SI_FeatureList	75
6.6	Auxiliary Types and Routines	77
6.6.1	SI_Color Type	77
6.6.2	SI_RGBColor Method	77
6.6.3	SI_mkRGBClr Function	78
7	SQL/MM Still Image Information Schema	80
7.1	Introduction	80
7.2	SI_FEATURES view	80
7.3	SI_IMAGE_FORMATS view	80
7.4	SI_IMAGE_FORMAT_CONVERSIONS view	80
7.5	SI_IMAGE_FORMAT_FEATURES view	80
7.6	SI_THUMBNAIL_FORMATS view	81
7.7	SI_VALUES view	81
7.8	Short name views	81
8	SQL/MM Still Image Definition Schema	82
8.1	Introduction	82
8.2	SI_FEATURES base table	82

8.3	SI_IMAGE_FORMATS base table.....	83
8.4	SI_IMAGE_FORMAT_CONVERSIONS base table	84
8.5	SI_IMAGE_FORMAT_FEATURES base table	84
8.6	SI_THUMBNAIL_FORMATS base table	85
8.7	SI_VALUES base table.....	85
9	Status Codes	87
10	Conformance	88
10.1	Requirements for conformance.....	88
10.2	Features of ISO/IEC 9075-9:2001 required in this part of ISO/IEC 13249	91
10.3	Claims of conformance	92
Annex A	(informative).....	93
A.1	Implementation-defined Meta-variables	94
Annex B	(informative).....	95
B.1	Implementation-dependent Meta-variables	99
Index	100

Tables	Page
Table 1 – Method and function name correspondences.....	9
Table 2 – SQLSTATE class and subclass values	87

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 13249-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This second edition cancels and replaces the first edition (ISO/IEC 13249-5:2001), which has been technically revised.

ISO/IEC 13249 consists of the following parts, under the general title *Information technology — Database languages — SQL multimedia and application packages*:

- *Part 1: Framework*
- *Part 2: Full-Text*
- *Part 3: Spatial*
- *Part 5: Still image*
- *Part 6: Data mining*

Introduction

The purpose of this International Standard is to define multimedia and application specific types and their associated routines using the user-defined features in ISO/IEC 9075.

This document is based on the content of ISO/IEC International Standard Database Language (SQL).

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

- 1) Clause 1, "Scope", specifies the scope of this part of ISO/IEC 13249.
- 2) 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.
- 3) Clause 3, "Definitions, notations, and conventions", defines the notations and conventions used in this part of ISO/IEC 13249.
- 4) Clause 4, "Concepts", presents concepts used in the definition of this part of ISO/IEC 13249.
- 5) Clause 5, "Still Image Types", defines the still image user-defined types and associated routines.
- 6) Clause 6, "Feature Types", defines the user-defined types provided for the manipulation of still image features.
- 7) Clause 7, "SQL/MM Still Image Information Schema" defines the SQL/MM Still Image Information Schema.
- 8) Clause 8, "SQL/MM Still Image Definition Schema" defines the SQL/MM Still Image Definition Schema.
- 9) Clause 9, "Status Codes", defines the SQLSTATE codes used in this part of ISO/IEC 13249.
- 10) Clause 10, "Conformance", defines the criteria for conformance to this part of ISO/IEC 13249.
- 11) 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.
- 12) 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.

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

Part 5: Still image

1 Scope

This part of ISO/IEC 13249:

- a) introduces the still image part of ISO/IEC 13249 (all parts);
- b) gives the references necessary for this part of ISO/IEC 13249;
- c) defines notations and conventions specific to this part of ISO/IEC 13249;
- d) defines concepts specific to this part of ISO/IEC 13249;
- e) defines the still image user-defined types and their associated routines.

The still image user-defined types defined in this part of ISO/IEC 13249 adhere to the following.

- A still image user-defined type is generic to image handling. It addresses the need to store, manage and retrieve information based on aspects of inherent image characteristics such as height, width and format and based on image features such as average color, color histogram, positional color and texture. It also addresses the need to employ manipulation such as rotation, scaling, as well as similarity assessment.
- A still image user-defined type does not redefine the database language SQL directly or in combination with another still image data type.

The still image user-defined types are applicable to all different image formats. However, not all functionality can be used with all known still image formats.

An implementation of this part of ISO/IEC 13249 may exist in environments that also support information and content management, 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, graphics, multimedia, scientific research and medicine.

2 Normative references

The following referenced documents are indispensable for the application 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 9075-9:2001, *Information technology — Database languages — SQL — Part 9: Management of External Data (SQL/MED)*

ISO/IEC 13249-1:2002, *Information technology — Database languages — SQL multimedia and application packages — Part 1: Framework*

ISO/IEC 10918-1:1994, *Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines*

ISO/IEC 15444-1:2000, *Information technology — JPEG 2000 image coding system — Part 1: Core coding system*