

# INTERNATIONAL STANDARD

**ISO/IEC  
8806-4**

First edition  
1991-12-15

---

---

---

## **Information technology — Computer graphics — Graphical Kernel System for Three Dimensions (GKS-3D) language bindings —**

### **Part 4: C**

*Technologies de l'information — Infographie — Interfaces de langages  
pour GKS (Graphical Kernel System) pour trois dimensions —  
Partie 4: C*



Reference number  
ISO/IEC 8806-4:1991(E)

## Contents

<b>1</b>	<b>Scope.....</b>	<b>1</b>
<b>2</b>	<b>Normative references.....</b>	<b>2</b>
<b>3</b>	<b>The C Language Binding of GKS-3D .....</b>	<b>3</b>
<b>3.1</b>	<b>Conformance .....</b>	<b>3</b>
<b>3.2</b>	<b>Functions versus Macros .....</b>	<b>3</b>
<b>3.3</b>	<b>Character Strings .....</b>	<b>3</b>
<b>3.4</b>	<b>Function Identifiers .....</b>	<b>3</b>
<b>3.5</b>	<b>Registration.....</b>	<b>3</b>
<b>3.6</b>	<b>Identifiers for Graphical Items.....</b>	<b>4</b>
<b>3.7</b>	<b>Return Values .....</b>	<b>4</b>
<b>3.8</b>	<b>Header Files .....</b>	<b>4</b>
<b>3.9</b>	<b>Memory Management.....</b>	<b>4</b>
<b>3.9.1</b>	<b>Functions which Return Simple Lists.....</b>	<b>5</b>
<b>3.9.2</b>	<b>Functions which Return Complex Data Structures .....</b>	<b>5</b>
<b>3.10</b>	<b>Error Handling .....</b>	<b>6</b>
<b>3.10.1</b>	<b>Application Supplied Error Handlers .....</b>	<b>6</b>
<b>3.10.2</b>	<b>Error Codes .....</b>	<b>7</b>
<b>3.10.3</b>	<b>C-specific GKS-3D errors .....</b>	<b>7</b>
<b>3.11</b>	<b>Colour Representations.....</b>	<b>7</b>
<b>3.12</b>	<b>Storage of Multi-dimensional Arrays .....</b>	<b>8</b>
<b>3.12.1</b>	<b>Storage of 2*3 Matrices.....</b>	<b>8</b>
<b>3.12.2</b>	<b>Storage of 3*4 Matrices.....</b>	<b>8</b>
<b>3.12.3</b>	<b>Storage of 4*4 Matrices.....</b>	<b>8</b>
<b>3.12.4</b>	<b>Storage of Colour Arrays.....</b>	<b>8</b>
<b>4</b>	<b>Tables.....</b>	<b>9</b>
<b>4.1</b>	<b>Abbreviation Policy in Construction of Identifiers.....</b>	<b>9</b>
<b>4.2</b>	<b>Table of Abbreviations Used.....</b>	<b>9</b>
<b>4.3</b>	<b>Function Names .....</b>	<b>13</b>
<b>4.3.1</b>	<b>List Ordered Alphabetically by Bound Name .....</b>	<b>13</b>
<b>4.3.2</b>	<b>List Ordered Alphabetically by GKS-3D Name .....</b>	<b>19</b>
<b>4.3.3</b>	<b>List Ordered Alphabetically by Bound Name within Level.....</b>	<b>25</b>
<b>5</b>	<b>Type Definitions .....</b>	<b>32</b>
<b>5.1</b>	<b>Mapping of GKS-3D data types .....</b>	<b>32</b>
<b>5.2</b>	<b>Environmental Type Definitions.....</b>	<b>32</b>
<b>5.3</b>	<b>Implementation Dependent Type Definitions .....</b>	<b>33</b>
<b>5.4</b>	<b>Implementation Independent Type Definitions .....</b>	<b>44</b>
<b>6</b>	<b>Macro Definitions .....</b>	<b>65</b>
<b>6.1</b>	<b>Function identifiers .....</b>	<b>65</b>
<b>6.2</b>	<b>Error Codes .....</b>	<b>68</b>
<b>6.3</b>	<b>Miscellaneous Macros .....</b>	<b>75</b>
<b>6.3.1</b>	<b>Linetypes.....</b>	<b>75</b>
<b>6.3.2</b>	<b>Marker Types.....</b>	<b>75</b>
<b>6.3.3</b>	<b>Colour Models .....</b>	<b>75</b>
<b>6.3.4</b>	<b>Prompt and Echo Types.....</b>	<b>75</b>
<b>6.3.5</b>	<b>Default Parameters of OPEN GKS.....</b>	<b>76</b>
<b>7</b>	<b>C GKS-3D Function Interface .....</b>	<b>77</b>
<b>7.1</b>	<b>Notational Conventions .....</b>	<b>77</b>
<b>7.2</b>	<b>Control Functions .....</b>	<b>77</b>
<b>7.3</b>	<b>Output Functions .....</b>	<b>79</b>

© ISO/IEC 1991

All rights reserved. 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 the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

<b>7.4</b>	<b>Output Attribute Functions .....</b>	<b>81</b>
<b>7.4.1</b>	Workstation Independent Primitive Attributes.....	81
<b>7.4.2</b>	Workstation Attributes.....	85
<b>7.5</b>	<b>Transformation Functions.....</b>	<b>87</b>
<b>7.5.1</b>	Normalization Transformation .....	87
<b>7.5.2</b>	View transformation functions .....	88
<b>7.5.3</b>	HLHSR functions .....	88
<b>7.5.4</b>	Workstation transformation .....	89
<b>7.6</b>	<b>Segment Functions.....</b>	<b>89</b>
<b>7.6.1</b>	Segment Manipulation Functions .....	89
<b>7.6.2</b>	Segment Attribute Functions .....	91
<b>7.7</b>	<b>Input Functions .....</b>	<b>92</b>
<b>7.7.1</b>	Initialization of Input Devices Functions .....	92
<b>7.7.2</b>	Setting the Mode of Input Devices Functions .....	95
<b>7.7.3</b>	Request Input Functions .....	96
<b>7.7.4</b>	Sample Input Functions .....	98
<b>7.7.5</b>	Event Input Functions.....	100
<b>7.8</b>	<b>Metafile Functions .....</b>	<b>102</b>
<b>7.9</b>	<b>Inquiry Functions.....</b>	<b>102</b>
<b>7.9.1</b>	Inquiry Functions for Operating State Value .....	102
<b>7.9.2</b>	Inquiry Functions for GKS-3D Description Table .....	103
<b>7.9.3</b>	Inquiry Functions for GKS-3D State List.....	103
<b>7.9.4</b>	Inquiry Functions for Workstation State List.....	112
<b>7.9.5</b>	Inquiry Functions for Workstation Description Table .....	124
<b>7.9.6</b>	Inquire functions for the Segment State List .....	135
<b>7.9.7</b>	Pixel Inquiries .....	136
<b>7.9.8</b>	Inquiry Functions for Error State List .....	137
<b>7.10</b>	<b>Utility Functions .....</b>	<b>137</b>
<b>7.10.1</b>	Utility Functions in GKS-3D .....	137
<b>7.10.2</b>	Binding Specific Utilities.....	138
<b>7.11</b>	<b>Error Handling.....</b>	<b>139</b>
<b>A</b>	<b>Compiled GKS-3D/C Specification.....</b>	<b>141</b>
<b>B</b>	<b>Sample Programs .....</b>	<b>204</b>
<b>B.1</b>	STAR Program .....	204
<b>B.2</b>	IRON Program.....	206
<b>B.3</b>	MAP Program .....	213
<b>B.4</b>	MANIPULATE Program .....	215
<b>B.5</b>	SHOW LINE Program.....	221
<b>B.6</b>	DODECA Program .....	226
<b>C</b>	<b>Metafile Items .....</b>	<b>231</b>
<b>D</b>	<b>Short Function Identifiers .....</b>	<b>233</b>
<b>E</b>	<b>Memory Management.....</b>	<b>240</b>
<b>E.1</b>	Introduction.....	240
<b>E.2</b>	Functions That Return Simple Lists .....	240
<b>E.2.1</b>	Operation of <code>ginq_list_line_inds</code> .....	240
<b>E.3</b>	Functions That Return Structured Data.....	243
<b>E.3.1</b>	Operation of <code>gcreate_store</code> .....	244
<b>E.3.2</b>	Operation of <code>ginq_stroke_st</code> and <code>ginq_pat_rep</code> .....	246
<b>E.3.3</b>	Operation of <code>gdel_store</code> .....	250
<b>F</b>	<b>Function Lists .....</b>	<b>253</b>
<b>F.1</b>	Alphabetic by GKS-3D Name .....	253
<b>F.2</b>	Alphabetic by Binding Name .....	259

## **Foreword**

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. 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 the 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 JTC1. 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.

International Standard ISO/IEC 8806-4 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*.

ISO/IEC 8806 consists of the following parts, under the general title

*Information technology - Computer graphics - Graphical Kernel System for Three Dimensions (GKS-3D) language bindings -*

- *Part 1: FORTRAN*
- *Part 2: PASCAL*
- *Part 3: ADA*
- *Part 4: C*

Annexes A to F of this part of ISO/IEC 8806 are for information only.

## **Introduction**

The Graphical Kernel System for Three Dimensions (GKS-3D) functional description is registered as ISO 8805 : 1988. As explained in the Scope and Field of Application of ISO 8805, that International Standard is specified in a language independent manner and needs to be embedded in language dependent layers (language bindings) for use with particular programming languages.

The purpose of this part of ISO/IEC 8806 is to define a standard binding for the C computer programming language.

Some functions in ISO 8805 also appear in the Graphical Kernel System (GKS) functional description (ISO 7942). The binding of those functions in this part of ISO/IEC 8806 is the same as in ISO/IEC 8651-4, the C language binding of GKS.

# **Information technology – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) language bindings -**

## **Part 4:**

**C**

### **1 Scope**

The Graphical Kernel System for Three Dimensions (GKS-3D), ISO 8805 : 1988 , specifies a language independent nucleus of a graphics system. For integration into a programming language, GKS-3D is embedded in a language dependent layer obeying the particular conventions of that language. This part of ISO/IEC 8806 specifies such a language dependent layer for the C language.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provision of this part of ISO/IEC 8806. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this part of ISO/IEC 8806 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7942:1985, *Information processing systems – Computer graphics – Graphical Kernel System (GKS) functional description.*

ISO/IEC 8651-4:1991, *Information technology – Computer graphics – Graphical Kernel System (GKS) language bindings - Part 4 : C.*

ISO 8805:1988, *Information processing systems – Computer graphics – Graphical Kernel System for Three Dimensions (GKS-3D) functional description.*

ISO/IEC 8806-1:1991, *Information processing systems – Computer graphics – Graphical Kernel System for three dimensions (GKS-3D) - language bindings - Part 1 : FORTRAN .*

ISO/IEC 9899:1990, *Programming languages - C.*

ISO/IEC TR 9973:1988, *Information processing – Procedures for registration of graphical items.*