

Office document architecture (ODA) and interchange format for text and office systems —

Part 8: Geometric graphics content architectures

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Information Systems Technology Standards Policy Committee (IST/-) to Technical Committee IST/18, upon which the following bodies were represented:

- British Computer Society
- British Facsimile Industry Consultative Committee
- British Printing Industries Federation
- British Telecommunications plc
- Computing Services Association
- Department of Trade and Industry (Information Technology Division)
- EEA (The Electronics and Business Equipment Association)
- HM Treasury (Central Computer and Telecommunications Agency)
- Her Majesty's Stationery Office
- Joint Network Team
- Ministry of Defence
- National Computer Users' Forum
- National Computing Centre Ltd.
- SGML Users' Group
- Telecommunication Engineering and Manufacturing Association
- University of London
- User Standards Forum for Information Technology (Institute of Data Processing Management)

This British Standard, having been prepared under the direction of the Information Systems Technology Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 May 1990

© BSI 04-2000

The following BSI references relate to the work on this standard:
Committee reference IST/18
Draft for comment 87/65889 DC

ISBN 0 580 18345 9

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	iii
1 Scope	1
2 Normative references	1
3 Definitions, symbols, abbreviations and conventions	2
4 General principles	2
5 Positioning	3
6 Definition of geometric graphics presentation attributes	5
7 Geometric graphics content portions attributes	18
8 Formal definitions of geometric graphics content architecture dependent data types	19
9 Content layout process	24
10 Content imaging process	30
11 Definition of geometric graphics content architecture classes	31
Annex A (informative) Summary of ASN.1 object identifiers	32
Annex B (informative) Recommendations for the development of geometric graphics content architecture levels in document application profiles	32
Annex C (informative) Basic differences between character primitives in the geometric graphics and the content of a basic component structured according to the character content architectures defined in ISO 8613-6	38
Annex D (normative) SGML representation of geometric graphics content-specific attributes for ODL	38
Figure 1 — Mapping of a virtual image defined in the VDC Space to an output medium (e.g. a softcopy device) using different region of interest specifications	4
Figure 2 — Relationship of region of interest to the basic layout object (right handed axes)	5
Figure 3 — Relationship of region of interest to the basic layout object (left handed axes)	5
Figure 4 — Diagrams used to illustrate the process of determining the basic layout object dimensions	26
Figure 5 — Layout process for the presentation attribute “picture dimensions” when a value is specified for the parameter “automatic”	27
Figure 6 — Layout process for the presentation attribute “picture dimensions” when a value is specified for the parameter “width controlled” or “height controlled”	28
Figure 7 — Layout process for the presentation attribute “picture dimensions” when a value is specified for the parameter “area controlled”	29
Table 1 — Geometric graphics presentation attributes	6
Table 2 — Default bundle representations	7
Table 3 — Default pattern representations	8
Table 4 — Default colour representations	8
Table A.1 — Summary of ASN.1 object identifiers	32
Table B.1 — Presentation attributes	32
Table B.2 — Geometric graphics encoding announcer	33
Table B.3 — Line rendition	34
Table B.4 — Marker rendition	34
Table B.5 — Text rendition	35

	Page
Table B.6 — Filled area rendition	36
Table B.7 — Edge rendition	37
Table B.8 — Colour representations	37
Table B.9 — Transparency specification	37
Table B.10 — Transformation specification	37
Publications referred to	Inside back cover

National foreword

This Part of BS 7299 has been prepared under the direction of the Information Systems Technology Standards Policy Committee. It is the UK implementation of, and is identical with, ISO 8613-8:1989 “*Information processing — Text and office systems — Office Document Architecture (ODA) and interchange format — Part 8: Geometric graphics content architectures*”, published by the International Organization for Standardization (ISO).

The following list includes all the Parts of this British Standard.

- *Part 1: Introduction and general principles;*
- *Part 2: Document structures;*
- *Part 4: Document profile;*
- *Part 5: Office document interchange format (ODIF);*
- *Part 6: Character content architectures;*
- *Part 7: Raster graphics content architectures;*
- *Part 8: Geometric graphics content architectures.*

NOTE To maintain alignment with the numbering of the Parts of ISO 8613, there is at present no Part 3 of this British Standard.

The UK actively participated in the development of the International Standard through BSI Technical Committee IST/18 and fully approved publication of the International Standard.

There are no plans at present to supplement this British Standard with any additional guidance, and any comments or enquiries on the International Standard or its application should be addressed to the Secretary of IST/18 at the BSI headquarters address.

Reasons for implementation. This Part of BS 7299 implements the International Standard for the following reasons.

- a) Because information technology equipment, services and systems tend to be, and generally need to be, designed, purchased, and used in a world-wide context, BSI policy is to agree, wherever possible, standards at international level and not to prepare unique national standards. At the time of its approval, the text of the International Standard was considered to be the best that could be achieved, taking into account both the needs of the “market place” and the “state of the art” in this subject area, and the international standardization process.
- b) The Commission of the European Communities has mandated the European Committee for Standardization (CEN) to produce European Standards (ENs) [or, where this cannot be achieved, Harmonization Documents (HDs) or Draft European Standards (ENVs)] in this subject area for application throughout the European Community by 1992. This British Standard anticipates that ISO 8613-8:1989 will be adopted without change as the Reference Document for the EN (or HD or ENV) and, therefore, fulfils in advance the UK obligation under CEN/CENELEC Common Rules to implement nationally each agreed European Standard.
- c) Publication of British Standards corresponding to the International Standards in which IST/- resources were invested will ensure that the BSI Catalogue becomes, and then remains, a comprehensive first source of information for UK users of IT equipment and services about the availability of International Standards on IT subjects. In turn, this will facilitate UK use of, and access to, those standards.

Cross-references. The cross-references relating to all Parts of this British Standard are given in the national foreword to Part 1.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 42, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

The purpose of ISO 8613 is to facilitate the interchange of documents.

In the context of ISO 8613, documents are considered to be items such as memoranda, letters, invoices, forms and reports, which may include pictures and tabular material. The content elements used within the documents may include graphic characters, geometric graphics elements and raster graphics elements, all potentially within one document.

NOTE ISO 8613 is designed to allow for extensions, including typographical features, colour, spreadsheets and additional types of content such as sound.

ISO 8613 applies to the interchange of documents by means of data communication or the exchange of storage media.

It provides for the interchange of documents for either or both of the following purposes:

- to allow presentation as intended by the originator;
- to allow processing such as editing and reformatting.

The composition of a document in interchange can take several forms:

- formatted form, allowing presentation of the document;
- processable form, allowing processing of the document;
- formatted processable form, allowing both presentation and processing.

ISO 8613 also provides for the interchange of ODA information structures used for the processing of interchanged documents.

Furthermore, ISO 8613 allows for the interchange of documents containing one or more different types of content such as character text, images, graphics and sound.

This part of ISO 8613:

- defines a geometric graphics content architecture that can be used in conjunction with the document architecture defined in ISO 8613-2;
- defines an interface which allows the use of content structured according to ISO 8632 within documents structured according to ISO 8613-2;
- defines those aspects of positioning and imaging applicable to the presentation of this geometric graphics content architecture in a basic layout object;
- defines the presentation attributes applicable to this geometric graphics content architecture;
- describes a content layout process, which together with the document layout process described in ISO 8613-2, describes the layout of geometric graphics content in basic layout objects and determines the dimensions of these basic layout objects.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8613. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8613 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 646:1983, *Information processing — ISO 7-bit coded character set for information interchange*.

ISO 8613:1989, *Information processing — Text and office systems — Office Document Architecture (ODA) and Interchange Format —*

- *Part 1: Introduction and general principles;*
- *Part 2: Document structures;*
- *Part 5: Office Document Interchange Format (ODIF).*

ISO 8632:1987, *Information processing systems — Computer graphics — Metafile for the storage and transfer of picture description information —*

- *Part 1: Functional specification;*
- *Part 3: Binary encoding.*

ISO 8824:1987, *Information processing systems — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1)*.

ISO 8824 Add.1, *Information processing systems — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1) — Addendum 1: ASN.1 extensions¹⁾*.

ISO 8879:1986, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*.

3 Definitions, symbols, abbreviations and conventions

3.1 Definitions

For the purpose of this part of ISO 8613, the definitions given in ISO 8613-1 apply. In addition, the definitions given in ISO 8632 and ISO 8879 apply to this part of ISO 8613.

3.2 Symbols, abbreviations and conventions

3.2.1 CGM

This term is used to reference the Computer Graphics Metafile defined in ISO 8632. It is used as a qualifier for terms defined in ISO 8632 (for example, CGM elements).

3.2.2 Individual CGM elements

Throughout this part whenever individual CGM elements are referred to they are written in uppercase; for example, SCALING MODE.

3.2.3 CGM concepts

Whenever the concepts defined in CGM are referred to they are written in mixed upper and lower case as appropriate; for example, Scaling Mode or Virtual Device Coordinates.

3.2.4 Width and height

Width is used throughout this part of ISO 8613 to express the extent of a 2-dimensional area in the direction given by the counter-clockwise rotation from the horizontal direction as specified by the geometric graphics presentation attribute “orientation”.

Height is used throughout this part of ISO 8613 to express the extent of a 2-dimensional area orthogonal to its width.

NOTE Width or height are mostly used in combination with a reference to an area; for example, width of the available area.

4 General principles

4.1 Content architecture classes

This part of ISO 8613 defines one class of geometric graphics content architectures:

- a formatted processable form, which allows for document content to be processed and also to be presented as intended by the originator. Formatted processable form content can be associated with any basic component.

4.2 Content

A content portion that is structured according to a geometric graphics content architecture represents a single pictorial image. The representation is based on the Computer Graphics Metafile (CGM) defined in ISO 8632 (see 7.2).

The CGM provides a format suitable for the storage, retrieval and interchange of picture description information. The format consists of an ordered set of elements. These elements are split into groups that

- structure the information in the metafile;
- specify the precision of the values used within the metafile;
- control the display of the picture;
- perform basic drawing actions;
- control the attributes of the basic drawing actions;
- provide access to non-standard device capabilities.

ISO 8632 defines the form (syntax) and the functional behaviour (semantics) of these elements.

¹⁾ To be published.

4.3 Presentation attributes

The geometric graphics content architecture defines geometric graphics presentation attributes applicable to basic layout and basic logical components. The geometric graphics presentation attributes direct the content layout process and specify the initial conditions at the start of the presentation of the content associated with a basic object.

Only the geometric graphics presentation attributes specifying CGM defaults (see 6.1.1) can be overwritten by CGM elements in the content of the basic component to which they apply.

4.4 Coding of content information

The ordered set of elements of the content portion is encoded according to the “binary” encoding defined in ISO 8632-3 and constitutes a complete CGM.

The functionality represented by the geometric graphics presentation attributes specifying CGM defaults (see 6.1.1) and CGM element groups is that defined by ISO 8632-1 and ISO 8632-3, except that

- the defaulting rules are modified (see 10.2.1);
- the CGM shall contain only one picture.

4.5 Layout and imaging of the content

The geometric graphics content architecture describes a content layout process which creates a basic layout object and determines the dimensions of this object into which the content associated with a basic logical object is to be laid out.

It also describes a content imaging process which determines the image of the content.

5 Positioning

5.1 Introduction

This clause describes the general principles concerning the positioning of a part of the VDC Space within basic layout objects.

This part is known as the *region of interest*. It is a rectangular region within the VDC Space, and is defined by two Virtual Device Coordinate pairs termed “first corner” and “second corner”.

NOTE The VDC Space is used within ISO 8632 for positioning geometric graphics elements, specifying directions, specifying dimensions etc.

5.2 Measurement units and directions

The positioning of geometric graphics content within a basic layout object is specified with relation to an orthogonal coordinate system.

The definition of the region of interest specifies the origin and directions of the axes of the coordinate system, with respect to the basic layout object.

Figure 1 illustrates that depending on which coordinates of the VDC Space are referenced by “first corner” and “second corner” the region of interest can affect the orientation of the axes used when imaging the geometric graphics content.

The measurement units of the x- and y-axis of the coordinate system are determined by the relationship of the dimensions of the region of interest to the dimensions of the basic layout object.

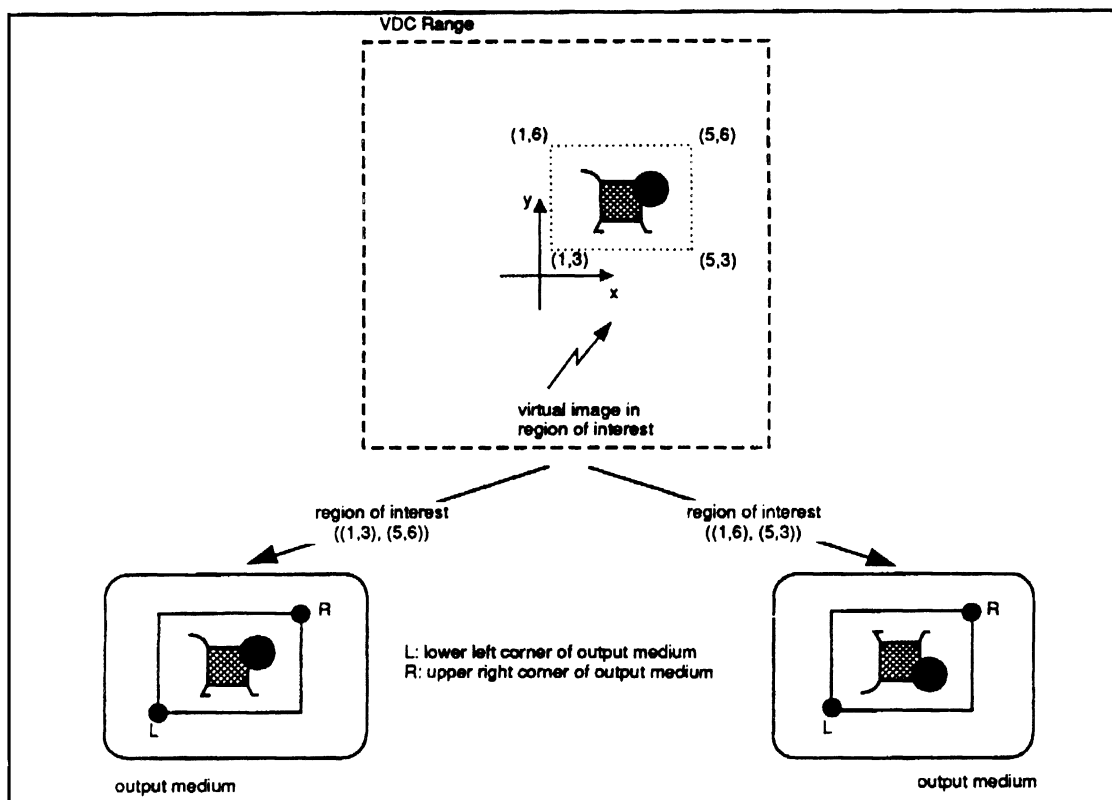


Figure 1 — Mapping of a virtual image defined in the VDC Space to an output medium (e.g. a softcopy device) using different region of interest specifications

5.3 The relationship between the region of interest and the basic layout object

When imaging geometric graphics content, the geometric graphics presentation attribute “picture orientation” determines the relationship of the “first corner” of the region of interest to the corners of the basic layout object.

The “first corner” of the region of interest is coincident with the corner of the basic layout object defined by the geometric graphics presentation attribute “picture orientation” (for example, the bottom left corner if the presentation attribute “picture orientation” has value “0”, see 6.1.3). The “second corner” of the region of interest is coincident with the diagonally opposite corner of the basic layout object. It is implied that the x-axis of the VDC Space always maps to the direction parallel to the width of the basic layout object.

Figure 2 and Figure 3 illustrate this mapping.

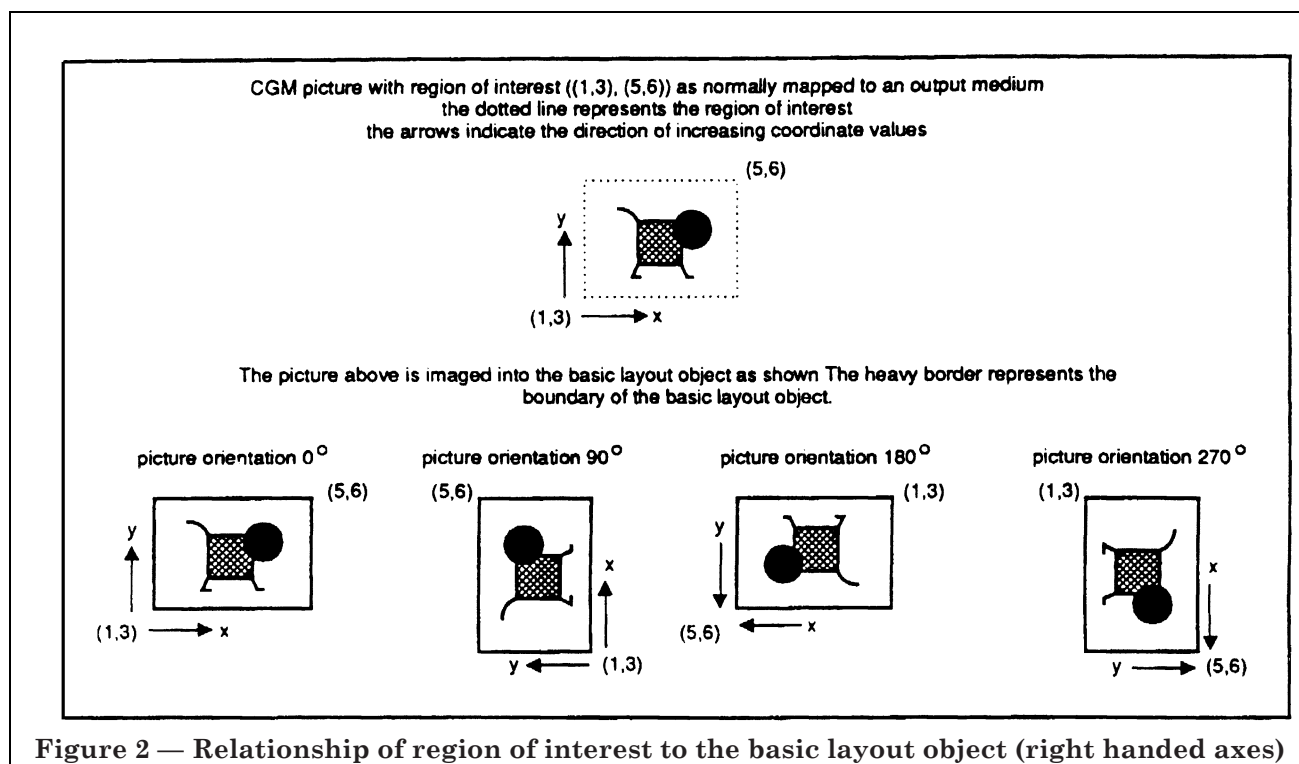


Figure 2 — Relationship of region of interest to the basic layout object (right handed axes)

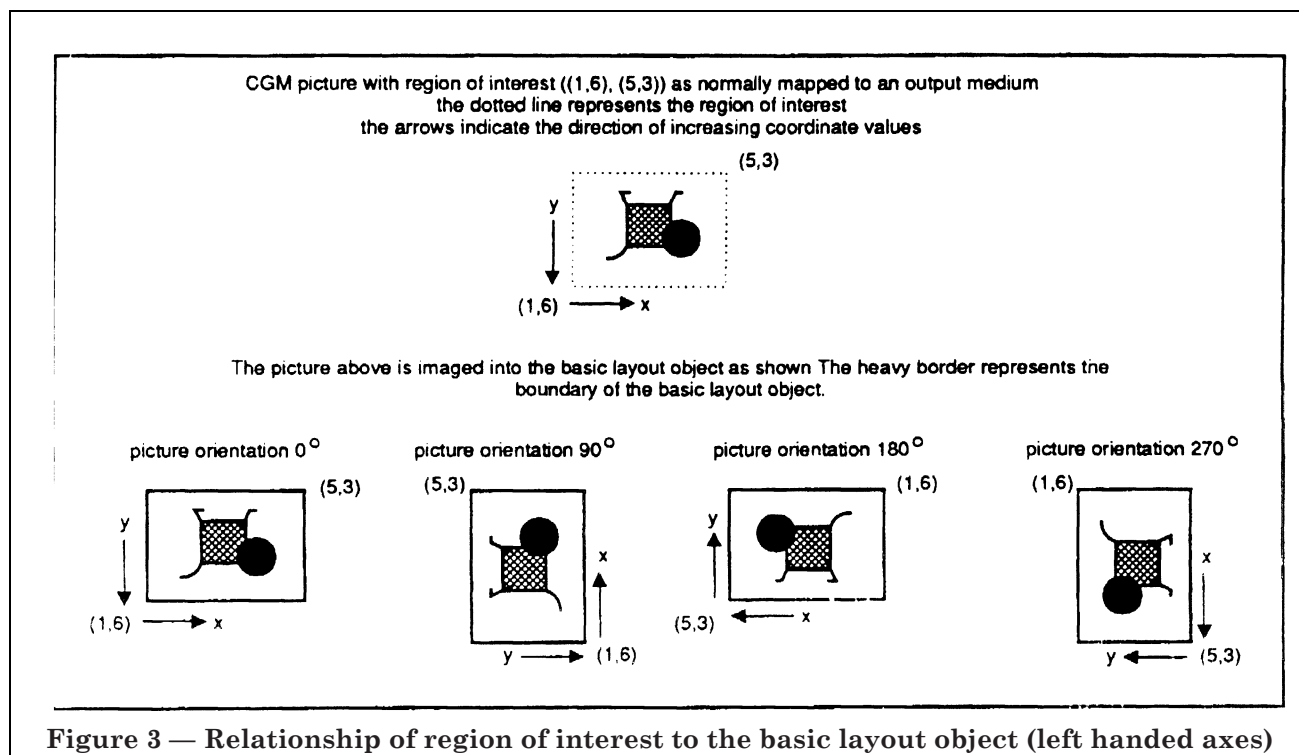


Figure 3 — Relationship of region of interest to the basic layout object (left handed axes)

6 Definition of geometric graphics presentation attributes

Presentation attributes specify the constraints and initial conditions relating to the layout and imaging of a basic component. They may be specified for basic layout components, presentation styles and default value lists.

The following categories of presentation attributes are defined:

- logical presentation attributes which take effect during the content layout process but are ignored during the content imaging process;
- layout presentation attributes which take effect during the content imaging process. Their values are either determined by a content layout process or specified by a process that creates or edits the content;
- shared presentation attributes which take effect during both the content layout and imaging processes.

The geometric graphics presentation attributes are summarized in Table 1.

Table 1 — Geometric graphics presentation attributes

Shared attributes	Layout attributes
Geometric graphics encoding announcer Line rendition Marker rendition Text rendition Filled area rendition Edge rendition Colour representation Transparency specification Transformation specification Region of interest specification Picture orientation	No layout presentation attributes are specified for this content architecture
	Logical attributes
	Picture dimensions

For each presentation attribute, a default value is defined. This value is used in the defaulting rules as defined in ISO 8613-2.

This clause also defines values specific to the geometric graphics content architecture for the content architecture class attributes. These attributes are defined in ISO 8613-2.

6.1 Shared presentation attributes

6.1.1 Attributes specifying CGM defaults

The following presentation attributes provide information used for the construction and interpretation of the CGM defaults. They provide information used by the layout and imaging processes.

NOTE This part of ISO 8613 uses the term “CGM defaults” whenever ISO 8632 uses the term “metafile defaults”. This is intended to indicate the different semantics, in conformance with clause 3.2.1, of “defaults” when used in the context of ISO 8613 (ODA) or ISO 8632 (CGM).

The default values given for the parameters of these presentation attributes have been derived from the defaults of the corresponding CGM elements as given in ISO 8632-1 and ISO 8632-3.

NOTE Defaults for parameters specifying Direct Colour Values are given either as “foreground” representing the foreground colour, or “background” representing the background colour. The choice of foreground and background colour is implementation dependent. For reproduction on paper the background colour will normally be the colour of the paper, for instance white, and the foreground colour a contrasting colour, for instance black.

The presentation attribute “geometric graphics encoding announcer” specifies the encoding of parameters of the remaining CGM defaults attributes and specifies default values for the corresponding CGM elements.

The values of the CGM defaults attributes applicable to a basic object are determined by the defaulting rules defined in ISO 8613-2.

The value of each parameter of a CGM defaults attribute is:

- the value specified;
- if not specified, the value defined in the specification of the default values for the attribute applicable to this parameter.

This part of ISO 8613 does not contain definitions of parameters of presentation attributes specifying CGM defaults which have the same definitions and semantics as CGM elements or parameters of these CGM elements with corresponding names defined in ISO 8632-1. This clause and its sub-clauses contain definitions of parameters for which the definitions differ from the definitions given in ISO 8632-1 and those parameters which are not defined in ISO 8632-1.

For certain parameters the CGM defines value ranges as being reserved for registration. The meanings of these values will be defined using the established procedures of the ISO International Registration Authority for Graphical Items.

The specification of the parameters of the CGM defaults attributes, their permissible and default values is made in tabular form. Some of these parameters have values composed of several sub-parameters. They are shown indented beyond the parameters using a smaller sized font. The sub-parameters may be further substructured. This is shown by further indentation.

Table 2, Table 3 and Table 4 define the default values for the bundle representations, the pattern representations and colour representations, respectively. These tables are used when determining the default state of the imaging process (see 10.2.1).

Table 2 — Default bundle representations

Representations	Bundle Index				
	1	2	3	4	5
Line					
Line Type	1(solid)	2(dash)	3(dot)	4(dash-dot)	5(dash-dot-dot)
Line Width (if scaled)	1,0	1,0	1,0	1,0	1,0
(if absolute)	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent
Line Colour (if indexed) (if direct)	1 foreground	1 foreground	1 foreground	1 foreground	1 foreground
Marker					
Marker Type	1(dot)	2(plus)	3(asterisk)	4(circle)	5(cross)
Marker Size (if scaled)	1,0	1,0	1,0	1,0	1,0
(if absolute)	0,01 × length of longest side of default VDC Extent	0,01 × length of longest side of default VDC Extent	0,01 × length of longest side of default VDC Extent	0,01 × length of longest side of default VDC Extent	0,01 × length of longest side of default VDC Extent
Marker Colour (if indexed) (if direct)	1 foreground	1 foreground	1 foreground	1 foreground	1 foreground
Text					
Font Index	1	1	none defined	none defined	none defined
Text Precision	string	character	—	—	—
Character Expansion Factor	1,0	0,7	—	—	—
Character Spacing	0,0	0,0	—	—	—
Text Colour (if indexed) (if direct)	1 foreground	1 foreground	— —	— —	— —

Table 2 — Default bundle representations

Representations	Bundle Index				
	1	2	3	4	5
Filled Area					
Interior Style	hollow	hatch	hatch	hatch	hatch
Fill Colour (if indexed) (if direct)	1 foreground	1 foreground	1 foreground	1 foreground	1 foreground
Hatch Index	1 (horizontal equally spaced parallel lines)	1 (horizontal equally spaced parallel lines)	2 (vertical equally spaced parallel lines)	3 (positive slope equally spaced parallel lines)	4 (negative slope equally spaced parallel lines)
Pattern Index	1	1	1	1	1
Edge					
Edge Type	1(solid)	2(dash)	3(dot)	4(dash-dot)	5(dash-dot-dot)
Edge Width (if scaled)	1,0	1,0	1,0	1,0	1,0
(if absolute)	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent	0,001 × length of longest side of default VDC Extent
Edge Colour (if indexed) (if direct)	1 foreground	1 foreground	1 foreground	1 foreground	1 foreground

Table 3 — Default pattern representations

Pattern Table Entry	Pattern Table Index	
	1	
NX (number of columns in pattern array)	1	
NY (number of rows in pattern array)	1	
Local Colour Precision	0	
Colour Index Array (if indexed)	{1}	
Value Array (if direct)	{foreground}	

Table 4 — Default colour representations

Colour Table Entry	Colour Table Index	
	0	1
Direct Colour Value	background	foreground

6.1.1.1 *Geometric graphics encoding announcer*

Parameter	Permissible values	Default
VDC Type	integer, real	integer
Integer Precision	8, 16, 24, 32	16
Real Precision	(floating point format, 9, 23), (floating point format, 12, 52), (fixed point format, 16, 16), (fixed point format, 32, 32),	(fixed point format, 16, 16)
Index Precision	8, 16, 24, 32	16
Colour Precision	8, 16, 24, 32	8
Colour Index Precision	8, 16, 24, 32	8
Maximum Colour Index	any integer ≥ 0	63
Colour Value Extent	any pair of Direct Colour Values	[(0, 0, 0), (255, 255, 255)]
Colour Selection Mode	indexed, direct	indexed
VDC Integer Precision	16, 24, 32	16
VDC Real Precision	(floating point format, 9, 23), (floating point format, 12, 52), (fixed point format, 16, 16), (fixed point format, 32, 32)	(fixed point format, 16, 16)

This presentation attribute specifies default values for VDC Type, Integer Precision, Real Precision, Index Precision, Colour Precision, Colour Index Precision, Maximum Colour Index, Colour Value Extent, Colour Selection Mode, VDC Integer Precision and VDC Real Precision.

This presentation attribute also determines the encoding of parameters of the remainder of the CGM defaults attributes.