Up to cover page | Back to DOM | On to Appendixes

CGM Open specification - WebCGM 2.0 - WebCGM Profile

Contents

6 WebCGM Profile

This section and its subsections are normative.

6.1 WebCGM Proforma

The following profile proforma (PPF) defines the WebCGM application profile for CGM files with a comparison to the ISO Model Profile as defined in ISO/IEC 8632:1999. The tables for the ISO Model Profile are duplicated here for reference and are intended to be accurate. In case of discrepancies, the Model Profile in ISO/IEC 8632:1999 shall take precedence. In the PPF, there are references such as 9.5.4.5, 7.5.11, and Annex I, etc. These are references to sections of the CGM:1999 text, from which this proforma is extracted. Other internal PPF references look like T.16.13 and Attachment 26.3, which are references to table entries in the PPF itself. 

The model profile uses check boxes to indicate whether an item is required, permitted, or prohibited in metafiles conforming to the model profile. Authors of cascading profiles should be aware that the model profile does not have all three possible choices for each item, and that alternate choices are indicated here in the tables with "No" and the "checked" choice is indicated with "Yes." For example, this rule "Element is: Required **Yes**; Permitted **No**;" means that the element is required in all metafiles conforming to WebCGM 2.0 and that authors of cascading profiles could choose to make the element optional (Permitted), but they must not prohibit the element.

6.2 Metafile Rules 

Functionality	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.13.1	Same as Model Profile: **No**	
Encodings	Select 1 or more encodings: Binary **Yes**; Clear text **No**;	Select 1 or more encodings: Binary **Yes**; Clear text **Yes**;
T.13.2	Same as Model Profile: **Yes**	
Number of pictures	Number of pictures permitted in a metafile: minimum (>=0)? ***1.*** maximum (>=0 or no limit)? ***1.*** Other: None.	Number of pictures permitted in a metafile: minimum (>=0)? ***1.*** maximum (>=0 or no limit)? ***No limit.*** Other: ***None.***

T.13.3	Same as Model Profile: **Yes**	
Empty pictures		Are pictures allowed which have no graphical primitives? (yes/no) ***Yes***. Other: ***None.***
T.13.4	Same as Model Profile: **Yes**	
Metafile size		Any restrictions on metafile size? (yes/no) ***No.*** Other: ***None.***

6.3 Multi-element Rules

Functionality	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.14.1	Same as Model Profile: **No**	
Colour References: 9.5.4.1	Select which rule applies to each metafile (choose 1): Either all colours or none shall be defined. **Yes**; All colours shall be defined. **No**; No colours shall be defined. **No**; Are colour indexes allowed to be redefined within a picture or metafile? (yes/no) ***Yes.***	Select which rule applies to each metafile (choose 1): Either all colours or none shall be defined. **Yes**; All colours shall be defined. **No**; No colours shall be defined. **No**; Are colour indexes allowed to be redefined within a picture or metafile? (yes/no) ***No.***

	Any restrictions on the number of distinct colours used within a picture or metafile? (Monochrome metafiles shall use at most two distinct colours.) ***None.*** Are conformance categories defined? (yes/no) ***Yes.*** If yes, specify. ***Monochrome and colour.*** Other: ***Grayscale is considered to be a special class of colour.***	Any restrictions on the number of distinct colours used within a picture or metafile? (Monochrome metafiles shall use at most two distinct colours.) ***None.*** Are conformance categories defined? (yes/no) ***Yes.*** If yes, specify. ***3 categories: monochrome, grayscale, and colour***. Other: ***None.***
T.14.2	Same as Model Profile: **Yes**	
Line primitives -geometric degeneracies References: 9.5.4.3		Geometric degeneracies are: Permitted **Yes**; Prohibited **No**; If permitted, graphical meaning of the degeneracy: ***A line primitive element, whose entire locus is a single point, denotes a graphical dot which is a filled circle, with diameter equal to the current line width and colour equal to the current line colour.*** Other: ***None.***
T.14.3	Same as Model Profile: **Yes**	
Filled area primitives - geometric degeneracies		Geometric degeneracies are: Permitted **Yes**; Prohibited **No**; If permitted, graphical meaning of the degeneracy: ***A filled-area primitive element, whose entire locus is either a single point or a line has the following***

References: 9.5.4.4		***meaning:*** ***- If the locus of a filled-area primitive is a single point, then the meaning is a dot (which is a filled circle).*** ***- If the locus of a filled-area primitive is a non-degenerate line segment, then the meaning is a line.*** ***The dot or line is displayed with the fill colour if EDGE VISIBILITY is 'off', unless INTERIOR STYLE is 'empty', in which case it is not rendered. If EDGE VISIBILITY is 'on', the interior treatment is the dot or line displayed in the fill colour, and then a dot or line superimposed with the current edge attributes.*** Other: ***None.***
T.14.4	Same as Model Profile: **No**	
Graphical text strings References: 9.5.4.5	Minimum string length (bytes): ***0*** Maximum string length (bytes): ***254*** Any restrictions on the use of ISO/IEC 2022 switching controls? ***The C0 character NUL (code value) is permitted and has no effect. String parameters of graphical text shall contain no control character (7/8 bit codes: 1-31 and 128-159). ISO/IEC 2022 switching is not allowed in graphical text. A valid WebCGM metafile may use for graphical text only the character sets: the collection of four character sets***	Minimum string length (bytes): 0. Maximum string length (bytes): ***254.*** Any restrictions on the use of ISO/IEC 2022 switching controls? C0 control codes (except NUL and ISO/IEC 2022 switching) are prohibited. ***Any character set used in the metafile which is accessed by ISO/IEC 2022 switching techniques shall be in the Character Set List (defined in this profile).***

	which comprise ISO Latin1 and Symbol (see CHARACTER SET LIST); Unicode UTF-8; and UTF-16. Other: ***None.*** Note. According to the Binary Encoding of CGM:1999, strings of multi-byte Unicode text are "big-endian", like the rest of the binary metafile.	Other: ***None.***
T.14.5	Same as Model Profile: **No**	
Non-graphical text strings References: 9.5.4.6	Maximum string length (bytes): for type SF: ***254*** for type SF within type D: ***1024*** Format effectors and ESC: Permitted **Yes**; Prohibited **No**; Other C0 control codes (except NUL and ISO/IEC 2022 switching) are prohibited. Any limits on the set of acceptable character sets? ***The permitted character sets for non-graphical text are ISO Latin 1 (LHS & RHS), and UNICODE UTF-8, and Unicode UTF-16. Only one of these three shall be used throughout any particular WebCGM metafile instance. According to the CGM standard, the default SF character set, at the beginning of the 'metafile id' parameter of the BEGIN METAFILE element is ISO Latin 1. If the metafile is to use UTF-8 for SF parameters, then the following 4-octet ISO 2022 sequence shall occur as the first 4 octets of the 'metafile id' parameter:***	Maximum string length (bytes): for type SF: ***254.*** for type SF within type D: ***1024.*** Format effectors and ESC: Permitted **Yes**; Prohibited **No**; Other C0 control codes (except NUL and ISO/IEC 2022 switching) are prohibited. Any limits on the set of acceptable character sets? ***The permitted character sets are ISO 8859-1 LHS No.1 and ISO 8859-1 RHS No.1.*** Any restrictions on the use of ISO/IEC 2022 switching controls? ***Any character set used in the metafile which is accessed by ISO/IEC 2022 switching techniques shall be in the character set list (defined in this profile).***

	ESC 2/5 2/15 4/9 **If the metafile is to use UTF-16 for SF parameters, then the following 4-octet ISO 2022 sequence shall occur as the first 4 octets of the 'metafile id' parameter:** **ESC 2/5 2/15 4/12** **Otherwise, the use of ISO 2022 switching is prohibited in non-graphical text string.** ***NOTE: Section 6.3.4.5 of CGM:1999 allows the switching to UTF-8 (variable length multi-byte), and allows the use of 8-bit access to the ISO Latin 1 set.*** Any restrictions on the use of ISO/IEC 2022 switching controls? ***Any character set used in the metafile which is accessed by ISO/IEC 2022 switching techniques shall be in the character set list (defined in this profile).*** Other: ***See 3.1.1 for additional restrictions to the character repertoire for those WebCGM non-graphical strings which may be part of the WebCGM URI fragment.*** Note. According to the Binary Encoding of CGM:1999, strings of multi-byte Unicode text are "big-endian", like the rest of the binary metafile.	Other: ***None.***

T.14.6	Same as Model Profile: **Yes**	
Data record strings References: 9.5.4.7		Maximum string length (bytes) or state "no limit": ***32767.*** SDR-coding techniques must be used (see annex C.2.2). Other: ***None.***

6.4 Delimiter Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.15.0	Same as Model Profile: **Yes**	
no-op [v1] References: Part 3, 8.2		Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. This element is applicable only to binary encoding. It shall be included in the profile only if binary encoding is permitted or required. If binary encoding is permitted, is the element Required **No**; Permitted **Yes;** If permitted, are there any restrictions on the Parameter value? ***None.*** Other: ***None.***

T.15.1	Same as Model Profile: **Yes**	
BEGIN METAFILE END METAFILE [v1] References: 7.2.1 7.2.2 9.5.4.6 T.14.5		Element is: Required **Yes**; The *metafile identifier* parameter shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. Other: ***None.***
T.15.2	Same as Model Profile: **No**	
BEGIN PICTURE BEGIN PICTURE BODY END PICTURE [v1] References:	Element is: Required **Yes**; The *picture identifier* shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. Number of occurrences of these elements allowed in the metafile: ***1.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *picture identifier* shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. Number of occurrences of these elements allowed in the metafile: ***No limit.*** Other: ***None.***

7.2.3 7.2.4 7.2.5 9.5.4.6 T.14.5		
T.15.3	Same as Model Profile: **No**	
BEGIN SEGMENT END SEGMENT [v2] References: 7.2.6 7.2.7	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Maximum number of simultaneously defined segments (both global and local) at any point in the metafile: Any limits on the number of elements or restrictions on which elements compose a segment? Is there any meaning given to the *segment identifier* parameter? (yes/no) If yes, specify. (Meaning shall have no graphical effect.) Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneously defined segments (both global and local) at any point in the metafile: ***1024.*** Any limits on the number of elements or restrictions on which elements compose a segment? ***None.*** Is there any meaning given to the *segment identifier* parameter? (yes/no) ***No.*** If yes, specify. (Meaning shall have no graphical effect). Other: ***When global segments are specified in the Metafile Descriptor, all global segment definitions shall follow all other Metafile Descriptor elements. When segments are specified in the Picture Descriptor, all such segment definitions shall follow all other Picture Descriptor elements.***

T.15.4	Same as Model Profile: **No**	
BEGIN FIGURE END FIGURE [v2] References: 7.2.8 7.2.9	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the number of elements or restrictions on which elements comprise a figure definition: ***Maximum number of elements = 1024. No restrictions on which eligible elements may be included.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the number of elements or restrictions on which elements comprise a figure definition: ***Maximum number of elements = 128. No restrictions on which eligible elements may be included.*** Other: ***None.***
T.15.5	Same as Model Profile: **No**	
BEGIN PROTECTION REGION END PROTECTION REGION [v3] References: 7.2.10 7.2.11	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneously defined protection regions: ***1***. Maximum number of elements within each protection region: ***128***. Is there any meaning to the region index parameter other than as a unique identifier for each protection region? (yes/no) ***No***. If yes, specify. (Meaning shall have no graphical effect). Other: ***Region index is restricted to the value "1".***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneously defined protection regions: ***32.*** Maximum number of elements within each protection region: ***128.*** Is there any meaning to the region index parameter other than as a unique identifier for each protection region? (yes/no) No. If yes, specify. (Meaning shall have no graphical effect). Other: ***None.***

T.15.6	Same as Model Profile: **Yes**	
BEGIN COMPOUND LINE END COMPOUND LINE [v3] References: 7.2.12 7.2.13		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the number of elements and identity of elements comprising a path definition: ***Maximum number of elements is 128. No restrictions on which eligible elements may be included.*** Other: ***None.***
T.15.7	Same as Model Profile: **Yes**	
BEGIN COMPOUND TEXT PATH END COMPOUND TEXT PATH [v3] References: 7.2.14 7.2.15		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the number and identity of elements comprising a path definition: ***Maximum number of elements is 128. No restrictions on which eligible elements may be included.*** Other: ***None.***

T.15.8	Same as Model Profile: **No**	
BEGIN TILE ARRAY END TILE ARRAY [v3] References: 7.2.16 7.2.17	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of tiles in path direction: ***64*** Maximum number of tiles in line direction: ***64*** Maximum number of cells/tile in path direction: ***4096*** Maximum number of cells/tile in line direction: ***4096*** Limits on pel path: ***shall be 0.*** Limits on line progression: ***None.*** Limits on image offset: ***None.*** Other: ***Two types of raster images are allowed. A single (non-tiled) image has a maximum of 1,073,741,824 (1 giga, 32768**2) cells. A non-tiled image may exceed the 4096 cells/tile restriction specified for the tiled images. Tiled raster images are limited 64X64 tiles which are a maximum of 4096X4096 cells each. These tiled images are limited to a total of 1,073,741,824 (1 giga, 32768**2) cells (adjustment of maximum number of tiles and cells per tile are necessary to meet this requirement).***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of tiles in path direction: ***16.*** Maximum number of tiles in line direction: ***16.*** Maximum number of cells/tile in path direction: ***1024.*** Maximum number of cells/tile in line direction: ***1024.*** Limits on pel path: ***None.*** Limits on line progression: ***None.*** Limits on image offset: ***None.*** Other: ***None.***
T.15.9	Same as Model Profile: **No**	

BEGIN APPLICATION STRUCTURE BEGIN APPLICATION STRUCTURE BODY END APPLICATION STRUCTURE [v4] References: 7.2.18 7.2.19 7.2.20	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the maximum number of defined structures within a picture:***None.*** Limits on the number and identity of elements comprising a structure: ***None.*** To the application structure identifier parameter, state the meaning: Assigned beyond being a unique identifier for the application structure: Is the inheritance flag parameter restricted? Yes/no: **Yes**. **The value of the inheritance flag is restricted to a value corresponding to "statelist"**. Other: **The value of the structure type parameter must be chosen from the list of valid structure types listed in the Section 3.2.1. Structures are sensitive to placement and are allowed according to the rules defined in Section 3.2.1, and placed in the metafile according to the content model defined in the XML DTD fragment in Section 3.3.**.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limits on the maximum number of defined structures within a picture: ***None.*** Limits on the number and identity of elements comprising a structure: ***None.*** Is there any meaning to the *application structure identifier* parameter? yes/no***No. No assigned meaning beyond being a unique identifier for the application structure.*** If yes, specify. Is the inheritance flag parameter restricted? Yes/no: **No** Other: ***None.***

6.5 Metafile Descriptor Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.16.1	Same as Model Profile: **Yes**	

METAFILE VERSION [v1] References: 7.3.1		Element is: Required **Yes**; Metafile versions permitted by this profile:***1, 2, 3, 4*** Other: ***None.***
T.16.2	Same as Model Profile: **No**	
METAFILE DESCRIPTION [v1] References: 7.3.2 9.5.2.1 9.5.2.2 9.5.4.6 T.14.1 T.14.5	Element is: Required **Yes**; The *description* parameter shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. The substring within the SF parameter shall be of the form: "keyword:item", where the double quotes are part of the substring. Maximum number of occurrences of this element? ***1*** Profile identification (use keyword, "ProfileId:"): ***"ProfileId:WebCGM".*** Profile edition (use keyword, "ProfileEd:"): ***Refers to the approved version and revision of the specification that applies for this graphic. The Item associated with the keyword ProfileEd shall be n.m. For this WebCGM Edition: "ProfileEd:2.0".*** Additional information content:	Element is: Required **Yes**; The *description* parameter shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. The substring within the SF parameter shall be of the form: "keyword:item", where the double quotes are part of the substring. Maximum number of occurrences of this element? ***Unlimited.*** Profile identification (use keyword, "ProfileId:"): ***"ProfileId:Model-Profile".*** Profile edition (use keyword, "ProfileEd:"): ***"ProfileEd:2".*** If the profile edition is not given, then the edition defaults to 1. Additional information content: Metafile colour conformance class, source, and date items shall be encoded as substrings of the

	Metafile colour conformance class, source, and date items shall be encoded as substrings of the *description* parameter using the keywords: "ColourClass:", "Source:", and "Date:", respectively. ColourClass: Required **Yes**; • Content: ***One of "ColourClass:monochrome" or "ColourClass:colour".*** Source? Required **No**; Permitted **Yes**; • Content: "***Source:supplier"*** Date? Required **No**; Permitted **Yes**; • Content: ***"Date:yyyymmdd"*** Other: ***Parameter strings are considered case insensitive.***	*description* parameter using the keywords: "ColourClass:", "Source:", and "Date:", respectively. ColourClass: Required **Yes**; Permitted **No**; • Content: ***(One of: colour, grayscale, or monochrome.)*** Source? Required **Yes**; Permitted **No**; • Content: ***(Vendor, product, and version).*** Date? Required **Yes**; Permitted **No**; • Content shall be date of metafile generation. ***The form and content shall be in accordance with ISO 8601:1988.*** Other: ***None.***
T.16.3	Same as Model Profile: **Yes**	
VDC TYPE [v1] References: 7.3.3		Element is: Required **No**; Permitted **Yes**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.16.4	Same as Model Profile: **No**	

INTEGER PRECISION [v1] References: 7.3.4 Part 3, 8.3 Part 4, 7.2	Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, are there any restrictions on the parameter value? ***16, or 32.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? Other:	Element is: Required**No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, are there any restrictions on the parameter value? ***8, 16, or 32.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***[-256,255], [-32767,32767], [-32768,32767] or [-2147483648, 2147483647]*** Other: ***None.***
T.16.5	Same as Model Profile: **Yes**	
REAL PRECISION [v1] References: 7.3.5 Part 3, 8.3 Part 4, 7.2		Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, are there any restrictions on the parameter value? ***(1, 16, 16) or (0, 9, 23).*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***-32767, +32767, 4; or -32768, +32767, 10; or -3.4028235E38, +3.4028235E38, 8***

		Note: The latter two values are the closest approximation, in base 10 clear text, to the REAL PRECISION values allowed in binary encoded CGMs. Other: ***None.***
T.16.6	Same as Model Profile: **No**	
INDEX PRECISION [v1] References: 7.3.6	Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, if permitted, are there any restrictions on the parameter value? ***16.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? Other:	Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, If permitted, are there any restrictions on the parametervalue? ***8, 16, or 32.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***[0, 127], [-256, 255], [-32767, 32767], [-32768, 32767], or [-2147483648, 2147483647]*** Other: ***None.***
T.16.7	Same as Model Profile: **Yes**	
COLOUR PRECISION [v1] References:		Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, are there any

7.3.7		restrictions on the parameter value? ***8 or 16.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***255 or 65535.*** Other: ***None.***
T.16.8	Same as Model Profile: **Yes**	
COLOUR INDEX PRECISION [v1] References: 7.3.8		Element is: Required **No**; Permitted **Yes**; The parameter value of this element is encoding dependent. If binary encoding is permitted, are there any restrictions on the parameter value? ***8 or 16.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***127, 255, 32767.*** Other: ***None.***
T.16.9	Same as Model Profile: **No**	
MAXIMUM COLOUR INDEX [v1]	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is this element required to be a least upper bound? (yes/no)	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is this element required to be a least upper bound? (yes/no) ***No.***

References: 7.3.9	***No.*** Any restrictions on the parameter values? • ***0-1 for monochrome metafiles.*** • ***0-255 for colour metafiles.*** Other: ***Grayscale is considered a special case of colour.***	Any restrictions on the parameter values? • ***0-1 for monochrome metafiles.*** • ***0-63 for grayscale metafiles.*** • ***0-255 for colour metafiles.*** Other: ***None.***
T.16.10	Same as Model Profile: **Yes**	
COLOUR VALUE EXTENT [v1] References: 7.3.10		Element is: Required **No**; Permitted **Yes**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.16.11	Same as Model Profile: **Yes**	
METAFILE ELEMENT LIST [v1] References: 7.3.11		Element is: Required **Yes**; Other: ***None.***
T.16.12	Same as Model Profile: **Yes**	

METAFILE DEFAULTS REPLACEMENT [v1] References: 7.3.12		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is each occurrence of the MDR restricted to defining just one default? (yes/no) ***No.*** Additional restrictions may be specified in parts 3 and 4 of ISO/IEC 8632. Other: ***None.***
T.16.13	Same as Model Profile: **No**	
FONT LIST [v1] References: 7.3.13 annex I	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element is required for all metafiles containing graphical text. Maximum number of fonts in the list: ***256*** All font indexes referenced in the metafile, including the default (nominally index 1) shall be defined in the FONT LIST element, with font name construction consistent with the rules of ISO/IEC 9541. List of ***recommended fonts:*** • ***Times-Roman*** • ***Times-Bold*** • ***Times-Italic*** • ***Times-BoldItalic*** • ***Helvetica*** • ***Helvetica-Bold***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element is required for all metafiles containing graphical text. Maximum number of fonts in the list: ***64.*** All font indexes referenced in the metafile, including the default (nominally index 1) shall be defined in the FONT LIST element, with font name construction consistent with the rules of ISO/IEC 9541. List of permitted fonts: • ***Times-Roman*** • ***Times-Bold*** • ***Times-Italic*** • ***Times-BoldItalic*** • ***Helvetica*** • ***Helvetica-Bold***

	• ***Helvetica-Oblique*** • ***Helvetica-BoldOblique*** • ***Courier*** • ***Courier-Bold*** • ***Courier-Oblique*** • ***Courier-BoldOblique*** • ***Symbol*** NOTE - Theses font names are trademarked and some are proprietary and copyrighted. Times and Helvetica are registered trademarks of Allied Corporation, the owner of the copyright on the fonts of those names. Metric equivalents of the named fonts may be substituted by interpreters. Times is a serif font. Helvetica is a sans-serif font. Courier is a monospaced, serif font. The association of character code to glyph which shall be used for each of the fonts and the metrics of the named fonts are contained in clause I.2, annex I of CGM:1999. Other: ***The list of recommended fonts is intended to be a list of required minimum interpreter font capability and a recommended maximum font capability for generators. If other fonts are used, the FONT PROPERTIES and RESTRICTED TEXT elements are required. Font names are considered case insensitive.***	• ***Helvetica-Oblique*** • ***Helvetica-BoldOblique*** • ***Courier*** • ***Courier-Bold*** • ***Courier-Oblique*** • ***Courier-BoldOblique*** • ***Symbol*** NOTE - Theses font names are trademarked and some are proprietary and copyrighted. Times and Helvetica are registered trademarks of Allied Corporation, the owner of the copyright on the fonts of those names. Metric equivalents of the named fonts may be substituted by interpreters. Times is a serif font. Helvetica is a sans-serif font. Courier is a monospaced, serif font. The association of character code to glyph which shall be used for each of the fonts and the metrics of the named fonts are contained in clause I.2, annex I. Other: ***None.***
T.16.14	Same as Model Profile: **No**	
CHARACTER SET LIST [v1]	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element is required for all metafiles containing graphical text.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element is required for all metafiles containing graphical text.

References: 7.3.14	Maximum limit for the number of character sets in the character set list: ***6.*** Character sets shall be selected from the ISO Registry of Character Sets. This list may be extended by adding profile-defined character sets. List character sets: : ***"94-character G-set", 4/2 (ISO 8859-1 LH);*** ***"96-character G-set", 4/1 (ISO 8859-1 RH);*** ***"94-character G-set", 2/10 3/10 (Symbol LH);*** ***"94-character G-set", 2/6 3/10 (Symbol RH);***. ***"complete code", 2/15 4/9 (UTF-8)*** ***"complete code", 2/15 4/12 (UTF-16)*** *Note. The tails for UTF-8 and UTF-16 differ from their WebCGM 1.0 values. 2.0 metafiles shall not use the 1.0 forms.* If any of these character sets is of type "complete code", specify the content of the complete code and its associated sequence tail: ***Specified*** Other: ***None.***	Maximum limit for the number of character sets in the character set list: ***4.*** Character sets shall be selected from the ISO Registry of Character Sets. This list may be extended by adding profile-defined character sets. List character sets: ***"94-character G-set", 4/2 (ISO 8859-1 LH);*** ***"96-character G-set", 4/1 (ISO 8859-1 RH);*** ***"94-character G-set", 2/10 3/10 (Symbol LH);*** ***"94-character G-set", 2/6 3/10 (Symbol RH).*** If any of these character sets is of type "complete code", specify the content of the complete code and its associated sequence tail: ***Not applicable.*** Other: ***None.***
T.16.15	Same as Model Profile: **No**	
CHARACTER CODING ANNOUNCER	Element is: Required **Yes**; Any restrictions on the parameter values? ***Value***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**;

[v1] References: 7.3.15	***shall be 'basic 8-bit'.*** Other: ***None.***	Any restrictions on the parameter values? ***Values shall be 'basic 7-bit' and 'basic 8-bit'.*** Other: ***None.***
T.16.16	Same as Model Profile: **No**	
NAME PRECISION [v2] References: 7.3.16 Part 3, 8.3 Part 4, 7.2	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The parameter value of this element is coding dependent. If binary encoding is permitted, are there any restrictions on the Parameter value? Other: If clear text encoding is permitted, are there any restrictions on the parameter value? Other:	Element is: Required **No**; Permitted **Yes**; The parameter value of this element is coding dependent. If binary encoding is permitted, are there any restrictions on the Parameter value? ***16 or 32.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***[-256, 255], [-32767, 32767], [-32768, 32767], or [-2147483648, 214748647]*** Other: ***None.***
T.16.17	Same as Model Profile: **Yes**	
MAXIMUM VDC EXTENT [v2] References: 7.3.17		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***None.*** Other: ***None.***

T.16.18	Same as Model Profile: **No**	
SEGMENT PRIORITY EXTENT [v2] References: 7.3.18	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter values. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.16.19	Same as Model Profile: **No**	
COLOUR MODEL [v3] References: 7.3.19	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of colour models? ***Shall be 1, 6, 7, or 8.*** Other: ***Values 6, 7, and 8 are the registered values for RGB-alpha, sRGB, and sRGB-alpha.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of colour models? ***None.*** Other: ***None.*** ***NOTE — Three colour models have been registered (as of date of publication) in the ISO Register of Graphical Items: RGB-alpha, sRGB, sRGB-alpha***
T.16.20	Same as Model Profile: **No**	
COLOUR CALIBRATION [v3] References:	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Calibration selection values permitted in accordance with the permitted model(s): If CYMK is permitted, minimum number of grid	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Calibration selection values permitted in accordance with the permitted model(s): ***Values 1..6, 9.***

7.3.20	locations: Any restrictions on the number of colour lookup table entries, n? Any restrictions on the number of grid locations, m? If CYMK is permitted, algorithms for interpolation between grid locations? Other: ***None.***	If CYMK is permitted, minimum number of grid locations: ***3.*** Any restrictions on the number of colour lookup table entries, n? ***None.*** Any restrictions on the number of grid locations, m? ***None.*** If CYMK is permitted, algorithms for interpolation between grid locations? ***None.*** Other: ***None.***
T.16.21	Same as Model Profile: **No**	
FONT PROPERTIES [v3] References: 7.3.21	Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***The required parameters, when used, are INDEX, FONT FAMILY, POSTURE, WEIGHT, PROPORTIONATE WIDTH, DESIGN GROUP and STRUCTURE.*** Other: ***This element is required when a font is used that is not in the list of recommended fonts specified in the FONT LIST element. Parameter values of type SF are considered to be case insensitive***	Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***All defined index and enumerated values of all parameters shall be permitted.*** Other: ***None.***
T.16.22	Same as Model Profile: **No**	
GLYPH MAPPING	Required **No**; Permitted **No**; Prohibited **Yes**; Subset of AFII registered glyphs which may be	Required **No**; Permitted **Yes**; Prohibited **No**; Subset of AFII registered glyphs which may be

[v3] References: 7.3.22	referenced: Maximum number of glyphs which may be defined: Other: ***None.***	referenced: ***None.*** Maximum number of glyphs which may be defined: ***8192.*** Other: ***None.***
T.16.23	Same as Model Profile: **Yes**	
SYMBOL LIBRARY LIST [v3] References: 7.3.23		Required **No**; Permitted **No**; Prohibited **Yes**; Libraries which may be accessed and their encoding rules: Maximum number of libraries which may be accessed: Other: ***NOTE - There are currently no registered symbol libraries.***
T.16.24	Same as Model Profile: **No**	
PICTURE DIRECTORY [v4] References: 7.3.24 9.5.4.6	Required **No**; Permitted **No**; Prohibited **Yes**; Follows rules for non-graphical text strings for picture identifier parameter, clause 9.5.4.6 and T.14.5. If present, shall PICTURE DIRECTORY elements be complete, i.e., have an entry for every picture in the metafile? (yes/no) If "no", describe any special meaning associated	Required **No**; Permitted **Yes**; Prohibited **No**; Follows rules for non-graphical text strings for picture identifier parameter, clause 9.5.4.6 and T.14.5. If present, shall PICTURE DIRECTORY elements be complete, i.e., have an entry for every picture in the metafile? (yes/no) ***Yes.*** If "no", describe any special meaning associated

T.14.5	with those entries which appear in PICTURE DIRECTORY elements which are incomplete. Other:	with those entries which appear in PICTURE DIRECTORY elements which are incomplete. Other: ***None.***

6.6 Picture Descriptor Elements 

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.17.1	Same as Model Profile: **No**	
SCALING MODE [v1] References: 7.4.1	Element: Required **Yes**; Any restrictions on the parameter values? ***SCALING MODE shall be metric.*** Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***If SCALING MODE is metric then the 'metric scale factor' shall be positive.*** Other: ***None.***
T.17.2	Same as Model Profile: **Yes**	
COLOUR SELECTION MODE [v1][v2] References: 7.4.2		Element: Required **No**; Permitted **Yes**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.3	Same as Model Profile: **Yes**	

LINE WIDTH SPECIFICATION MODE [v1][v2] References: 7.4.3		Element: Required **No**; Permitted **Yes**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.4	Same as Model Profile: **Yes**	
MARKER SIZE SPECIFICATION MODE [v1][v2] References: 7.4.4		Element: Required **No**; Permitted **Yes**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.5	Same as Model Profile: **Yes**	
EDGE WIDTH SPECIFICATION MODE [v1][v2] References: 7.4.5		Element: Required **No**; Permitted **Yes**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.6	Same as Model Profile: **Yes**	

VDC EXTENT [v1] References: 7.4.6		Element: Required **No**; Permitted **Yes**; Limits on the sense and orientation of the VDC space: ***None.*** Is zero-area VDC extent permitted? (yes/no) ***No.*** If yes, specify its meaning. Other: ***None.***
T.17.7	Same as Model Profile: **Yes**	
BACKGROUND COLOUR [v1] References: 7.4.7 9.5.4.1 T.14.1		Element: Required **No**; Permitted **Yes**; The *colour value* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Other: ***None.***
T.17.8	Same as Model Profile: **Yes**	
DEVICE VIEWPORT [v2] References:		Element: Required **No**; Permitted **No**; Prohibited **Yes**; Interaction of this element with environmental presentation directives: Meaning of this element if the specified value is

7.4.8		inconsistent with the presentation device: Other: ***NOTE - This element is prohibited due to its device dependence.***
T.17.9	Same as Model Profile: **Yes**	
DEVICE VIEWPORT SPECIFICATION MODE [v2] References: 7.4.9		Element: Required **No**; Permitted **No** Prohibited **Yes**; Set of legal values: Other: ***NOTE - This element is prohibited due to its device dependence.***
T.17.10	Same as Model Profile: **Yes**	
DEVICE VIEWPORT MAPPING [v2] References: 7.4.10		Element: Required **No**; Permitted **No**; Prohibited **Yes**; Set of legal values: Other: ***NOTE - This element is prohibited due to its device dependence.***
T.17.11	Same as Model Profile: **No**	

LINE REP-RESENTATION [v2] References: 7.4.11 9.5.2.6 9.5.4.2 T.20.1	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Maximum number of simultaneous bundle definitions: Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.12	Same as Model Profile: **No**	
MARKER REP-RESENTATION [v2] References: 7.4.12 9.5.2.6 9.5.4.2 T.20.5	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Maximum number of simultaneous bundle definitions: Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.13	Same as Model Profile: **No**	
TEXT REP-	Element: Required **No**; Permitted **No**; Prohibited	Element: Required **No**; Permitted **Yes**; Prohibited

RESENTATION [v2] References: 7.4.13 9.5.2.6 9.5.4.2 T.20.9	**Yes**; Maximum number of simultaneous bundle definitions: Other: ***None.***	**No**; Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.14	Same as Model Profile: **No**	
FILL REP-RESENTATION [v2] References: 7.4.14 9.5.2.6 9.5.4.2 T.20.21	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Maximum number of simultaneous bundle definitions: Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.15	Same as Model Profile: **No**	
EDGE REP-RESENTATION	Element: Required **No**; Permitted **No**; Prohibited **Yes**;	Element: Required **No**; Permitted **Yes**; Prohibited **No**;

[v2] References: 7.4.15 9.5.2.6 9.5.4.2 T.20.26	Maximum number of simultaneous bundle definitions: Other: ***None.***	Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.16	Same as Model Profile: **Yes**	
INTERIOR STYLE SPECIFICATION MODE [v3] References: 7.4.16		Element: Required **No**; Permitted **Yes**; Any restriction on the parameter value? ***None.*** Other: ***None.***
T.17.17	Same as Model Profile: **Yes**	
LINE AND EDGE TYPE DEFINITION [v3] References:		Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the number of definitions? ***Maximum of 32 line types shall be specified simultaneously.*** Any limits on the number of elements in a given

7.4.17		definition? ***Number of values in the dash gap list shall not exceed 8.*** Any restrictions on the dash cycle repeat length? ***None.*** Any restrictions on complexity of definition to prevent degeneracies? ***None.*** Other: ***None.***
T.17.18	Same as Model Profile: **Yes**	
HATCH STYLE DEFINITION [v3] References: 7.4.18		Element: Required **No**; Permitted **Yes**; Prohibited **No**; Limit on the number of hatch styles? ***Maximum of 32 hatch styles shall be specified simultaneously.*** Limit on the number of gaps in a given definition? ***Number of entries in the gap width list shall not exceed 8.*** Any limits on duty cycle length? ***None.*** Any restrictions on complexity of definition to prevent degeneracies? ***None.*** Any restrictions on the style indicator? ***None.*** Other: ***None.***
T.17.19	Same as Model Profile: **No**	
GEOMETRIC	Element: Required **No**; Permitted **No**; Prohibited	Element: Required **No**; Permitted **Yes**; Prohibited

PATTERN DEFINITION [v3] References: 7.4.19	**Yes**; Any limits on the number of geometric patterns defined? Any limits on the classes of primitives? Other: ***None.***	**No**; Any limits on the number of geometric patterns defined? ***The maximum number of geometric patterns is 64.*** NOTE - The number of geometric patterns cannot exceed the number of segments. Any limits on the classes of primitives? ***None.*** Other: ***None.***
T.17.20	Same as Model Profile: **No**	
APPLICATION STRUCTURE DIRECTORY [v4] References: 7.4.20 9.5.4.6 T.14.5	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Follow rules for non-graphical text strings *for application structure identifier* parameter, clause 9.5.4.6 and T.14.5. Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Follows rules for non-graphical text strings *for application structure identifier* parameter, clause 9.5.4.6 and T.14.5. If present, shall APPLICATION STRUCTURE DIRECTORY elements be complete, i.e., have an entry for every application structure in the picture? (yes/no) ***Yes.*** If "no", describe any special meaning associated with those entries which appear in APPLICATION STRUCTURE DIRECTORY elements which are incomplete. Other: ***None.***

6.7 Control Elements 

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.18.1	Same as Model Profile: **Yes**	
VDC INTEGER PRECISION [v1] References: 7.5.1 Part 3, 8.5 Part 4, 7.4		Element is: Required **No**; Permitted **Yes**; The parameter values of this element are encoding dependent. If binary encoding is permitted, are there any restrictions on the Parameter value? ***16 or 32.*** Other: ***None.*** If clear text encoding is permitted, are there any restrictions on the parameter value? ***[-32767, 32767], [-32768, 32767], or [-2147483648, 2147483647].*** Other: ***None.***
T.18.2	Same as Model Profile: **Yes**	
VDC REAL PRECISION [v1] References: 7.5.2 Part 3, 8.5 Part 4, 7.4		Element is: Required **No**; Permitted **Yes**; The parameter values of this element are encoding dependent. If binary encoding is permitted, are there any restrictions on the Parameter value? ***(1, 16, 16) or (0, 9, 32)*** Other: ***None.*** If clear text encoding is permitted, are there any

		restrictions on the parameter value? ***0.0, 1.0 , 4; or*** ***-32767, 32767, 4; or*** ***-32768, 32767, 10; or*** ***-3.4028235E38, +3.4028235E38, 8*** ***Note: The latter two values are the closest approximation, in base 10 clear text, to the REAL PRECISION values allowed in binary encoded CGMs.*** Other: ***None.***
T.18.3	Same as Model Profile: **Yes**	
AUXILIARY COLOUR [v1] References: 7.5.3 9.5.4.1 T.14.1 D.4.4.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *auxiliary colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Other: ***None.***
T.18.4	Same as Model Profile: **Yes**	

TRANSPARENCY [v1] References: 7.5.4 9.5.7.9 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restriction on the parameter value? ***None.*** Other: ***None.***
T.18.5	Same as Model Profile: **Yes**	
CLIP RECTANGLE [v1] References: 7.5.5 D.4.4.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Meaning of boundary cases for: zero-area: Prohibited. area greater than VDC extent: Clipping shall be done to the intersection of CLIP RECTANGLE and VDC EXTENT. additional cases: None. Other: ***None.***
T.18.6	Same as Model Profile: **Yes**	
CLIP INDICATOR [v1] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.***

7.5.6		Other: ***None.***
T.18.7	Same as Model Profile: **No**	
LINE CLIPPING MODE [v2] References: 7.5.7 D.4.4.3	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter value? ***None.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.8	Same as Model Profile: **No**	
MARKER CLIPPING MODE [v2] References: 7.5.8 D.4.4.3	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; P>Any restrictions on the parameter value? ***None.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.9	Same as Model Profile: **No**	
EDGE CLIPPING MODE [v2] References:	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; P>Any restrictions on the parameter value? ***None.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***

7.5.9 D.4.4.3		
T.18.10	Same as Model Profile: **Yes**	
NEW REGION [v2] References: 7.5.10		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element shall be permitted only if BEGIN FIGURE is permitted. Any restrictions on the number of occurrences? ***None.*** Other: ***None.***
T.18.11	Same as Model Profile: **No**	
SAVE PRIMITIVE CONTEXT [v2] References: 7.5.11	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Maximum number of simultaneously saved contexts: Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of simultaneously saved contexts: ***1024.*** Other: ***None.***
T.18.12	Same as Model Profile: **No**	
RESTORE PRIMITIVE CONTEXT [v2]	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; This element is permitted only if SAVE PRIMITIVE CONTEXT is permitted.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element is permitted only if SAVE PRIMITIVE CONTEXT is permitted.

References: 7.5.12	Other: ***None.***	Other: ***None.***
T.18.13	Same as Model Profile: **No**	
PROTECTION REGION INDICATOR [v3] References: 7.5.13	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The values are restricted to: ***off, clip***. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element shall be permitted only if BEGIN PROTECTION REGION is permitted. Other: ***None.***
T.18.14	Same as Model Profile: **No**	
GENERALIZED TEXT PATH MODE [v3] References: 7.5.14	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***off, axis-tangential*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.15	Same as Model Profile: **Yes**	
MITRE LIMIT [v3] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.***

7.5.15		Other: ***None.***
T.18.16	Same as Model Profile: **Yes**	
TRANSPARENT CELL COLOUR [v3] References: 7.5.16 9.5.4.1 T14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *transparent cell colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter values? ***None.*** Other: ***None.***

6.8 Graphical Primitive Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.19.1	Same as Model Profile: **Yes**	
POLYLINE [v1] References: 7.6.1 T.14.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points or state "no limit": ***4096.*** Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***

D.2.21		
T.19.2	Same as Model Profile: **Yes**	
DISJOINT POLYLINE [v1] References: 7.6.2 T.14.2 D.2.2.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points or state "no limit": ***4096.*** Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.3	Same as Model Profile: **Yes**	
POLYMARKER [v1] References: 7.6.3		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points or state "no limit": ***4096.*** Other: ***None.***
T.19.4	Same as Model Profile: **No**	
TEXT [v1] References:	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *string* parameter shall follow the rules for graphical text, clause 9.5.4.5.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *string* parameter shall follow the rules for graphical text, clause 9.5.4.5.

7.6.4 9.5.4.5	Is the 'not final' flag allowed: (yes/no) Other: ***Graphical text shall be represented by the Restricted Text element in this profile.***	Is the 'not final' flag allowed: (yes/no) ***Yes.*** Other: ***None.***
T.19.5	Same as Model Profile: **Yes**	
RESTRICTED TEXT [v1] References: 7.6.5 9.5.4.5 T.26.7 D.4.5.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *string* parameter shall follow the rules for graphical text, clause 9.5.4.5. Is the 'not final' flag allowed: (yes/no) ***Yes.*** For[v1/2] metafiles, is the realization of RESTRICTED TEXT according to one of the standard or registered values for RESTRICTED TEXT TYPE? (yes/no)***Yes.*** If yes, specify. Boxed-cap, also see T.26.7 For [v3] and [v4] metafiles, RESTRICTED TEXT TYPE shall be used if this element is used. Other: ***None.***
T.19.6	Same as Model Profile: **Yes**	
APPEND TEXT [v1] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *string* parameter shall follow the rules for graphical text, clause 9.5.4.5.

7.6.6. 9.5.4.5 D.4.5.1		Other: ***None.***
T.19.7	Same as Model Profile: **Yes**	
POLYGON [v1] References: 7.6.7 T.14.3 D.2.2.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points: *4096*. Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***
T.19.8	Same as Model Profile: **Yes**	
POLYGON SET [v1] References: 7.6.8 T.14.3 D.2.2.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points: ***4096.*** Number of polygons in a set? ***No limit.*** Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***Each individual polygon within a set shall have at least 3 points.***

T.19.9	Same as Model Profile: **No**	
CELL ARRAY [v1] References: 7.6.9 D.4.5.3	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limit for nx: ***32768*** Limit for ny: ***32768*** Limit for nx*ny:***1,073,741,824 ("1 giga", 32768**2).*** Are rotated and skewed cell arrays allowed? (yes/no) ***No.*** If yes, specify the graphical meaning. Other: ***Zero-area cell arrays are prohibited.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Limit for nx: ***2048.*** Limit for ny: ***2048.*** Limit for nx*ny: ***4194304.*** Are rotated and skewed cell arrays allowed? (yes/no) ***No.*** If yes, specify the graphical meaning. Other: ***Zero-area cell arrays are prohibited.***
T.19.10	Same as Model Profile: **Yes**	
GENERALIZED DRAWING PRIMITIVE [v1] References: 7.6.10		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; List all the registered GDPs that are allowed: List all profile-defined GDPs that are allowed and attach complete description: Other:
T.19.11	Same as Model Profile: **Yes**	
RECTANGLE		Element is: Required **No**; Permitted **Yes**; Prohibited **No**;

[v1] References: 7.6.11 T.14.3 D.2.2.2		Zero-area geometric degeneracies shall be as defined in T.14.3. Other: None.
T.19.12	Same as Model Profile: **Yes**	
CIRCLE [v1] References: 7.6.12 T.14.3 D.2.2.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***
T.19.13	Same as Model Profile: **Yes**	
CIRCULAR ARC 3 POINT [v1] References: 7.6.13		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***

T.14.2 D.2.2.2 D.4.5.4		
T.19.14	Same as Model Profile: **Yes**	
CIRCULAR ARC 3 POINT CLOSE [v1] References: 7.6.14 T.14.3 D.2.2.2 D.4.5.5		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***
T.19.15	Same as Model Profile: **Yes**	
CIRCULAR ARC CENTRE [v1] References: 7.6.15		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***

T.14.2 D.2.2.2 D.4.5.6		
T.19.16	Same as Model Profile: **Yes**	
CIRCULAR ARC CENTRE CLOSE [v1] References: 7.6.16 T.14.3 D.2.2.2 D.4.5.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***
T.19.17	Same as Model Profile: **Yes**	
ELLIPSE [v1] References: 7.6.17 T.14.3		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***

D.2.2.2 D.4.5.9 D.4.5.10		
T.19.18	Same as Model Profile: **Yes**	
ELLIPTICAL ARC [v1] References: 7.6.18 T.14.2 D.2.2.1 D.4.5.11		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.19	Same as Model Profile: **Yes**	
ELLIPTICAL ARC CLOSE [v1] References: 7.6.19 T.14.3 D.2.2.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-area geometric degeneracies shall be as defined in T.14.3. Other: ***None.***

D.4.5.12		
T.19.20	Same as Model Profile: **Yes**	
CIRCULAR ARC CENTRE REVERSED [v2] References: 7.6.20 T.14.2 D.2.2.1 D.4.5.8		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.21	Same as Model Profile: **Yes**	
CONNECTING EDGE [v2] References: 7.6.21 T.14.2 D.2.2.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; This element shall be permitted only if BEGIN/END FIGURE is permitted. Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***

T.19.22	Same as Model Profile: **No**	
HYPERBOLIC ARC [v3] References: 7.6.22 T.14.2 D.2.2.1	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.23	Same as Model Profile: **No**	
PARABOLIC ARC [v3] References: 7.6.23 T.14.2 D.2.2.1	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.24	Same as Model Profile: **Yes**	
NON-UNIFORM B-SPLINE		Element is: Required **No**; Permitted **Yes**; Prohibited **No**;

[v3] References: 7.6.24 T.14.2 D.2.2.1		Set of spline orders: ***cubic spline (order=4).*** Maximum number of control points: ***4096.*** Zero-length geometric degeneracies shall be as defined in T.14.2. Other: The spline shall be clamped form, i.e., the first 4 knots shall be identical and the last 4 knots shall be identical.
T.19.25	Same as Model Profile: **Yes**	
NON-UNIFORM RATIONAL B-SPLINE [v3] References: 7.6.25 T.14.2 D.2.2.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Set of spline orders: ***cubic spline (order=4).*** Maximum number of control points: ***4096.*** Zero-length geometric degeneracies shall be as defined in T.14.2. Other: The spline shall be clamped form, i.e., the first 4 knots shall be identical and the last 4 knots shall be identical.
T.19.26	Same as Model Profile: **Yes**	
POLYBEZIER [v3] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum number of points: ***4096.***

7.6.26 T.14.2 D.2.2.1		Any restrictions on the continuity indicator? ***None.*** Zero-length geometric degeneracies shall be as defined in T.14.2. Other: ***None.***
T.19.27	Same as Model Profile: **Yes**	
POLYSYMBOL [v3] References: 7.6.27 D.2.2.1		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Point list: Effect of a reference to a symbol index parameter which is not in the symbol library. Other: ***NOTE - This element is prohibited because SYMBOL LIBRARY LIST is prohibited.***
T.19.28	Same as Model Profile: **No**	
BITONAL TILE [v3] References: 7.6.28 D.2.2.1 D.4.5.13	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; List allowable compression types: ***0, 1, 2, 5, or 6.*** Requirements on row padding: ***None.*** Other: ***The values 0, 1 are deprecated and may be removed from a future version of WebCGM.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; List allowable compression types: ***Values 0..6.*** Requirements on row padding: ***None.*** Other: ***CCITT compression methods (T6 and T4) should be used with 1 bit cell colour precision and indexed colour.***

		Note — Several compression types have been registered (as of date of publication) in the ISO Register of Graphical Items, specifically: JPEG, LZW, and PNG.
T.19.29	Same as Model Profile: **No**	
TILE [v3] References: 7.6.29 D.2.2.1 D.4.5.13	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; List allowable compression types: ***0, 1, 2, 5, 6, 7, or 9*** Requirements on row padding: ***None.*** Other: ***The value 9 is the ISO registered value for compression method 0 of PNG. The values 0, 1, 2 are deprecated and may be removed from a future version of WebCGM.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; List allowable compression types: ***Values 0..6.*** Requirements on row padding? ***None.*** Other: ***CCITT compression methods (T6 and T4) should be used with 1 bit cell colour precision and indexed colour.*** NOTE — Several compression types have been registered (as of date of publication) in the ISO Register of Graphical Items, specifically: JPEG, LZW, and PNG.

6.9 Attribute Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.20.1	Same as Model Profile: **No**	
LINE BUNDLE INDEX [v1]	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *line bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *line bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2.

References: 7.7.1 9.5.4.2 D.4.6.1 T.17.11	For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***	For [v1] metafiles, allowable index values: ***1..5.*** • **index 1 2 3 4 5** **line type 1 2 3 4 5** **line width 1.0 1.0 1.0 1.0 1.0** **line colour 1 1 1 1 1** For [v2], [v3], and [v4] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.2	Same as Model Profile: **No**	
LINE TYPE [v1] References: 7.7.2 9.4.17 D.4.6.2	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Select 1 or more of the following: • values 1..5: **Yes** • subset of registered values (attach list): 6..15: **Yes** • profile-defined values (attach complete description): **No** For [v3] metafiles, • negative values assigned by the LINE AND EDGE TYPE DEFINITION element. **Yes**; Other: ***Line types 6-15 are included in the***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Select 1 or more of the following: • values 1..5; **Yes** • subset of registered values (attach list); **No** • profile-defined values (attach complete description); **No** For [v3] and [v4] metafiles, • negative values assigned by the LINE AND EDGE TYPE DEFINITION element. **Yes** Other: ***None.***

	Register of Graphical Objects. This register is available from the ISO SC24 Committee. See Section 4.18 about specific and generic line types.	
T.20.3	Same as Model Profile: **Yes**	
LINE WIDTH [v1] References: 7.7.3 D.4.6.3		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is value zero allowed? (yes/no) ***Yes.*** If yes, specify its meaning.***Minimum available line width.*** Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.4	Same as Model Profile: **Yes**	
LINE COLOUR [v1] References: 7.7.4 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *line colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.5	Same as Model Profile: **No**	
MARKER	Element is: Required **No**; Permitted **No**; Prohibited	Element is: Required **No**; Permitted **Yes**;

BUNDLE INDEX [v1] References: 7.7.5 9.5.4.2 T.17.12 D.4.6.1	**Yes**; The *marker bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***	Prohibited **No**; The *marker bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: ***1..5.*** **index 1 2 3 4 5** **marker type 1 2 3 4 5** **marker width 1.0 1.0 1.0 1.0 1.0** **marker colour 1 1 1 1 1** For [v2], [v3] and [v4] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.6	Same as Model Profile: **Yes**	
MARKER TYPE [v1] References: 7.7.6 D.4.6.4		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Indicate one or more of the following restrictions: • values 1..5; **Yes** • subset of registered values (attach list); **No** • profile-defined values (attach complete description). **No** Other: ***None.***

T.20.7	Same as Model Profile: **Yes**	
MARKER SIZE [v1] References: 7.7.7 D.4.6.5		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is value zero allowed? (yes/no) ***Yes.*** If yes, specify its meaning. ***Minimum available size.*** Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.8	Same as Model Profile: **Yes**	
MARKER COLOUR [v1] References: 7.7.8 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *marker colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.9	Same as Model Profile: **No**	
TEXT BUNDLE INDEX [v1]	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *text bundle index* parameter shall follow the	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *text bundle index* parameter shall follow the

References: 7.7.9 9.5.4.2 T.17.13 D.4.6.1	rules for indexes, clause 9.5.4.2. • For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***	rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: ***1..2.*** **index 1 2** **font index 1 1** **text precision stroke stroke** **character expansion factor 1.0 0.7** **character spacing 0.0 0.0** **text colour 1 1** For [v2], [v3] and [v4] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.10	Same as Model Profile: **Yes**	
TEXT FONT INDEX [v1] References: 7.7.10 9.5.4.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Every referenced index shall refer to an entry in the FONT LIST (see T.16.13). Other: ***None.***

T.16.13		
T.20.11	Same as Model Profile: **No**	
TEXT PRECISION [v1] References: 7.7.11	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***Value shall be 'stroke'.*** Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.12	Same as Model Profile: **Yes**	
CHARACTER EXPANSION FACTOR [v1] References: 7.7.12 D.4.6.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is value zero allowed? (yes/no) ***No.*** If yes, state the meaning. Any restrictions on the parameter value? ***Values shall be restricted to the range 0.1..10.0*** Other: ***None.***
T.20.13	Same as Model Profile: **Yes**	
CHARACTER SPACING [v1] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***Values shall be restricted to the range of -1.0..5.0.***

7.7.13 D.4.6.8		Other: ***None.***
T.20.14	Same as Model Profile: **Yes**	
TEXT COLOUR [v1] References: 7.7.14 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *text colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.15	Same as Model Profile: **Yes**	
CHARACTER HEIGHT [v1] References: 7.7.15 D.4.6.9		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is zero height allowed: (yes/no) ***Yes.*** If yes, state its meaning: Minimum available height. Any restrictions on the parameter? ***None.*** Other: ***None.***
T.20.16	Same as Model Profile: **Yes**	
CHARACTER		Element is: Required **No**; Permitted **Yes**;

ORIENTATION [v1] References: 7.7.16 D.4.6.10		Prohibited **No**; Any restrictions on the following distortion aspects? rotation? **None.** skewing? **None.** mirroring? **None.** aspect ratio? **None.** Other: ***None.***
T.20.17	Same as Model Profile: **Yes**	
TEXT PATH [v1] References: 7.7.17 D.4.6.11		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.18	Same as Model Profile: **Yes**	
TEXT ALIGNMENT [v1] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the horizontal and vertical alignment values? ***None.***

7.7.18 D.4.6.12		Any restrictions on the continuous horizontal and vertical alignment values? ***None.*** Other: ***None.***
T.20.19	Same as Model Profile: **No**	
CHARACTER SET INDEX [v1] References: 7.7.19 9.5.4.2 T.16.14 T.16.22 D.4.6.13	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Every referenced index shall refer to an entry in the CHARACTER SET LIST. This includes implicit reference to the default index value. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Every referenced index shall refer to an entry in the CHARACTER SET LIST or GLYPH MAPPING. This includes implicit reference to the default index value. Other: ***None.***
T.20.20	Same as Model Profile: **No**	
ALTERNATE CHARACTER SET INDEX [v1] References: 7.7.20	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Every referenced index shall refer to an entry in the CHARACTER SET LIST. This includes implicit reference to the default index value. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Every referenced index shall refer to an entry in the CHARACTER SET LIST or GLYPH MAPPING. This includes implicit reference to the default index value. Other: ***None.***

9.5.4.2 T.16.14 T.16.22 D.4.6.13		
T.20.21	Same as Model Profile: **No**	
FILL BUNDLE INDEX [v1] References: 7.7.21 9.5.4.2 T.17.14 D.4.6.1	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *fill bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *fill bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: ***1..5.*** **index 1 2 3 4 5** **interior style hatch hatch hatch hatch hatch** **fill colour 1 1 1 1 1** **hatch index 1 2 3 4 5**  **pattern index 1 1 1 1 1** For [v2], [v3] and [v4] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.22	Same as Model Profile: **Yes**	

INTERIOR STYLE [v1] References: 7.7.22 D.4.6.15		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; For 'hollow' interior style, line type and width of the bounding line: ***Solid line type and default line width.*** Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.23	Same as Model Profile: **Yes**	
FILL COLOUR [v1] References: 7.7.23 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *fill colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.24	Same as Model Profile: **Yes**	
HATCH INDEX [v1] References: 7.4.18		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Select 1 or more of the following: • values 1..6: **Yes** • subset of registered values (attach list): **No** • profile-defined values (attach complete

7.7.24 6.7.4.3 D.4.6.16		description): **No** For [v3] and [v4] metafiles, • negative values assigned by the HATCH STYLE DEFINITION element. **Yes** Other: ***None.***
T.20.25	Same as Model Profile: **Yes**	
PATTERN INDEX [v1] References: 7.7.25 9.5.4.2		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *pattern index* parameter shall follow the rules for indexes, clause 9.5.4.2. Any restrictions on the parameter value? ***None***. Other: ***None***.
T.20.26	Same as Model Profile: **No**	
EDGE BUNDLE INDEX [v1] References: 7.7.26 9.5.4.2	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *edge bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition.	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *edge bundle index* parameter shall follow the rules for indexes, clause 9.5.4.2. For [v1] metafiles, allowable index values: ***1..5.*** • ***index 1 2 3 4 5*** **edge type 1 2 3 4 5**

T.17.15 D.4.6.1	Other: ***None.***	**edge width 1.0 1.0 1.0 1.0 1.0**  **edge colour 1 1 1 1 1** For [v2], [v3] and [v4] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.27	Same as Model Profile: **Yes**	
EDGE TYPE [v1] References: 7.4.17 9.7.27 D.4.6.17		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Select 1 or more of the following: • values 1..5: **Yes** • subset of registered values (attach list): **No** • profile-defined values (attach complete description): **No** For [v3] and [v4] metafiles, • negative values assigned by the LINE AND EDGE TYPE DEFINITION element. **Yes** Other: ***None.***
T.20.28	Same as Model Profile: **Yes**	
EDGE WIDTH [v1]		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Is value zero allowed? (yes/no) ***Yes.***

References: 7.7.28 D.4.6.18		If yes, specify its meaning. ***Minimum available edge width.*** Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.29	Same as Model Profile: **Yes**	
EDGE COLOUR [v1] References: 7.7.29 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; The *edge colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.30	Same as Model Profile: **Yes**	
EDGE VISIBILITY [v1] References: 7.7.30		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.31	Same as Model Profile: **Yes**	
FILL		Element is: Required **No**; Permitted **Yes**;

REFERENCE POINT [v1] References: 7.7.31		Prohibited **No**; Any restrictions on the parameter value? None. Other: None.
T.20.32	Same as Model Profile: **Yes**	
PATTERN TABLE [v1] References: 7.7.32		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Maximum size for nx: ***32.*** Allowable values for nx: ***8, 16, or 32.*** Maximum size for ny: ***32.*** Allowable values for ny: ***8, 16, or 32.*** Any restrictions on the number of pattern definitions? ***64.*** Any restrictions on allowable combinations of nx and ny? ***None.*** Any restrictions on the number of colours? ***None.*** Other: ***None.***
T.20.33	Same as Model Profile: **Yes**	
PATTERN SIZE		Element is: Required **No**; Permitted **Yes**;

[v1] References: 7.7.33 D.4.6.19		Prohibited **No**; Must pattern vectors be parallel to coordinate axes? (yes/no) ***Yes.*** If no, state the meaning of skewed or non-aligned patterns. Other: ***None.***
T.20.34	Same as Model Profile: **No**	
COLOUR TABLE [v1] References: 7.7.34 9.5.4.1 T.14.1	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the length of colour list? ***Monochrome: 2, Colour: 256.*** Any restrictions on the index values? ***Index values shall not exceed the maximum colour index.*** Other: ***Grayscale metafiles are considered special cases of colour metafiles.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the length of colour list? ***Monochrome: 2, Greyscale: 64, Colour: 256.*** Any restrictions on the index values? ***Index values shall not exceed the maximum colour index.*** Other: ***None.***
T.20.35	Same as Model Profile: **No**	
ASPECT SOURCE FLAGS [v1] References: 7.7.35	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Are all ASF values to be the same: for the metafile? (yes/no) within each class (line, marker, text, fill, edge) of primitive? (yes/no)	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Are all ASF values to be the same: for the metafile? (yes/no) ***No.*** within each class (line, marker, text, fill, edge) of primitive? (yes/no) ***Yes.***

D.4.6.20	Other: ***None.***	Other: ***None.***
T.20.36	Same as Model Profile: **No**	
PICK IDENTIFIER [v2] References: 7.7.36	Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter value? Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.37	Same as Model Profile: **No**	
LINE CAP [v3] References: 7.7.37 9.5.7.5	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values for the line cap indicator? (choose 1 or both) **Yes**; values 1..4; **No**; subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) **Yes**; values 1..3; **No**; subset of registered values (attach list). Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values for the line cap indicator? (choose 1 or both) **Yes**; values 1..5; **No**; subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) **Yes**; values 1..3; **No**; subset of registered values (attach list). Other: ***None.***
T.20.38	Same as Model Profile: **Yes**	

LINE JOIN [v3] References: 7.7.38 9.5.7.5 T.26.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? (choose 1 or both) **Yes**; values 1..4; **No**; subset of registered values (attach list). Other: ***None.***
T.20.39	Same as Model Profile: **Yes**	
LINE TYPE CONTINUATION [v3] References: 7.7.39 9.5.7.5 T.26.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? ***1..4.*** Other: ***None.***
T.20.40	Same as Model Profile: **Yes**	
LINE TYPE INITIAL OFFSET [v3] References:		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.*** Other: ***None.***

7.7.40		
T.20.41	Same as Model Profile: **Yes**	
TEXT SCORE TYPE [v3] References: 7.7.41		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? (choose 1 or both) **Yes**; Values 1..4; **No**; Subset of registered values (attach list). Other: ***None.***
T.20.42	Same as Model Profile: **Yes**	
RESTRICTED TEXT TYPE [v3] References: 7.7.42 9.5.7.5 T.26.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? (choose 1 or both) **Yes**; Values 1..6; **No**; Subset of registered values (attach list). Algorithms for achieving restriction type? (attach) ***Not specified.*** Other: ***None.***
T.20.43	Same as Model Profile: **Yes**	

INTERPOLATED INTERIOR [v3] References: 7.7.43		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the number of stages? ***Maximum number of stages is 8.*** Any restrictions on the set of values? (choose 1 or both) **Yes**; Values 1..3; **No**; Subset of registered values (attach list). Other: ***None.***
T.20.44	Same as Model Profile: **No** 	
EDGE CAP [v3] References: 7.7.44 9.5.7.5 T.26.7	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values for the edge cap indicator? (choose 1 or both) **Yes**; values 1..4; **No**; subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) **Yes**; values 1..3; **No**; subset of registered values (attach list). Other: ***None.***	Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values for the edge cap indicator? (choose 1 or both) **Yes**; values 1..5; **No**; subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) **Yes**; values 1..3; **No**; subset of registered values (attach list). Other: ***None.***

T.20.45	Same as Model Profile: **Yes**	
EDGE JOIN [v3] References: 7.7.45 9.5.7.5 T.26.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? (choose 1 or both) **Yes**; values 1..4; **No**; subset of registered values (attach list). Other: ***None.***
T.20.46	Same as Model Profile: **Yes**	
EDGE TYPE CONTINUATION [v3] References: 7.7.46 9.5.7.5 T.26.7		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the set of values? ***1..4.*** Other: ***None.***
T.20.47	Same as Model Profile: **Yes**	
EDGE TYPE INITIAL OFFSET [v3]		Element is: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter value? ***None.***

References: 7.7.47		Other: ***None.***
T.20.48	Same as Model Profile: **Yes**	
SYMBOL LIBRARY INDEX [v3] References: 7.7.48 9.5.4.2 T.16.23		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Every referenced index shall refer to an entry in the SYMBOL LIBRARY LIST (see T.16.23). Other: ***This element is prohibited because SYMBOL LIBRARY LIST is prohibited.***
T.20.49	Same as Model Profile: **Yes**	
SYMBOL COLOUR [v3] References: 7.7.49 9.5.4.1 T.14.1		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; The *symbol colour specifier* parameter shall follow the rules for colour, clause 9.5.4.1 and T.14.1. Any restrictions on the parameter value? Other: ***This element is prohibited because SYMBOL LIBRARY LIST is prohibited.***

T.16.23 D.4.6.21		
T.20.50	Same as Model Profile: **Yes**	
SYMBOL SIZE [v3] References: 7.7.50 T.16.23		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Is value zero is allowed: (yes/no) If yes, specify its meaning. Any restrictions on the parameter value? Other: ***This element is prohibited because SYMBOL LIBRARY LIST is prohibited.***
T.20.51	Same as Model Profile: **Yes**	
SYMBOL ORIENTATION [v3] References: 7.7.51 T.16.23 D.4.6		Element is: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on rotation? Any restrictions on skewing? Any restrictions on mirroring? Any restrictions on distortion of aspect ratio? Other: ***This element is prohibited because SYMBOL LIBRARY LIST is prohibited***.

6.10. Escape Elements 

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.21.1	Same as Model Profile: **No**;	
ESCAPE [v1] References: 7.8.1	Element: Required **No**; Permitted **Yes**; Prohibited **No**; List all registered ESCAPEs that are allowed: • ***ESCAPE 22, Transparent Cell Colour [v1/v2] metafiles only.*** • ***ESCAPE 45, Alpha Transparency: The SDR parameter is encoded as a real value between 0.0 and 1.0, inclusively, and applies to all subsequent graphical primitives.*** List all profile-defined ESCAPEs that are allowed and attach complete description: Other: ***All ESCAPE element parameters shall be encoded as SDRs*** NOTE: Only registered ESCAPEs and profile-defined ESCAPEs shall be allowed in profiles.	Element: Required **No**; Permitted **Yes**; Prohibited **No**; List all registered ESCAPEs that are allowed: ***ESCAPE 22, Transparent Cell Colour [v1/v2] metafiles only***. List all profile-defined ESCAPEs that are allowed and attach complete description: ***None.*** Other: ***None***

6.11 External Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.22.1	Same as Model Profile: **No**	
MESSAGE [v1]	Element: Required **No**; Permitted **No**; Prohibited **Yes**;	Element: Required **No**; Permitted **Yes**; Prohibited **No**;

References: 7.9.1	Values of the *action required flag* parameter: • 'action' Permitted **No**; Prohibited **No**; (if permitted, specify the messages and actions taken) • 'no action' Permitted **No**; Prohibited **No**; Any restrictions on the length of the message string, other than those for type SF parameter? Other: ***None.***	Values of the *action required flag* parameter: • 'action' Permitted **No**; Prohibited **Yes**; (if permitted, specify the messages and actions taken) • 'no action' Permitted **Yes**; Prohibited **No**; Any restrictions on the length of the message string, other than those for SF parameter? ***None.*** Other: ***None.***
T.22.2	Same as Model Profile: **No**	
APPLICATION DATA [v1] References: 7.9.2	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Attach a syntactic and semantic description of all application data elements associated with this profile. Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; The use of this element shall not be restricted. Attach a syntactic and semantic description of all application data elements associated with this profile. Other: ***None.***

6.12 Segment Elements

Element	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.23.1	Same as Model Profile: **No**	

COPY SEGMENT [v2] References: 7.10.1 D.4.9.2	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Every segment identifier shall refer to a defined segment. Any limits on the segment transformation application value? Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Every segment identifier shall refer to a defined segment. Any limits on the segment transformation application value? ***None.*** Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? ***Non-singular.*** Other: *None.*
T.23.2	Same as Model Profile: **No**	
INHERITANCE FILTER [v2] References: 7.10.2	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any limits on the filter selection list? Any limits on the selection setting? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the filter selection list? ***None.*** An limits on the selection setting? ***None.*** Other: ***None.***
T.23.3	Same as Model Profile: **No**	
CLIP INHERITANCE [v2] References:	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any limits on the parameter? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any limits on the parameter? ***None.*** Other: ***None.***

7.10.3 D.4.9.2		
T.23.4	Same as Model Profile: **No**	
SEGMENT TRANS-FORMATION [v2] References: 7.10.4	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? ***Non-singular.*** Other: ***None.***
T.23.5	Same as Model Profile: **No**	
SEGMENT HIGHLIGHTING [v2] References: 7.10.5	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter values? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.23.6	Same as Model Profile: **No**	
SEGMENT DISPLAY PRIORITY [v2]	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter values? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***None.*** Other: ***None.***

References: 7.10.6		
T.23.7	Same as Model Profile: **No**	
SEGMENT PICK PRIORITY [v2] References: 7.10.7	Element: Required **No**; Permitted **No**; Prohibited **Yes**; Any restrictions on the parameter values? Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Any restrictions on the parameter values? ***None.*** Other: ***None.***

6.13 Application Structure Descriptor Elements

Functionality	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.24.1	Same as Model Profile: **No**	
APPLICATION STRUCTURE ATTRIBUTE [v4] References: 6.9 6.13.5	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Define the set of structure elements for use within application structures, and attach complete syntactic and semantic description: ***The set of attributes allowed is listed in Section 3 and are defined according to application structure type.*** Other: ***None.***	Element: Required **No**; Permitted **Yes**; Prohibited **No**; Define the set of structure elements for use within application structures, and attach complete syntactic and semantic description: ***None.*** Other: ***None.***

7.9.2 7.1.1		

6.14 Generator Implementation Requirements 

Functionality	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.25.1	Same as Model Profile: **Yes**	
Colour requirements References: 9.5.4.1 9.5.6.2.2		Colour mapping is: Permitted **Yes**; Prohibited **No**; Reduction of the number of colours? ***Not specified.*** ***NOTE - If mapping of application colours to metafile colour specifications is required, it is recommended that colour distance in the mapping be computed by the Euclidean metric in CIEXYZ space.*** Definition of mapping algorithms, metrics, and colour space? ***No specific colour mapping techniques or selection of metafile colour sets are defined.*** For [v1/2] metafiles, implicit colour calibration specifications? ***No specifications are defined.*** Other: ***None.***
T.25.2	Same as Model Profile: **Yes**	

Geometric accuracy and latitude References: 9.5.6.2.1		Accuracy and latitude for mapping application graphics to CGM graphical primitive elements: Accuracy and latitude for mapping application graphics to CGM graphical primitive elements: ***Generators shall produce a metafile whose graphical primitive elements match the application graphical primitives accurately to within ±0.1% of relative position within the VDC Extent box or ±1/2 pixel of the intended size, whichever is greater. Generators shall produce geometric size aspects of the primitives (e.g., text size, line width, and edge width) to within 1% of the intended size or ±1/2 pixel of the intended size, whichever is greater.*** ***This requirement shall apply to all graphical primitive elements, unless superseded by specific element requirements in this clause.***
T.25.3	Same as Model Profile: **Yes**	
Text accuracy and latitude References: 9.5.6.2.3		Is text accuracy and latitude addressed? (yes/no) ***Yes***. If yes, specify. ***Metafile text specifications shall match the text of the application picture to within ±1% of relative to the intended size or ±1/2 pixel of the intended size, whichever is greater, for the placement and overall extent of each text string.***
T.25.4	Same as Model Profile: **No**	
Font substitution References:	Font substitution is: Permitted **Yes**; Prohibited **No**; Similarity of font visual characteristics? ***Substituted fonts shall be metrically equivalent or be controlled by the RESTRICTED TEXT element.***	Font substitution is: Permitted **Yes**; Prohibited **No**; Similarity of font visual characteristics? ***Substituted fonts shall have similar visual characteristics (e.g., posture, weight, proportionate width).***

9.5.6.2.4 I.2	Font metrics? ***Specified in ISO/IEC 8632:1999 Annex I for the core 13 fonts.*** Individual glyph metrics? ***Specified in ISO/IEC 8632:1999 Annex I for the core 13 fonts.*** Other: ***None.***	Font metrics? ***Specified in clause I.2.*** Individual glyph metrics? ***Specified in clause I.2.*** Other: ***None.***
T.25.5	Same as Model Profile: **Yes**	
Preservation of primitives References: 9.5.6.3		Is preservation of graphical primitive elements addressed? (yes/no) ***No.*** If yes, specify allowable substitutions.
T.25.6	Same as Model Profile: **No**	
Semantic latitude References: 9.5.6.4	Drawing priority and mode: ***Priority shall correspond to the metafile order (i.e., primitives occurring later in the file shall overlay primitives occurring earliest in the file). Mode shall be "replacement" mode.*** Clipping: ***Clipping shall be to the intersection of the clip rectangle, the VDC EXTENT, the device viewport, and the device view surface limits.*** Edge centreing: ***Edges shall be centred on the ideal mathematically-defined edge of the area*** Meaning of predefined line types and edge types: ***See Section 6.17 about specific and generic line types.***	Drawing priority and mode: ***Priority shall correspond to the metafile order (i.e., primitives occurring later in the file shall overlay primitives occurring earliest in the file). Mode shall be "replacement" mode.*** Clipping: ***Clipping shall be to the intersection of the clip rectangle, the VDC EXTENT, the device viewport, and the device view surface limits.*** Edge centreing: ***Edges shall be centred on the ideal mathematically-defined edge of the area.*** Meaning of predefined line types and edge types: ***The exact on-off definitions for the predefined line types and edge types are not specified.***

	Meaning of predefined hatch styles: ***See Section 6.18 about specific and generic hatch styles.*** Other: ***None.***	Meaning of predefined hatch styles:***The inter-line spacing is not specified. Use the latitudes of annex D.4.6.16 for the angular directions.*** Other: ***None.***
T.25.7	Same as Model Profile: **Yes**	
Error processing References: 9.5.6.5		Is error processing addressed? (yes/no) ***No.*** If yes, specify the action taken. Classification of error severity? Requirements for error recovery? Requirements for error reporting? Additional areas? Other: ***None.***
T.25.8	Same as Model Profile: **Yes**	
Reporting References: 9.5.6.6		Is reporting required? (yes/no) ***No.*** If yes, specify the action taken. Method and format of the reporting? Requirement to report substitution, error, fallback behavior, mappings, or other behaviors? Additional areas?

		Other: ***None.***
T.25.9	Same as Model Profile: **Yes**	
Degeneracies References: 9.5.6.7 9.5.4.4 D.2 D.4		Is the generation of degenerate primitives addressed? (yes/no) ***No. The generation of degenerate primitives is not restricted.*** If yes, attach specifications. Other: ***None.***

6.15 Interpreter Implementation Requirements

Functionality	Specifications - WebCGM 2.0 Profile	Specifications - Model Profile
T.26.1	Same as Model Profile: **Yes**	
Number of pictures References: 9.5.7.2 T.13.2		If 0 pictures are permitted (see T.13.2), describe the interpreter behavior: ***Prohibited by T.13.2.***
T.26.2	Same as Model Profile: **Yes**	
Empty pictures		If permitted (see T.13.3), interpreter behavior:

References: 9.5.7.3 T.13.3		***The graphical effect shall be one picture in the background colour.***
T.26.3	Same as Model Profile: **Yes**	
Colour requirements References: 9.5.4.1 9.5.7.4.2 9.5.4.5		Interpreters shall be classified as either monochrome, greyscale, or colour interpreters (depending on the colour capability of the interpreter), and shall meet the criteria in attachment 26.3 ***Conversions between different colour models shall be according to the conversions in annex G.*** Mapping of metafile colour to device components? ***If mapping (to fewer colour, or greyscale, or monochrome) is required for RGB metafiles, the recommendations of annex D.3.2 shall be used.*** For [v1/2] metafiles, implicit colour calibration specifications? ***No specifications are defined.*** Other: ***None.***
T.26.4	Same as Model Profile: **Yes**	
Geometric accuracy and latitude References:		Accuracy and latitude for placement and realization of geometric aspects when geometric primitive elements are rendered. ***Interpreters shall render graphical primitive elements***

9.5.7.4.1		***accurately to within ± 0.1% of relative position within the VDC Extent box or ±1/2 of the pixel resolution of the output device, whichever is greater. Interpreters shall render the geometric size aspect of primitives (e.g., text size, line width, and edge width) to within 1% of the intended size or ±1/2 pixel of resolution of the output device, whichever is greater.*** This requirement shall apply to all graphical primitive elements, unless superseded by specific element requirements in this clause.
T.26.5	Same as Model Profile: **Yes**	
Text rendering References: 9.5.7.4.3		Is text accuracy and latitude addressed? (yes/no) ***Yes.*** If yes, specify. ***Interpreter-rendered text shall match the text specification of the metafile to within 1% relative to the intended size or ±1/2 pixel of resolution of the output device, whichever is greater, for the placement and overall extent of each text string.*** Is precision of text rendering is addressed? (yes/no) ***Yes.*** If yes, specify interpreter action. ***Interpreters shall render text using 'stroke' precision, regardless of the actual value of the TEXT PRECISION of the metafile.***
T.26.6	Same as Model Profile: **No**	
Font substitution	Font substitution is: Permitted **Yes**; Prohibited	Font substitution is: Permitted **Yes**; Prohibited

References: T.16.13 9.5.7.4.4 annex I.2	**No**; If prohibited, use the font as specified in the FONT LIST. If permitted, include a reference set of font and glyph metrics which correspond to the canonical instances of the substitutable font. See the FONT LIST element and annex I CGM:1999. Are substitution methods, latitudes, and constraints addressed? (yes/no) **No** If yes, specify: Similarity of font visual characteristics? ***Substituted fonts shall be metrically equivalent or be controlled by the RESTRICTED TEXT element.*** Font metrics? Substituted fonts shall have similar metrics to the fonts specified in the metafile. Individual glyph metrics? Specified in ISO/IEC 8632:1999 Annex I for the core thirteen fonts. Additional areas? None. Other: ***None.***	**No**; If prohibited, use the font as specified in the FONT LIST. If permitted, include a reference set of font and glyph metrics which correspond to the canonical instances of the substitutable font. ***See the FONT LIST element and I.2.*** Are substitution methods, latitudes, and constraints addressed? (yes/no) ***Yes.*** If yes, specify: Similarity of font visual characteristics? ***Substituted fonts shall have similar visual characteristics to the fonts specified in the metafile*** Font metrics? ***Substituted fonts shall have similar metrics to the fonts specified in the metafile.*** Individual glyph metrics? ***As specified in annex I.2.*** Additional areas? ***None.*** Other: ***None.***
T.26.7	Same as Model Profile: **No**	
Semantic latitude	Drawing priority and mode: ***Priority shall***	Drawing priority and mode: ***Priority shall***

References:	***correspond to the metafile order (i.e., primitives occurring later in the file shall overlay primitives occurring earliest in the file. Mode shall be "replacement" mode.)***	***correspond to the metafile order (i.e., primitives occurring later in the file shall overlay primitives occurring earliest in the file. Mode shall be "replacement" mode.)***
9.5.7.5		
T.20.37	View surface clearing at picture start: ***Surface will be cleared upon the occurrence of BEGIN PICTURE BODY, except as specified elsewhere in this profile.***	View surface clearing at picture start: ***Surface will be cleared upon the occurrence of BEGIN PICTURE BODY.***
T.20.38		
T.20.39	Clipping: ***When CLIP INDICATOR is 'off', clipping shall be to the intersection of the device viewport and the device view surface limits. When CLIP INDICATOR is 'on', clipping shall be to the intersection of the clip rectangle, the VDC EXTENT, the device viewport, and the device view surface limits***	Clipping: ***When CLIP INDICATOR is 'off', clipping shall be to the intersection of the device viewport and the device view surface limits. When CLIP INDICATOR is 'on', clipping shall be to the intersection of the clip rectangle, the VDC EXTENT, the device viewport, and the device view surface limits.***
T.20.42		
T.20.44	Edge centreing: ***Edges shall be centred on the ideal mathematically-defined edge of the area.***	Edge centering: ***Edges shall be centred on the ideal mathematically-defined edge of the area.***
T.20.45		
T.20.46	Meaning of predefined line types and edge types: ***See Section 6.17 about specific and generic line types.***	Meaning of predefined line types and edge types: ***The exact on-off definitions for the predefined line types and edge types are not specified.***
	Meaning of predefined hatch styles: ***See Section 6.18 about specific and generic hatch styles.***	Meaning of predefined hatch styles: ***The inter-line spacing is not specified. Use the latitudes of annex D.4.6.16 for the angular directions.***
	In the absence of a LINE/MARKER/TEXT/EDGE CLIPPING MODE element, the interpreter treatment of LINE/MARKER/TEXT/EDGE CLIPPING MODE shall be:	In the absence of a LINE/MARKER/TEXT/EDGE CLIPPING MODE element, the interpreter treatment of LINE/MARKER/TEXT/EDGE CLIPPING MODE shall be (check one):
	In the style of one specific parameter value, from the set of standardized values. **YES.** Specify	In the style of one specific parameter value, from the set of standardized values. **NO.** Specify which

which one: **SHAPE** In the style of any of the specific parameter values, from the set of standardized values. **NO** For [v1/v2] metafiles, text restriction method for RESTRICTED TEXT elements, chosen from the set of standard and registered styles of the RESTRICTED TEXT TYPE element: ***Value 2.*** For [v1/2] metafiles, interpreter treatment of the 2 aspects of line cap shall be either: • in the style of one specific parameter value pair from the set of standard and registered values (excluding values 1) of the LINE CAP element. **No** Values = ? • in the style of any parameter value pair from the set of standard and registered values (excluding values 1) of the LINE CAP element. **Yes** For [v1/2] metafiles, interpreter treatment of the 2 aspects of edge cap shall be either: • in the style of one specific parameter value pair, from the set of standard and registered values (excluding values 1) of the EDGE CAP element. **No** Values = ? • in the style of any parameter value pair, from the set of standard and registered values (excluding values 1) of the EDGE CAP element. **Yes** For [v1/2] metafiles, interpreter treatment of line join shall be either:	one: In the style of any of the specific parameter values, from the set of standardized values. **YES** For [v1/v2] metafiles, text restriction method for RESTRICTED TEXT elements, chosen from the set of standard and registered styles of the RESTRICTED TEXT TYPE element: ***Value 2.*** For [v1/2] metafiles, interpreter treatment of the 2 aspects of line cap shall be either: • in the style of one specific parameter value pair from the set of standard and registered values (excluding values 1) of the LINE CAP element. **No** Values = ? • in the style of any parameter value pair from the set of standard and registered values (excluding values 1) of the LINE CAP element. **Yes** For [v1/2] metafiles, interpreter treatment of the 2 aspects of edge cap shall be either: • in the style of one specific parameter value pair, from the set of standard and registered values (excluding values 1) of the EDGE CAP element. **No** Values = ? • in the style of any parameter value pair, from the set of standard and registered values (excluding values 1) of the EDGE CAP element. **Yes** For [v1/2] metafiles, interpreter treatment of line join shall be either:

- in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the LINE JOIN element. **No** Value = ?
- in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the LINE JOIN element. **Yes**

For [v1/2] metafiles, interpreter treatment of edge join shall be either:

- in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the EDGE JOIN element. **No** Value = ?
- in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the EDGE JOIN element. **Yes**

For [v1/2] metafiles, interpreter treatment of line type continuation shall be either:

- in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the LINE TYPE CONTINUATION element. **No** Value = ?
- in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the LINE TYPE CONTINUATION element. **Yes**

For [v1/2] metafiles, interpreter treatment of edge type continuation shall be either:

- in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the LINE JOIN element. **No** Value = ?
- in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the LINE JOIN element. **Yes**

For [v1/2] metafiles, interpreter treatment of edge join shall be either:

- in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the EDGE JOIN element. **No** Value = ?
- in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the EDGE JOIN element. **Yes**

For [v1/2] metafiles, interpreter treatment of line type continuation shall be either:

- **No**; in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the LINE TYPE CONTINUATION element. Value = ?
- **Yes**; in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the LINE TYPE CONTINUATION element.

For [v1/2] metafiles, interpreter treatment of edge type continuation shall be either:

	• in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the EDGE TYPE CONTINUATION element. **No** Value = ? • in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the EDGE TYPE CONTINUATION element. **Yes** Other: ***None.***	• in the style of one specific parameter value, from the set of standard and registered values (excluding value 1) of the EDGE TYPE CONTINUATION element. **No** Value = ? • in the style of any parameter value, from the set of standard and registered values (excluding value 1) of the EDGE TYPE CONTINUATION element. **Yes** Other: ***None.***
T.26.8	Same as Model Profile: **Yes**	
Error processing References: 9.5.7.6		Is error processing addressed? (yes/no) ***No.*** If yes, specify the action taken. Classification of error severity? Requirements for error recovery? Requirements for error reporting? Additional areas? Other: ***None.***
T.26.9	Same as Model Profile: **Yes**	
Reporting References: 9.5.7.7		Is reporting required? (yes/no) ***No.*** If yes, specify the action taken. Method and format of the reporting?

		Requirement to report any substitution, error, fallback behavior, mappings, or other behaviors? Additional areas? Other: ***None.***
T.26.10	Same as Model Profile: **Yes**	
Degeneracies References: 9.5.7.8 9.5.4.4 D.2 D.4		Is the interpretation of degenerate primitives addressed? (yes/no) ***Yes.*** If yes, for each primitive, specify the degeneracy including its source (i.e., intrinsic or computational). ***Intrinsically degenerate primitives shall be rendered as specified in annex D subsections: D.2.2, D.2.3, D.4.5.4 through D.4.5.8, D.4.5.11, and D.4.5.12. Interpreters are not required to detect computational degeneracy. If interpreters do detect computational degeneracies, they shall be rendered as specified in annex D subsections: D.2.2, D.2.3, D.4.5.4 through D.4.5.8, D.4.5.11, and D.4.5.12*** Other: ***None.***
T.26.11	Same as Model Profile: **Yes**	
Transparency References: 7.5.3		If Transparency permitted specify interpreter behavior: ***Interpreters shall implement the AUXILIARY COLOUR and TRANSPARENCY elements as described in the 2nd and 3rd***

7.5.4 T.18.4		***paragraphs of the description in 7.5.4.***
T.26.12	Same as Model Profile: **No**	
INTERPRETATION OF STRUCTURES AND DIRECTORIES [v4] References: 7.2.18 7.3.24 7.4.20 9.5.7.10	Any requirements on the interpretation of the application structures ? ***Interpreters shall produce the correct graphical results.*** Is application meaning associated with application structures ? yes/no ***Yes.*** If yes, specify the interpreter action or actions for each type of structure. ***Viewer behavior for application structures is specified in 3.2.1.1, 3.2.1.2, 3.2.1.3, 3.2.1.4, and 3.2.1.5.*** Other: ***None.***	Any requirements on the interpretation of the application structures ? ***Interpreters shall produce the correct graphical results.*** Is application meaning associated with application structures ? yes/no ***No.*** If yes, specify the interpreter action or actions for each type of structure. Other: ***None.***

Attachment 26.3

Colour requirements, Model Profile:

The colour mapping step (CMS) and colour rendering step (CRS) for each class of interpreters is as follows:

- monochrome:
  CMS
  all foreground information is mapped to one colour, background information to another colour.

CRS
: all foreground information is mapped to one colour, background information to another colour.

- grayscale:
  CMS
  : 32 gray levels, the recommendations of annex D.3.2 is used to map colour to gray.
  CRS
  : a unique representation of each of the levels of gray.
- full colour:
  CMS
  : 5R,9G,5B grid of RGB colour cube, plus a 32 gray levels (0-1), some of which are already on the grid.
  CRS
  : a unique representation of the 254 (255) "colours".

6.16 Binary Encoding Rules

6.16.1 Delimiter Elements

6.16.2 Metafile Descriptor Elements

6.16.3 Control Elements

6.16 Symbol Library

Note. The symbol library functionality of WebCGM 1.0 is removed from WebCGM 2.0.

6.17 Line and Edge Style Definitions

WebCGM supports both generic, but imprecise line types, and specific, precise line types. The realizations of line types 1..5 are described in general terms in the CGM standard (e.g., "dash-dot-dot"), and the realizations and constraints of the registered line types 6..15 are described in the ISO Register of Graphical Items (e.g., requirements for inking vertexes in certain engineering line types). Otherwise, the exact line patterns of implicit line types 1..15 are unconstrained. Where exact realizations of line types are expected and required, the LINE AND EDGE TYPE DEFINITION element should be used.

6.18 Hatch Style Definitions

WebCGM supports both generic, but imprecise hatch styles, and specific, precise hatch styles. The realizations of hatch styles 1..6 are described in general terms in the CGM standard. Otherwise, the exact hatch patterns of implicit hatch styles 1..6 are unconstrained. Where exact realizations of hatch styles are expected and required, the HATCH STYLE DEFINITION element should be used.

6.19 JPEG Compression within the Tile Element

This profile allows the use of JPEG restricted to the TILE element. The method is limited to BASELINE JPEG. BASELINE JPEG conforms to the process required for all DCT-based decoders. The colour selection mode of the TILE element shall always be direct, independent of the COLOUR SELECTION MODE in effect in the CGM. The cell colour precision parameter of the TILE shall always be 8-bit for BASELINE JPEG. The COLOUR model of the TILE element shall be defined in the method specific parameters element of the TILE. It can be the same or independent of the COLOUR MODEL of the CGM. BASELINE JPEG shall assume that the order of the spectral bands is the same order given by the colour model as defined by the method specific parameters. For example, if the model is RGB, each scan will compress the red component, followed by the green component, followed by the blue component. For the case where the colour model is "RGB related", the specific colour model shall be defined in the method specific parameters of the TILE element. The method specific parameters shall be present for each image compressed using BASELINE JPEG. The parameters shall be encoded as an SDR. The JPEG colour model parameter is required and is specified according to the rules of the INDEX PRECISION element. Valid values are:

- 0 - JPEG colour model is the same as the COLOUR MODEL of the CGM.
- 1 - RGB
- 2 - CIELAB
- 3 - CIELUV
- 4 - CMYK
- 5 - RGB related

Values outside the range of 0-5 are not allowed. The JPEG colour submodel is required only when the JPEG colour model is "RGB related" and is specified according to the rules of the INDEX PRECISION ELEMENT. Valid values are:

- 0 - YCbCr
- 1 - YCrCb
- 2 - YUV
- 3 - YIQ
- 4 - YES
- 5 - ADT

Other values are not allowed.

Back to top of chapter