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AMENDMENT 1
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Information technology — Computer graphics — Metafile for the storage and transfer of picture description information —

Part 1: Functional specification

AMENDMENT 1: Rules for profiles

Technologies de l'information — Infographie — Métafichier de stockage et de transfert des informations de description d'images —

Partie 1: Description fonctionnelle

AMENDEMENT 1: Règles pour profils

Reference number
ISO/IEC 8632-1:1992/Amd.1:1994(E)

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Information technology — Computer graphics — Metafile for the storage and transfer of picture description information —

Part 1:
Functional specification

AMENDMENT 1: Rules for profiles

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Replace clause 7 in the Contents by:

Page 2

Clause 2: Add the following to the list of references:

"ISO 8601:1988 *Data elements and interchange formats — Information interchange - Representation of dates and time.*

ISO 8859-1:1987 *Information processing — 8-bit single-byte coded graphic character sets - Latin alphabet No. 1.*

ISO/IEC TR 10000-1:1992 *Information technology — Framework and taxonomy of International Standardized Profiles - Part 1: Framework.*

ISO/IEC TR 10000-2:1992 *Information technology — Framework and taxonomy of International Standardized Profiles - Part 2: Taxonomy of profiles.*"

Page 4

Clause 3.1: Add the following to the list of definitions:

"3.1.99 **colour device:** A device which offers more than two colours.

3.1.100 **grey-scale device:** A special case of colour device where hue and saturation are the same for all colours (generally saturation = 0).

3.1.101 **geometric degeneracy:** The degeneracy is intrinsic to the parameterization of the element. A degeneracy which results when parameterization for the geometry does not provide sufficient information to draw the intended primitive.

3.1.102 **interoperability:** The generator and the interpreter have the same understanding of the encodings, the syntax, and the semantics of the metafile.

3.1.103 **monochrome device:** A device which has only two colours, a foreground and a background colour. The background colour is the colour of the display surface after it has been cleared.

3.1.104 **Profile Proforma (PPF):** A template consisting of profile specifications, which is used by writers of profiles for generating instances of a profile. A completed PPF specifies the rules and options of a profile of ISO/IEC 8632."

Page 9

Clause 3.2: Add the following to the list of abbreviations:

"ISP International Standardized Profile
PPF Profile Proforma"

Page 232

Replace Clause 7 with the following new clause.

"7 Profiles and conformance

7.1 Introduction

7.1.1 Objectives

This clause provides rules for defining valid profiles of ISO/IEC 8632. Profiles are used as a method for defining subsets of ISO/IEC 8632 by identifying the CGM elements, parameters, options, and implementation requirements necessary for meeting a particular set of requirements.

The primary objectives of the profile rules are:

a) to promote interoperability by minimizing arbitrary subsets of ISO/IEC 8632;

b) to provide the framework for developing profiles;

c) to promote uniformity in the development of conformance tests;

d) to supplement ISO/IEC TR10000 for International Standardized Profiles (ISPs) for the CGM standard;

e) to provide a basis for evaluating profiles as potential ISPs.

7.1.2 Scope

This clause:

a) defines the concept of profiles of ISO/IEC 8632;

b) provides rules for defining profiles of ISO/IEC 8632;

c) provides conformance criteria for profiles of ISO/IEC 8632;

d) provides conformance criteria for metafiles, metafile generators, and metafile interpreters;

e) defines criteria on which to evaluate profiles of ISO/IEC 8632;

f) provides a Profile Proforma (PPF) and Model Profile.

This clause addresses the CGM data stream and implementation requirements. Implementation requirements address the latitude allowed by CGM generators and interpreters. This clause does not directly address the environmental, performance, or resource requirements of the generator or interpreter.

This clause does not define the application requirements or dictate application functional content of a profile — the latter is the purview of application constituencies.

The scope of this clause is limited to rules for valid profiles for open interchange of graphical picture metafiles.

7.1.3 Concept and purpose of profiles for CGM

A major goal of ISO/IEC 8632 is to facilitate the transfer of picture information between computers, sites, and applications.

Profiles provide a means to:

a) improve interoperability between implementations by inhibiting the proliferation of private subsets of ISO/IEC 8632;

b) provide a foundation for testing and promote uniformity of conformance tests;

c) enhance the availability of consistent implementations of profiles.

A profile of ISO/IEC 8632 defines the options, elements, and parameters of ISO/IEC 8632 necessary to accomplish a particular function and maximize the probability of interchange between systems

implementing the profile. Profiles are defined by application constituencies who agree to adhere to the same subset of CGM for the purpose of graphical data interchange using ISO/IEC 8632. Alternatively, profiles of ISO/IEC 8632 may be part of a set of interrelated standards and profiles assembled for the purpose of accomplishing a larger functional purpose.

A profile may:

d) give the meaning of implementation dependent semantics of some elements;

e) enforce common resolution of ambiguous semantics of ISO/IEC 8632;

f) ensure that identical use of identical elements and parameter values has the same meaning;

g) specify subsets or groupings of registered items from the appropriate ISO/IEC registers;

h) prohibit undefined or ill-defined elements or parameter values.

A profile of ISO/IEC 8632, according to the taxonomy of ISO/IEC TR10000-2, is an FCG Profile, that is, an interchange format and representation profile of CGM.

A profile of ISO/IEC 8632 shall not specify any requirement that would contradict or cause non-conformance to ISO/IEC 8632. Any metafile conforming to a profile of ISO/IEC 8632 conforms to ISO/IEC 8632.

Profiles address metafile requirements, as well as implementation requirements for metafile generators and metafile interpreters. Profiles define maximum requirements for generators and minimum requirements for interpreters.

7.1.4 Purpose of the Model Profile

The Model Profile serves two purposes:

1) It is a usable, implementable instance of a profile of ISO/IEC 8632. It is the only instance contained in ISO/IEC 8632. While it is designed to be implementable on a range of systems, it is also designed with modest limits that will not preclude its implementation in limited environments (low to mid-range computing systems). The Model Profile may not be suitable for application communities with more advanced and demanding requirements.

2) It is a guide to writing profiles. As an instance of a profile, the Model Profile is a starting point from which an application-specific profile should be defined, for those application communities for which the Model Profile itself does not suffice. Writers of profiles should consider each of the specifications of the Model Profile and either accept the specifications where they are adequate, or modify them when not.

7.2 Conformance

7.2.1 Conformance of profiles

A profile of ISO/IEC 8632

a) shall meet all requirements specified in ISO/IEC 8632;

b) shall be structured in accordance with the structural components and presentation rules defined in 7.4;

c) shall not specify any requirements that would contradict or cause non-conformance to ISO/IEC 8632;

d) may contain a conformance clause that adds requirements that are more specific and limited in scope than ISO/IEC 8632;

e) shall meet the conformance requirements for a FCG Profile as defined in ISO/IEC TR10000-1;

f) shall meet all the specific rules in this clause.

7.2.2 Conformance of metafiles

Conformance of metafiles to ISO/IEC 8632 is defined in terms of conformance to profiles. A metafile conforms to ISO/IEC 8632 if it conforms to a profile.

In order to conform to a profile of ISO/IEC 8632, a metafile

a) shall be a syntactically correct metafile for a specific version;

b) shall conform to all profile requirements defined for that version.

A metafile is a syntactically correct version of ISO/IEC 8632 if the following conditions are met.

c) The metafile contains exactly one correct METAFILE VERSION element.

d) All graphical elements contained therein match the functional specification of the corresponding elements of ISO/IEC 8632-1 for that version. The metafile shall obey the relationships defined in the formal grammar for that version, the state tables, and all other syntactic requirements for that version.

e) The sequence of elements in the metafile obeys the relationships specified in ISO/IEC 8632-1 for that version, producing the structure specified in ISO/IEC 8632-1. For example, the metafile must begin with BEGIN METAFILE and end with END METAFILE, and include exactly one metafile descriptor at the beginning which contains at least all the required elements.

f) No elements appear in the metafile other than those specified in ISO/IEC 8632-1 for that version, unless required for the encoding technique. All non-standardized elements are encoded using the ESCAPE or GDP elements or the external elements APPLICATION DATA and MESSAGE.

g) The metafile is encoded according to the rules in one of the standardized encodings specified in ISO/IEC 8632-2, ISO/IEC 8632-3, or ISO/IEC 8632-4.

7.2.3 Conformance of metafile generators

Conformance of metafile generators is defined in terms of conformance to a particular profile of CGM.

If ***P*** is a profile of CGM which conforms to the rules of this clause, then a metafile generator is a conforming ***P*** generator if it:

a) generates only metafiles which conform to the requirements of profile ***P*** or is directed to operate in a mode where only such metafiles can be generated;

b) maps the graphical characteristics of the pictures onto a set of CGM elements which define those pictures within the accuracy and latitude defined by the Generator Implementation Requirements in the profile ***P***.

A metafile generator which conforms to the Model Profile for a specific version, shall:

c) generate no syntax in violation of that version of ISO/IEC 8632;

d) generate metafiles which conform to that version of the Model Profile;

e) map the graphical characteristics of application pictures onto a set of CGM elements which define those pictures within the latitude allowed by the Generator Implementation Requirements of the Model Profile.

7.2.4 Conformance of metafile interpreters

Conformance of metafile interpreters is defined in terms of conformance to a particular profile of CGM.

If ***P*** is a profile of CGM which conforms to the rules of this clause, then a metafile interpreter is a conforming ***P*** interpreter if it:

a) is able to read any metafile which conforms to the requirements of profile ***P***;

b) renders the graphical characteristics of the CGM elements in any such metafile into a graphical image or picture within the accuracy and latitude defined by the Interpreter Implementation Requirements in the profile ***P***.

A metafile interpreter which conforms to the Model Profile for a specific version, shall:

c) be able to read any metafile which conforms to that version of the Model Profile of ISO/IEC 8632;

d) render the graphical characteristics of the CGM elements in any such metafile into a graphical image or picture within the latitude defined by the Interpreter Implementation Requirements of the Model Profile.

7.3 Criteria for designing profiles

The following criteria provide the means for determining the appropriateness and correctness of proposed profiles. The objective is to limit the proliferation of profiles and ensure the quality of those profiles.

7.3.1 Criteria on the profile in its entirety

The following criteria shall be applied to a proposed profile.

a) The application constituency and functional purpose of a proposed profile shall be well defined.

b) The functional purpose of a proposed profile shall not be satisfied by an existing profile. If the functional purpose of a proposed profile can be satisfied by a derivative of an existing profile, it shall be so defined — significant subsets shall not be replicated.

c) The proposed profile shall meet the identified functional requirements.

7.3.2 Criteria for the technical content of the profile

The following criteria shall be applied to the technical content of a proposed profile.

a) A proposed profile shall not specify requirements that violate ISO/IEC 8632.

b) A proposed profile shall place requirements on the CGM and not on the internal behaviour, structure, or performance of implementations (e.g., generators and interpreters).

c) A proposed profile may contain requirements on the functional and graphical characteristics of implementations claiming conformance to the profile.

d) A proposed profile shall be consistent in its requirements regarding CGM elements and parameters. For example, if a profile places no restrictions on the number of indexes defined by the CHARACTER SET LIST element, then it is inconsistent to place a restriction on CHARACTER SET INDEX.

e) A proposed profile shall not specify requirements which are conflicting, unnecessary, or redundant.

7.4 Form and format of a profile

A profile of ISO/IEC 8632 shall contain the following components:

a) a concise definition of the scope and purpose of the profile;

b) a scenario illustrating the profile's use and applicability;

c) all references to ISO/IEC 8632, i.e., approved amendments, errata, and registers.

d) references to any other relevant source documents;

e) specification of the set of elements, parameters, implementation requirements, and features of ISO/IEC 8632, presented in the format and according to the rules of 7.5.

f) a definintion of conformance of metafiles and implementations to the profile.

The content and layout of the profile shall conform to the *Rules for Drafting and Presentation of International Standardized Profiles* in annex A of ISO/IEC TR10000-1.

7.5 Profile rules, proforma, and model profile

7.5.1 Overview

This clause presents:

a) rules for defining CGM profiles;

b) a Profile Proforma (PPF);

c) a definition of the Model Profile.

The PPF is a set of tables which are a template for writing profiles. Most of the profile rules are inherent in the structure of the PPF. For example, the PPF requires certain information to be completed — each such case is a statement, equivalent to the rule, "Profiles shall specify ...".

All CGM profiles shall include a completed PPF.

This clause contains the completed PPF of the Model Profile.

The following subcluases address

— General Principles which apply to all profiles.

— Metafile Rules, which apply to the general characteristics of a conforming metafile.

— Multi-element Rules, which apply to several elements.

— Individual Element Rules, which apply to the elements one by one. A rule is described for each element defined in clause 5. Each rule in this subclause specifies whether a profile must address the rule, whether a profile may optionally address the rule, or whether the profile shall not restrict the use of the element in any manner.

— Generator Implementation Requirements, which apply to the behaviour of CGM generator implementations.

— Interpreter Implementation Requirements, which apply to the behaviour of CGM interpreter implementations.

Rules which address encoding issues are described in parts 2, 3, and 4 of ISO/IEC 8632.

The PPF is presented in tabular form supplemented by descriptive material. The PPF template and the Model Profile are presented together.

7.5.2 General principles

7.5.2.1 Self-identification of profiles

It is required that the METAFILE DESCRIPTION element identify the profile, and its edition, to which the metafiles conform. The edition indicates the version or release date of the profile.

7.5.2.2 Source identification of profiles

The optional information of the PPF, for the METAFILE DESCRIPTION element, allows profiles to require that metafiles identify their source (e.g., vendor, product, product version).

7.5.2.3 Private encodings

The "encodings" item of the PPF effectively prohibits profiles from specifying private encodings.

7.5.2.4 Restrictions on grammar and state tables

In completing the PPF, profile writers may restrict the use of some elements by restricting the formal grammar or the state tables.

EXAMPLE — A profile may specify that segments are not allowed in Picture Body by either:

1) restricting the formal grammar:

Replace
<picture content> ::= <picture element> |
with
<picture content> ::= <picture element>.

2) modifying the state table:

Remove the "X" in the POS column of table 8 in "BEGIN SEGMENT".

3) making the statement:

Segments are not permitted to appear in the Picture Body.

7.5.2.5 Defining subsets

It is a principal role of profiles to define subsets of the options of ISO/IEC 8632. However, defining subsets of ISO/IEC 8632 shall not be arbitrary and shall have a clear connection to the achievement of one or more of the defined goals of the profile.

7.5.2.6 Metafile defaults

Clause 6 addresses all elements which have default values. While no profile can change these values, an equivalent effect may be achieved by use of the METAFILE DEFAULTS REPLACEMENT element. Profiles may require that a metafile contain a METAFILE DEFAULTS REPLACEMENT element with well-defined content.

For default values in clause 6 which are listed as "device dependent" or "interpreter dependent", if there is a element for setting the value of such an element, then profiles shall require the use of such elements. The appropriate element shall be included in the METAFILE DEFAULTS REPLACEMENT element or in the metafile body. For such elements, profiles shall not assign implicit defaults. These elements include:

For profiles of Version 2 (and above)
LINE REPRESENTATION
MARKER REPRESENTATION
TEXT REPRESENTATION
FILL REPRESENTATION
EDGE REPRESENTATION

Specifying the default value for elements which specify colour values shall be consistent with the rules for colour (see 7.5.4.1). Specifically, if all colours used within the metafile shall be defined, then the element for setting the colour value shall be used; otherwise, the element shall not be used. The elements affected by this rule are:

BACKGROUND COLOUR
COLOUR TABLE

When specified as a direct colour:
LINE COLOUR
MARKER COLOUR
TEXT COLOUR
FILL COLOUR
EDGE COLOUR

If no element exists to set the value, then the profile shall define the default values to be used. The elements affected by this rule, because they do not exist in Version 1 include:

For profiles of Version 1 (only)
LINE REPRESENTATION
MARKER REPRESENTATION
TEXT REPRESENTATION
FILL REPRESENTATION
EDGE REPRESENTATION

7.5.2.7 Restricting element values

In those cases where it is necessary to restrict an element to its default value in order to meet the goals of a profile, the restriction shall be achieved by allowing the element to appear in conforming files and restricting its value to the default rather than prohibiting the element.

NOTE — The implementation burden necessary to implement this guideline is small compared to the interoperability gain. Many implementations, even if only interested in the default value, consider such a "defensive" strategy to be good insurance against mistakes of other implementations in realizing the defaults of ISO/IEC 8632.

7.5.2.8 Classification of elements and parameter values

Elements and parameter values can be classified as either standard, registered, profile-defined, or private.

— Standard refers to elements and parameter values which have been defined in ISO/IEC 8632.

— Registered refers to elements and parameter values which have been entered into a registry and thus, have an internationally recognized definition and have undergone a standardization process.

— Profile-defined refers to elements such as ESCAPEs and GDPs, whose syntax, semantics, and identifier are defined within the profile.

— Private refers to truly private elements and parameter values, that is, known only by prior agreement between generators and interpreters.

Profiles shall limit metafiles to standard, registered, and profile-defined metafile elements and/or parameter values.

Profiles shall limit the use of ESCAPE and GDP elements to those which are registered or profile-defined.

Profiles shall prohibit private elements and parameter values which produce graphical effect. Profiles may allow private elements and parameter values which produce no graphical effect, (e.g., APPLICATION DATA).

7.5.2.9 Registered elements and values

Profiles shall specify the set of registered elements and parameter values which are allowed. Registered elements and parameter values are those which have been entered into any registry which is referenced in a normative manner by ISO/IEC 8632 (see 4.12). Profiles shall refer to these registered items using their registered identifier and definition.

If a CGM profile exists which contains profile-defined, non-registered elements with values which are affected by the ISO International Register of Graphical Items, then the elements shall be registered first before such a profile is approved as an ISP.

7.5.2.10 Generator and interpreter behaviour

Profiles of CGM shall address implementation conformance requirements. Profiles shall not address the internal structure, performance or other internal behavioural characteristics of implementations of generators or interpreters. These issues may be addressed by the application community in supplemental documentation.

7.5.2.11 Physical media

Physical file format and other issues of media, delivery, or networking are beyond the scope of ISO/IEC 8632 and shall not be specified by profiles of ISO/IEC 8632. These issues may however be important for successful interoperability and if addressed by the application commmunity, shall be addressed in specifications other than the profiles.

7.5.3 Metafile rules

The metafile rules are completely contained in the PPF table 13. These rules apply to the entire metafile.

7.5.4 Multi-element rules

The information in this subclause explains and supplements the rules in the PPF tables 14 through 23.

7.5.4.1 Colour

The PPF requires that profile writers choose one of the following rules.

a) For each metafile, either all colours used within the metafile, including background and foreground colours, shall be defined or none shall be defined.

b) For all metafiles, all colours used within the metafile, including background and foreground colours, shall be defined.

c) For all metafiles, no colours shall be defined.

NOTES

1 This rule requires that, if any direct colours are to be explicitly specified in the metafile, or if any indexed colours are to have their representations defined, then these should be done for the colours associated with each primitive type (e.g., line, marker, text, fill area) before the first occurrence of a primitive of that type.

2 When the background colour is defined by the BACKGROUND COLOUR element, the effect on the background of redefinition of colour index zero within the picture body is not clearly stated in the text of this standard. Clarification of this ambiguity is the subject of a defect report.

Colour is "used" at the point that the associated graphical primitive is encountered in the metafile, except for primitives in Picture Descriptor or Metafile Descriptor segments. In the latter cases, colour is used when the associated primitive is encountered during execution of a COPY SEGMENT. The background colour is used at BEGIN PICTURE BODY.

Profiles shall not define implicit defaults for colour attributes or for colour representations.

Profiles may define conformance categories for both metafiles and implementations based on colour content and capability: colour, greyscale, and monochrome.

The elements affected by these colour rules are:

BACKGROUND COLOUR	LINE COLOUR
LINE REPRESENTATION	MARKER COLOUR
MARKER REPRESENTATION	TEXT COLOUR
TEXT REPRESENTATION	FILL COLOUR
FILL REPRESENTATION	EDGE COLOUR
EDGE REPRESENTATION	CELL ARRAY
AUXILIARY COLOUR	PATTERN TABLE
BITONAL TILE	COLOUR TABLE
TILE	SYMBOL COLOUR

7.5.4.2 Indexes (except colour)

The purpose of this rule is that every referenced index value correspond to a well-defined representation of that value. Specific rules are given in the PPF tables for the individual elements listed below.

An index value is "referenced" if it appears explicitly in a referencing element. An index value is also referenced if it is the default value of that referencing element, and is used in the display of a primitive.

The elements affected by this rule are:

Referencing element	Corresponding representation element
LINE BUNDLE INDEX	LINE REPRESENTATION
LINE TYPE	LINE AND EDGE TYPE DEFINITION
MARKER BUNDLE INDEX	MARKER REPRESENTATION
TEXT BUNDLE INDEX	TEXT REPRESENTATION
TEXT FONT INDEX	FONT LIST
FONT PROPERTIES	FONT LIST

CHARACTER SET INDEX	CHARACTER SET LIST, GLYPH MAPPING
ALTERNATE CHARACTER SET INDEX	CHARACTER SET LIST, GLYPH MAPPING
FILL BUNDLE INDEX	FILL REPRESENTATION
HATCH INDEX	HATCH STYLE DEFINITION
PATTERN INDEX	PATTERN TABLE and GEOMETRIC PATTERN DEFINITION
EDGE BUNDLE INDEX	EDGE REPRESENTATION
EDGE TYPE	LINE AND EDGE TYPE DEFINITION
SYMBOL LIBRARY INDEX	SYMBOL LIBRARY

NOTE — LINE TYPE, HATCH INDEX, and EDGE TYPE values which are either registered or clause 5 values are already well-defined.

7.5.4.3 Line primitives - geometric degeneracies

The PPF requires that profiles specify whether geometric degeneracies are permitted or prohibited.

If geometric degeneracies are permitted, the PPF requires that profiles specify the graphical meaning of the degeneracy.

The elements affected by this rule are:

POLYLINE	HYPERBOLIC ARC
DISJOINT POLYLINE	PARABOLIC ARC
GENERALIZED DRAWING PRIMITIVE	NON-UNIFORM B-SPLINE
CIRCULAR ARC 3 POINT	NON-UNIFORM RATIONAL B-SPLINE
CIRCULAR ARC CENTRE	POLYBEZIER
ELLIPTICAL ARC	Compound Line
CIRCULAR ARC CENTRE REVERSED	

7.5.4.4 Area primitives - geometric degeneracies

The PPF requires that profiles specify whether geometric degeneracies are permitted or prohibited.

If geometric degneracies are permitted, the PPF requires that profiles specify the graphical meaning of the degeneracy.

The elements affected by this rule are:

POLYGON	CIRCULAR ARC CENTRE CLOSE
POLYGON SET	ELLIPSE
RECTANGLE	ELLIPTICAL ARC CLOSE
CIRCLE	CONNECTING EDGE
CIRCULAR ARC 3 POINT CLOSE	Closed Figure
GENERALIZED DRAWING PRIMITIVE	

7.5.4.5 Graphical text strings

Length

The PPF requires that profiles specify a finite limit for the maximum string length (bytes) in graphical text strings. This limit applies to the total length of the text string including all appended text elements.

NOTE — The string length in bytes equals the number of character codes for single-byte character sets, but not for multi-byte character sets.

Content

All profiles prohibit the non-printing codes, except for NUL (code value 0) and the codes required to effect ISO/IEC 2022 character set switching consistent with the value of the CHARACTER CODING ANNOUNCER. Profiles may further restrict the use of ISO/IEC 2022 switching controls.

The elements affected by this rule are:

TEXT
RESTRICTED TEXT
APPEND TEXT
GENERALIZED DRAWING PRIMITIVE

7.5.4.6 Non-graphical text strings

Length

The PPF requires that profiles specify a finite limit for the maximum string length (bytes) in non-graphical text strings (e.g., elements with data type SF).

Profiles may specify two length numbers:

— one for the group of elements with data type SF parameters;

— one for the group of elements with data type D parameters which have type SF data within the D parameters, in the case that the D parameter uses SDR formatting and contain type SF data.

NOTE — The string length in bytes equals the number of character codes for single-byte character sets, but not for multi-byte character sets.

Content

The PPF requires that all profiles:

— prohibit all C0 control except for NUL (code value 0) which has no effect and ISO/IEC 2022 character set switching. Profiles may further restrict the use of ISO/IEC 2022 switching controls.

The elements affected by this rule are:

Type SF Parameters	SF data within D parameters
BEGIN METAFILE	GENERALIZED DRAWING PRIMITIVE
BEGIN PICTURE	ESCAPE
METAFILE DESCRIPTION	APPLICATION DATA
FONT LIST	
CHARACTER SET LIST	SF data within SDR parameters
MESSAGE	BITONAL TILE
FONT PROPERTIES	TILE
GLYPH MAPPING	
SYMBOL LIBRARY LIST	

7.5.4.7 Data record strings

Length

The PPF requires that profiles specify a finite limit for the maximum string length (bytes) in the data record or specify that there is no limit.

Content

The PPF requires that profiles require the SDR-coding techniques (see annex C.2.2) for the data records.

The elements affected by this rule are:

GENERALIZED DRAWING PRIMITIVE
ESCAPE
APPLICATION DATA

NOTES

1 The string length in bytes equals the number of character codes for single-byte character sets, but not for multi-byte character sets.

2 Data Record (D) is a data type which is coded in parts 2, 3 and 4 of ISO/IEC 8632 with delimiting syntax equivalent to the coding syntax for S and SF data types.

3 The binary and character encodings of the enumerated (E) data type in SDR uses integers, (e.g., 0, 1, 2); whereas the clear text encoding of the enumerated data type traditionally uses words (e.g., 'on', 'off'). This difference may prevent blind intertranslation between encodings. It is recommended that the use of enumerated (E) data type in SDR coding for ESCAPE and GDP elements be avoided. Type index (I) should be used instead. Although this is now a recommended practice, there are some existing registered items which use the word-encoded method for E within SDR.

4 Graphical Registration requires the SDR formatting of D parameters. Registration of these elements is required in order for a profile to be considered as an ISP.

7.5.5 Individual element rules

All rules are contained in the PPF tables 15 through 23.

7.5.6 Generator implementation requirements

The information in this subclause explains and supplements the rules in the PPF table 24.

The PPF requires that profile writers address Generator Implementation Requirements (GIR). Conforming generators shall be consistent with a specific profile or the Model Profile specified herein.

The implementor's documentation shall specify the profile to which the generator conforms.

Generators shall produce conforming metafiles whose contents accurately represent the source picture according to the semantic rules of ISO/IEC 8632 and the profile as identified in the Metafile Descriptor and the generator product documentation.

7.5.6.1 Relationship to other profiles

Profiles shall not prohibit a generator implementation from implementing more than one particular profile provided that the generator can be commanded to operate in a mode that produces metafiles that conform to the profile as identified in the Metafile Descriptor.

7.5.6.2 Generator fidelity

The PPF requires that profiles address the fidelity requirements for the mapping of application graphical objects to metafile elements.

Categories that may be addressed include, without limitation, the geometric accuracy of the mapping of graphical primitives and the realization of primitive attributes.

7.5.6.2.1 Generator colour requirements

Cases may arise in which the colours of application pictures cannot be encoded in an obvious and straightforward manner into the colour facilities permitted in the metafile by a profile.

EXAMPLES

1 — The application has many more colours than the metafile.

2 — The meaning of the Version 1 metafile RGB specification (1,0,0), "full red" is ambiguous (i.e., the colour is uncalibrated).

The PPF requires that profiles address, without limitation, the following aspects of mapping application colour into metafile colour specifications:

a) reduction of the number of colours used by the application to match metafile limits imposed by the profile;

b) definition of mapping algorithms, metrics to be used, and colour space in which the mapping algorithms and metrics are to be applied (e.g., CIEXYZ, regardless of the metafile colour space);

c) implicit colour calibration specifications to be used in mapping application colours to metafile colour specifications, for Version 1 and Version 2 profiles; Version 3 profiles shall use or require the explicit Version 3 elements.

7.5.6.2.2 Generator geometric accuracy and latitude
The PPF requires that profiles address the geometric accuracy required of conforming generators and the latitude permitted when application graphical primitives are mapped to CGM graphical primitive elements.

Aspects of the geometric accuracy which may be addressed include placement of the primitive and the size of the primitive. Geometric accuracy may be measured by reference to the VDC extent or by reference to the size or extent of the primitive itself.

7.5.6.2.3 Generator geometric accuracy and latitude
The PPF requires that profiles address the geometric accuracy required of conforming generators and the latitude permitted when application graphical primitives are mapped to CGM graphical primitive elements.

Aspects of the geometric accuracy which may be addressed include placement of the primitive and the size of the primitive. Geometric accuracy may be measured by reference to the VDC extent or by reference to the size or extent of the primitive itself.

7.5.6.2.4 Generator text accuracy and latitude
The PPF requires that profiles address, independently of overall "Generator geometric primitives accuracy and latitude", the accuracy and latitude of mapping the application text strings into metafile specifications.

7.5.6.2.5 Generator font substitution
The PPF requires that profiles address the substitution of fonts permitted in conforming metafiles for fonts in the application picture.

Specific substitution methods may be addressed. If addressed, substitution methods and latitudes may include, without limitation, discussion of similarity of visual characteristics of fonts, as well as font metrics and individual glyph metrics. Visual characteristics, if addressed, shall be addressed at least according to the set of font properties defined in the FONT PROPERTIES element of clause 5.

7.5.6.3 Preservation of primitives

The PPF requires that profiles address the preservation of the identities of graphical primitive elements. The "preservation of grahical primitive elements" refers to the CGM primitives which are used to represent the graphical characteristics of the application picture. For example, using CGM polygons to represent application ellipses. Profiles may explicitly state which primitive substitutions are allowed and which are not.

7.5.6.4 Semantic latitude

The PPF requires that profiles address those elements where semantic latitude is permitted in ISO/IEC 8632.

Profiles shall address at least the following:

a) drawing priority and mode: whether the order in which the graphical characteristics of the application picture are created is reflected in the metafile by the ordering of the primitives;

b) clipping: interaction between VDC extent and clip rectangle for all metafiles;

c) precise meaning of the predefined line types, edge types, and hatch styles.

7.5.6.5 Generator error processing

The PPF requires that profiles address the action taken if an error occurs while generating the CGM. Profiles may address, without limitation:

— classification of error severity;

— requirements for error recovery;

— requirements for error reporting.

7.5.6.6 Reporting

The PPF requires that profiles address whether reporting shall be required.

Profiles may address the method and format of the reporting (e.g., continuous log file, on-screen operator message, dump files).

Profiles may require the reporting of any substitution, error, fallback behaviour, mappings, or other behaviour.

7.5.6.7 Degeneracies

The PPF requires that profiles address the permissibility of generation of metafile graphical primitive elements which are degenerate in the senses discussed in annex D subclauses D.2.2, D.2.3, D.4.5.4 through D.4.5.8, D.4.5.11, and D.4.5.12.

Profiles may address individually the two possible sources of such degeneracies:

— intrinsic: the degeneracy already exists in the specification of the application graphical object;

— computational: the object is not intrinsically degenerate, but it degenerates during the computation and data preparation which generates the metafile element.

7.5.7 Interpreter implementation requirements

The information in this subclause explains and supplements the rules in the PPF table 25.

The PPF requires that profile writers address Interpreter Implementation Requirements (IIR). Conforming interpreters shall be consistent with a specific profile or the Model Profile specified herein.

The implementor's documentation shall specify the profile to which the interpreter conforms.

Interpreters shall produce a target picture whose appearance agrees with the semantic rules of the metafile elements as defined in ISO/IEC 8632 and the profile.

7.5.7.1 Relationship to other profiles

Profiles shall not prohibit an interpreter implementation from implementing more than one particular profile provided that the implementation can be commanded to operate in a mode that interprets metafiles that conform to the profile as identified in the Metafile Descriptor.

7.5.7.2 Number of pictures

If the profile permits zero pictures in a metafile, then the profile shall specify the behaviour of the interpreter when zero pictures are encountered.

7.5.7.3 Empty pictures

If the profile permits empty pictures, then the profile shall specify the behaviour of the interpreter when empty pictures are encountered.

7.5.7.4 Interpreter fidelity

The PPF requires that profiles address the fidelity requirements for interpretation of all elements containing graphical information.

NOTE — It is recommended, if a profile intends to allow approximations for a particular element, that the specification of clause D.4 be endorsed (if one exists for the particular element), in the absence of specific profile requirements to the contrary.

Categories which may be addressed include, without limitation, the geometric characteristics of graphical primitives and the realization of primitive attributes.

7.5.7.4.1 Interpreter colour requirements

For the purposes of these profile rules, the presentation of metafile colour information by interpreters is modelled as a two step process.

In the first step, the interpreter maps the metafile colour information, whether indexed or direct, to an intermediate abstract discrete colour space, designated as "the Required Interpreter Support Set". This is called the *colour mapping step*. For example, if the profile permits an unlimited number (within the constraints imposed by the numerical precisions) of direct colours in the metafile, the profile might require all conforming interpreters to support, with a unique and distinguishable representation, the 125 colours which are represented by the 5x5x5 uniform grid applied to the RGB unit cube.

In the second step of the colour presentation model, the interpreter choses a representation for each colour in the Required Interpreter Support Set and renders the colour to the device. This is called the *colour rendering step*. For example, a CMYK printer uses colour dither algorithm to approximate the 4096 colours in a 16x16x16 gridding of the RGB cube; whereas a black-and-white raster laser printer interpreter maps all foreground colour information to black.

The PPF requires that profiles address at least two aspects of the interpretation of colour information in the metafile.

Specific points that may be addressed include, without limitation:

a) permissibility of mapping metafile colour to one or more of the sets:

   — a colour set with fewer colours than those in the metafile;

   — a greyscale set;

   — a monochrome (two-colour) set.

b) implicit colour calibration specifications to be used in the colour mapping step for Version 1 and Version 2 profiles; Version 3 profiles shall use or require the explicit Version 3 elements.

c) if the colour mapping step is permitted to be other than the identity mapping, the definition of the Required Interpreter Support Set (or possibly multiple sets, if such are allowed).

d) the definition of mapping algorithms, metrics to be used, and colour space in which the mapping algorithms and metrics are to be applied (e.g., CIEXYZ, regardless of the metafile colour space).

7.5.7.4.2 Interpreter geometric accuracy and latitude

The PPF requires that profiles address the geometric accuracy required of conforming interpreters and the latitude permitted in placement of primitives and realization of geometric aspects when geometric primitive elements are rendered.

NOTE — A profile may specify several sets of requirements according to the application needs with respect to the interpretation. For example, accuracy may be different for previewing and for final drawing.

7.5.7.4.3 Interpreter text rendering

The PPF requires that profiles address, independently of overall "Interpreter geometric primitives accuracy and latitude", the accuracy and latitude of mapping the metafile text specifications into application text strings.

Profiles may address the precision of text rendering. Profiles may require all text to be rendered according to a specified precision regardless of the value of the metafile TEXT PRECISION element.

7.5.7.4.4 Font substitution

The PPF requires that profiles address whether or not interpreters are permitted to substitute other fonts for fonts specified in the FONT LIST element of the metafile.

If the profile prohibits substitution, then the font name in the FONT LIST shall refer to a specific and unambiguously defined font resource, and interpreters shall use that font resource.

If the profile permits substitution, then the profile may address specific methods of substitution. If addressed, substitution methods and latitudes may include, without limitation, discussion of similarity of visual characteristics of fonts, as well as accuracy of matching the font metrics and individual glyph metrics (see also 7.5.7.4.3). Visual characteristics, if addressed, shall be addressed according to the set of font properties defined in the FONT PROPERTIES element of clause 5, as a minimum.

If font substitution is permitted, then the profile shall contain a reference set of font and glyph metrics which correspond to the canonical instances of the substitutable fonts.

7.5.7.5 Semantic latitude

The PPF requires that profiles address those elements where semantic latitude is permitted in ISO/IEC 8632.

Profiles shall address at least the following:

a) drawing priority and mode: whether primitives occurring later in the metafile are displayed "on top of" primitives occurring earlier, and whether they replace earlier primitive parts or combine with them in some way;

b) view surface clearing at picture start;

c) clipping: clip modes for Version 1 metafiles; interaction between VDC extent and clip rectangle for all metafiles;

d) precise meaning of the predefined line types, edge types, and hatch styles;

e) the value 'unspecified' in LINE JOIN, LINE CAP, EDGE JOIN, EDGE CAP for Version 1 and Version 2 metafiles;

f) algorithms for RESTRICTED TEXT TYPE in Version 1 and Version 2 metafiles.

7.5.7.6 Interpreter error processing

The PPF requires that profiles address the action taken if an error occurs while interpreting the CGM. Profiles may address, without limitation:

— classification of error severity;

— requirements for error recovery;

— requirements for error reporting.

7.5.7.7 Reporting

The PPF requires that profiles address whether reporting shall be required.

Profiles may address the method and format of the reporting (e.g., continuous log file, on-screen operator message, dump files).

Profiles may require the reporting of any substitution, error, fallback behaviour, mappings, or other behaviour.

7.5.7.8 Degeneracies

The PPF requires that profiles address the interpretation and rendering of metafile graphical primitive elements which are degenerate in the senses discussed in annex D subclauses: D.2.2, D.2.3, D.4.5.4 through D.4.5.8, D.4.5.11, and D.4.5.12.

Profiles may address individually the two possible sources of such degeneracies:

— intrinsic: the degeneracy already exists as the element is specified in the metafile;

— computational: the element is not intrinsically degenerate, but it degenerates during the computation of the interpreting and rendering process.

7.5.8 PPF Tables

The Profile Proforma is contained in tables 13 through 25. These tables when completed by the author of the profile, contain the normative specifications of the profile.

The PPF tables have 3 columns:

— The first identifies the element or functionality to be addressed.

— The second is the template for the profile writer to complete.

— The third is the completed specification for the Model Profile.

Each item to be addressed — element or functionality — comprises a "row" of the table.

The first column of each row contains:

1) A unique identifier for that row, T.n.m, indicating that this is row "m" of table "n". For example, row T.16.2 is the second row of table 16 (the METAFILE DESCRIPTION element).

2) The name of the item for that row, for example, METAFILE DESCRIPTION.

3) If appropriate for an item, its metafile version (v1, v2, or v3). This is the lowest metafile version for which the item is defined. If the state rules of an element are different depending upon the metafile version, then multiple version numbers are given.

4) References to other sections of this clause, clause 5, and the annexes for additional normative or informative material.

A second column is the PPF template for profile authors. For each row (element or functionality) it contains:

5) A check box indicating that all specifications for this row for this profile are exactly the same as those for this row in the Model Profile.

6) Check boxes to indicate whether the item is required, permitted, or prohibited in metafiles conforming to the profile. If the check box choice is limited, then only the allowable check boxes are given. For example, if an element shall not be prohibited, then the "prohibited" check box is omitted.

7) One or more rules which are to be addressed by all profile authors. If the state rules or parameter values of an element are different depending upon the metafile version, then the PPF rule is qualified by the version number.

8) A general category, "Other:", in which profile authors may add any additional specifications which are consistent with the rules for profiles in this clause.

A third column is the Model Profile specification. Each row contains:

9) A checked box indicating the item's status.

10) The specifications of the Model Profile.

If the "Same as Model Profile" box is checked for a row, then no further information need be supplied for the profile in that row — all specifications for that row match the Model Profile. Otherwise, the profile shall have complete information for all column 2 rules within a row. It is acceptable in most cases to simply refer to the Model Profile, with the words "as Model Profile".

Rules presented as statements and ending with a semicolin (":"), shall be completed with specific information. In most cases, these rules may be prefaced with "Profiles shall specify...". Rules presented as questions and ending with a question mark ("?"), are optional, and shall be completed with either

specific information or the word "none". In most cases, these rules may be prefaced with "Profiles may specify any ...".

The category "Other:" shall be completed with either the word "none" or with specific information.

It is possible that specific information for some rules may be too much to fit into the table space provided. In this case, the table entry shall specify (assuming that this is row T.n.m), "see Attachment n.m", and the specification shall be put into an attachment labeled "Attachment n.m".

Profile authors shall complete all required information in the template, column 2 of the PPF tables. Profiles may contain any other specifications, parameter restrictions, etc., unless explicitly prohibited by the rules of this clause and the PPF tables.

Table 13 - Metafile rules

Functionality	Specifications - PPF	Specifications - Model Profile
T.13.1 Encodings	Same as Model Profile ☐	
	Select 1 or more encodings: Binary ☐ Character ☐ Clear text ☐	Select 1 or more encodings: Binary ☑ Character ☑ Clear text ☑
T.13.2 Number of pictures	Same as Model Profile ☐	
	Number of pictures permitted in a metafile: minimum (≥0)? maximum (≥0 or no limit)? Other:	Number of pictures permitted in a metafile: minimum (≥0)? ***1.*** maximum (≥0 or no limit)? ***No limit.*** Other: ***None.***
T.13.3 Empty pictures	Same as Model Profile ☐	
	Are pictures allowed which have no graphical primitives? (yes/no) Other:	Are pictures allowed which have no graphical primitives? (yes/no) ***Yes.*** Other: ***None.***
T.13.4 Metafile size	Same as Model Profile ☐	
	Any restrictions on metafile size? Other:	Any restrictions on metafile size? ***None.*** Other: ***None.***

Table 14 - Multi-element rules

Functionality	Specifications - PPF	Specifications - Model Profile
T.14.1 Colour References: 7.5.4.1	Same as Model Profile ☐	
	Select which rule applies to each metafile (choose 1): Either all colours or none shall be defined. ☐ All colours shall be defined. ☐ No colours shall be defined. ☐ Are colour indexes allowed to be redefined within a picture or metafile? (yes/no) Any restrictions on the number of distinct colours used within a picture or metafile? (Monochrome metafiles shall use at most two distinct colours.) Are conformance categories defined? (yes/no) If yes, specify. Other:	Select which rule applies to each metafile (choose 1): Either all colours or none shall be defined. ☑ All colours shall be defined. ☐ No colours shall be defined. ☐ 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. ***3 categories: monochrome, greyscale, and colour.*** Other: ***None.***
T.14.2 Line primitives - geometric degeneracies References: 7.5.4.3	Same as Model Profile ☐	
	Geometric degeneracies are: Permitted ☐ Prohibited ☐ If permitted, graphical meaning of the degeneracy: Other:	Geometric degeneracies are: Permitted ☑ Prohibited ☐ 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.***

Table 14 - Multi-element rules (continued)

Functionality	Specifications - PPF	Specifications - Model Profile
T.14.3 Filled area primitives - geometric degeneracies References: 7.5.4.4	Same as Model Profile ☐	
	Geometric degeneracies are: Permitted ☐ Prohibited ☐ If permitted, graphical meaning of the degeneracy: Other:	Geometric degeneracies are: Permitted ☑ Prohibited ☐ 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 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 Graphical text strings References: 7.5.4.5	Same as Model Profile ☐	
	Minimum string length (bytes): Maximum string length (bytes): Any restrictions on the use of ISO/IEC 2022 switching controls? Other:	Minimum string length (bytes): ***0.*** Maximum string length (bytes): ***254.*** 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: ***None.***

Table 14 - Multi-element rules (continued)

Functionality	Specifications - PPF	Specifications - Model Profile
T.14.5 Non-graphical text strings References: 7.5.4.6	Same as Model Profile ☐	
	Maximum string length (bytes): for type SF: for type SF within type D: Format effectors and ESC: Permitted ☐ Prohibited ☐ Other C0 control codes (except NUL and ISO/IEC 2022 switching) are prohibited. Any limits on the set of acceptable character sets? Any restrictions on the use of ISO/IEC 2022 switching controls? Other:	Maximum string length (bytes): for type SF: ***254.*** for type SF within type D: ***1024.*** Format effectors and ESC: Permitted ☑ Prohibited ☐ 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).*** Other: ***None.***
T.14.6 Data record strings References: 7.5.4.7	Same as Model Profile ☐	
	Maximum string length (bytes) or state "no limit": SDR-coding techniques must be used (see annex C.2.2). Other:	Maximum string length (bytes) or state "no limit": ***32767.*** SDR-coding techniques must be used (see annex C.2.2). Other: ***None.***

Table 15 - Delimiter elements

Element	Specifications - PPE	Specifications - Model Profile
T.15.1	Same as Model Profile ☐	
BEGIN METAFILE END METAFILE [v1] References: 5.2.1 5.2.2 7.5.4.6 T.14.5	Element is: Required ☑ The *metafile identifier* shall follow the rules for non-graphical text, clause 7.5.4.6 and T.14.5. Other:	Element is: Required ☑ The *metafile identifier* shall follow the rules for non-graphical text, clause 7.5.4.6 and T.14.5. Other: ***None.***
T.15.2	Same as Model Profile ☐	
BEGIN PICTURE BEGIN PICTURE BODY END PICTURE [v1] References: 5.2.3 5.2.4 5.2.5 7.5.4.6 T.14.5	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *picture identifier* shall follow the rules for non-graphical text, clause 7.5.4.6 and T.14.5. Number of occurrences of these elements allowed in the metafile: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *picture identifier* shall follow the rules for non-graphical text, clause 7.5.4.6 and T.14.5. Number of occurrences of these elements allowed in the metafile: ***No limit.*** Other: ***None.***

Table 15 - Delimiter elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.15.3 BEGIN SEGMENT END SEGMENT [v2] References: 5.2.6 5.2.7	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ 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:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 BEGIN FIGURE END FIGURE [v2] References: 5.2.8 5.2.9	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Limits on the number of elements or restrictions on which elements comprise a figure definition: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 15 - Delimiter elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.15.5 BEGIN PROTECTION REGION END PROTECTION REGION [v3] References: 5.2.10 5.2.11	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneously defined protection regions: Maximum number of elements within each protection region: Is there any meaning to the *region index* parameter other than as a unique identifier for each protection region? (yes/no) If yes, specify. (Meaning shall have no graphical effect). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 BEGIN COMPOUND LINE END COMPOUND LINE [v3] References: 5.2.12 5.2.13	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Limits on the number of elements and identity of elements comprising a path definition: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 15 - Delimiter elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.15.7 BEGIN COMPOUND TEXT PATH END COMPOUND TEXT PATH [v3] References: 5.2.14 5.2.15	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Limits on the number and identity of elements comprising a path definition: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 BEGIN TILE ARRAY END TILE ARRAY [v3] References: 5.2.16 5.2.17	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of tiles in path direction: Maximum number of tiles in line direction: Maximum number of cells/tile in path direction: Maximum number of cells/tile in line direction: Limits on pel path: Limits on line progression: Limits on image offset: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 16 - Metafile descriptor elements

Element	Specifications - PPF	Specifications - Model Profile
T.16.1 METAFILE VERSION [v1] References: 5.3.1	Same as Model Profile ☐	
	Element is: Required ☑ Metafile versions permitted by this profile: Other:	Element is: Required ☑ Metafile versions permitted by this profile: ***1, 2, 3.*** Other: ***None.***
T.16.2 METAFILE DESCRIPTION [v1] References: 5.3.2 7.5.2.1 7.5.2.2 7.5.4.6 T.14.1 T.14.5	Same as Model Profile ☐	
	Element is: Required ☑ The *description* parameter shall follow the rules for non-graphical text, clause 7.5.4.6 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? Profile identification (use keyword, "ProfileId:"): Profile edition (use keyword, "ProfileEd:"): If the profile edition is not given, then the edition defaults to 1.	Element is: Required ☑ The *description* parameter shall follow the rules for non-graphical text, clause 7.5.4.6 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:1".*** If the profile edition is not given, then the edition defaults to 1.

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.2 continued METAFILE DESCRIPTION	Additional information content: 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 ☐ Permitted ☐ Content: Source: Required ☐ Permitted ☐ Content: Date: Required ☐ Permitted ☐ Content shall be date of metafile generation. Other:	Additional information content: 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 ☑ Permitted ☐ Content: ***(One of: colour, greyscale, or monochrome.)*** Source? Required ☑ Permitted ☐ Content: ***(Vendor, product, and version).*** Date? Required ☑ Permitted ☐ Content shall be date of metafile generation. ***The form and content shall be in accordance with ISO 8601:1988.*** Other: ***None.***
T.16.3 VDC TYPE [v1] References: 5.3.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Any restrictions on the parameter value? Other:	Element is: Required ☑ Permitted ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.16.4 INTEGER PRECISION [v1] References: 5.3.4	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.5 REAL PRECISION [v1] References: 5.3.5	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.16.6 INDEX PRECISION [v1] References: 5.3.6	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.16.7 COLOUR PRECISION [v1] References: 5.3.7	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.8 COLOUR INDEX PRECISION [v1] References: 5.3.8	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.16.9 MAXIMUM COLOUR INDEX [v1] References: 5.3.9	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Is this element required to be a least upper bound? (yes/no) Any restrictions on the parameter values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Is this element required to be a least upper bound? (yes/no) ***No.*** Any restrictions on the parameter values? ***0-1 for monochrome metafiles.*** ***0-63 for greyscale metafiles.*** ***0-255 for colour metafiles.*** Other: ***None.***
T.16.10 COLOUR VALUE EXTENT [v1] References: 5.3.10	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.11 METAFILE ELEMENT LIST [v1] References: 5.3.11	Same as Model Profile ☐ Element is: Required ☑ Other:	Element is: Required ☑ Other: ***None.***
T.16.12 METAFILE DEFAULTS REPLACEMENT [v1] References: 5.3.12	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Is each occurrence of the MDR restricted to defining just one default? (yes/no) Additional restrictions may be specified in parts 2, 3, and 4 of ISO/IEC 8632. NOTE — Profile specifications regarding use of MDR shall be consistent with other profile specifications. For example, if a profile restricts metafiles to a single picture, then it makes little sense for the profile to require the MDR element in metafiles. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Is each occurrence of the MDR restricted to defining just one default? (yes/no) ***No.*** Additional restrictions may be specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.13 FONT LIST [v1] References: 5.3.13 annex H	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ This element is required for all metafiles containing graphical text. Maximum number of fonts in the list: 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: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 annex H. Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.14 CHARACTER SET LIST [v1] References: 5.3.14	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ This element is required for all metafiles containing graphical text. Maximum limit for the number of character sets in the character set list: 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: If any of these character sets is of type "complete code", specify the content of the complete code and its associated sequence tail: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ This element is required for all metafiles containing graphical text. 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 CHARACTER CODING ANNOUNCER [v1] References: 5.3.15	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***Values shall be 'basic 7-bit' and 'basic 8-bit'.*** Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.16 NAME PRECISION [v2] References: 5.3.16	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ The parameter value of this element is coding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter value of this element is coding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.16.17 MAXIMUM VDC EXTENT [v2] References: 5.3.17	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.16.18 SEGMENT PRIORITY EXTENT [v2] References: 5.3.18	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.16.19 COLOUR MODEL [v3] References: 5.3.19	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of colour models? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of colour models? ***None.*** Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.20 COLOUR CALIBRATION [v3] References: 5.3.20	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Calibration selection values permitted in accordance with the permitted model(s): If CYMK is permitted, minimum number of grid 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:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Calibration selection values permitted in accordance with the permitted model(s): ***Values 1..6, 9.*** 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 FONT PROPERTIES [v3] References: 5.3.21	Same as Model Profile ☐	
	Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***All defined index and enumerated values of all parameters shall be permitted.*** Other: ***None.***

Table 16 - Metafile descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.16.22 GLYPH MAPPING [v3] References: 5.3.22	Same as Model Profile ☐	
	Required ☐ Permitted ☐ Prohibited ☐ Subset of AFII registered glyphs which may be referenced: Maximum number of glyphs which may be defined: Other:	Required ☐ Permitted ☑ Prohibited ☐ Subset of AFII registered glyphs which may be referenced: ***None.*** Maximum number of glyphs which may be defined: ***8192.*** Other: ***None.***
T.16.23 SYMBOL LIBRARY LIST [v3] References: 5.3.23	Same as Model Profile ☐	
	Required ☐ Permitted ☐ Prohibited ☐ Libraries which may be accessed and their encoding rules: Maximum number of libraries which may be accessed: Other:	Required ☐ Permitted ☐ Prohibited ☑ 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.***

Table 17 - Picture descriptor elements

Element	Specifications - PPF	Specifications - Model Profile
T.17.1 SCALING MODE [v1] References: 5.4.1	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***If SCALING MODE is metric then the 'metric scale factor' shall be positive.*** Other: ***None.***
T.17.2 COLOUR SELECTION MODE [v1][v2] References: 5.4.2	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.3 LINE WIDTH SPECIFICATION MODE [v1][v2] References: 5.4.3	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Any restrictions on the parameter values? ***None.*** Other: ***None.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.17.4 MARKER SIZE SPECIFICATION MODE [v1][v2] References: 5.4.4	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.5 EDGE WIDTH SPECIFICATION MODE [v1][v2] References: 5.4.5	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.17.6 VDC EXTENT [v1] References: 5.4.6	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Limits on the sense and orientation of the VDC space: Is zero-area VDC extent permitted? (yes/no) If yes, specify its meaning. Other:	Element: Required ☐ Permitted ☑ 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.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPE	Specifications - Model Profile
T.17.7 BACKGROUND COLOUR [v1] References: 5.4.7 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ The *colour value* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Other:	Element: Required ☐ Permitted ☑ The *colour value* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Other: ***None.***
T.17.8 DEVICE VIEWPORT [v2] References: 5.4.8	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☑ Prohibited ☐ Interaction of this element with environmental presentation directives: Meaning of this element if the specified value is inconsistent with the presentation device: Other:	Element: Required ☐ Permitted ☐ Prohibited ☑ Interaction of this element with environmental presentation directives: Meaning of this element if the specified value is inconsistent with the presentation device: Other: ***NOTE — This element is prohibited due to its device dependence.***
T.17.9 DEVICE VIEWPORT SPECIFICATION MODE [v2] References: 5.4.9	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Set of legal values: Other:	Element: Required ☐ Permitted ☐ Prohibited ☑ Set of legal values: Other: ***NOTE — This element is prohibited due to its device dependence.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.17.10 DEVICE VIEWPORT MAPPING [v2] References: 5.4.10	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Set of legal values: Other:	Element: Required ☐ Permitted ☐ Prohibited ☑ Set of legal values: Other: ***NOTE — This element is prohibited due to its device dependence.***
T.17.11 LINE REPRESENTATION [v2] References: 5.4.11 7.5.2.6 7.5.4.2 T.20.1	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneous bundle definitions: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.12 MARKER REPRESENTATION [v2] References: 5.4.12 7.5.2.6 7.5.4.2 T.20.5	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneous bundle definitions: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.17.13 TEXT REP-RESENTATION [v2] References: 5.4.13 7.5.2.6 7.5.4.2 T.20.9	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneous bundle definitions: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.14 FILL REP-RESENTATION [v2] References: 5.4.14 7.5.2.6 7.5.4.2 T.20.21	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneous bundle definitions: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***
T.17.15 EDGE REP-RESENTATION [v2] References: 5.4.15 7.5.2.6 7.5.4.2 T.20.26	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneous bundle definitions: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneous bundle definitions: ***20.*** Other: ***None.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.17.16 INTERIOR STYLE SPECIFICATION MODE [v3] References: 5.4.16	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Any restriction on the parameter value? Other:	Element: Required ☐ Permitted ☑ Any restriction on the parameter value? ***None.*** Other: ***None.***
T.17.17 LINE AND EDGE TYPE DEFINITION [v3] References: 5.4.17	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the number of definitions? Any limits on the number of elements in a given definition? Any restrictions on the dash cycle repeat length? Any restrictions on complexity of definition to prevent degeneracies? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ 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 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.***

Table 17 - Picture descriptor elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.17.18 HATCH STYLE DEFINITION [v3] References: 5.4.18	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Limit on the number of hatch styles? Limit on the number of gaps in a given definition? Any limits on duty cycle length? Any restrictions on complexity of definition to prevent degeneracies? Any restrictions on the style indicator: Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ 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 GEOMETRIC PATTERN DEFINITION [v3] References: 5.4.19	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the number of geometric patterns defined? NOTE — The number of geometric patterns cannot exceed the number of segments. Any limits on the classes of primitives? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any limits on the number of geometric patterns defined? ***The maximum number of geometric patterns is 64.*** Any limits on the classes of primitives? ***None.*** Other: ***None.***

Table 18 - Control Elements

Element	Specifications - PPF	Specifications - Model Profile
T.18.1 VDC INTEGER PRECISION [v1] References: 5.5.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter values of this element are encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter values of this element are encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.18.2 VDC REAL PRECISION [v1] References: 5.5.2	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ The parameter values of this element are encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other:	Element is: Required ☐ Permitted ☑ The parameter values of this element are encoding dependent. Restrictions are specified in parts 2, 3, and 4 of ISO/IEC 8632. Other: ***None.***
T.18.3 AUXILIARY COLOUR [v1] References: 5.5.3 7.5.4.1 T.14.1 D.4.4.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *auxiliary colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *auxiliary colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Other: ***None.***

Table 18 - Control Elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.18.4 TRANSPARENCY [v1] References: 5.5.4 T.14.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restriction on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restriction on the parameter value? ***None.*** Other: ***None.***
T.18.5 CLIP RECTANGLE [v1] References: 5.5.5 D.4.4.2	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Meaning of boundary cases for: zero-area: area greater than VDC extent: additional cases? NOTE — Because objects "inside and on the boundary are drawn", then zero-area does not have the sometimes claimed effect of hiding subsequent primitives - there will be a visible effect, a dot or a line, if the object intersects the boundary of the degenerate area. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 18 - Control Elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.18.6 CLIP INDICATOR [v1] References: 5.5.6	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.7 LINE CLIPPING MODE [v2] References: 5.5.7 D.4.4.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.8 MARKER CLIPPING MODE [v2] References: 5.5.8 D.4.4.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.9 EDGE CLIPPING MODE [v2] References: 5.5.9 D.4.4.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 18 - Control Elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.18.10 NEW REGION [v2] References: 5.5.10	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ This element shall be permitted only if BEGIN FIGURE is permitted. Any restrictions on the number of occurrences? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ This element shall be permitted only if BEGIN FIGURE is permitted. Any restrictions on the number of occurrences? ***None.*** Other: ***None.***
T.18.11 SAVE PRIMITIVE CONTEXT [v2] References: 5.5.11	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of simultaneously saved contexts: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of simultaneously saved contexts: ***1024.*** Other: ***None.***
T.18.12 RESTORE PRIMITIVE CONTEXT [v2] References: 5.5.12	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ This element is permitted only if SAVE PRIMITIVE CONTEXT is permitted. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ This element is permitted only if SAVE PRIMITIVE CONTEXT is permitted. Other: ***None.***

Table 18 - Control Elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.18.13 PROTECTION REGION INDICATOR [v3] References: 5.5.13	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ This element shall be permitted only if BEGIN PROTECTION REGION is permitted. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ This element shall be permitted only if BEGIN PROTECTION REGION is permitted. Other: ***None.***
T.18.14 GENERALIZED TEXT PATH MODE [v3] References: 5.5.14	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.18.15 MITRE LIMIT [v3] References: 5.5.15	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 18 - Control Elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.18.16 TRANSPARENT CELL COLOUR [v3] References: 5.5.16	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *transparent cell colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *transparent cell colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter values? ***None.*** Other: ***None.***

Table 19 - Graphical primitive elements

Element	Specifications - PPF	Specifications - Model Profile
T.19.1 POLYLINE [v1] References: 5.6.1 7.5.4.3 D.2.21	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points or state "no limit": Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points or state "no limit": ***4096.*** Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.2 DISJOINT POLYLINE [v1] References: 5.6.2 7.5.4.3 D.2.2.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points or state "no limit": Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points or state "no limit": ***4096.*** Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.3 POLYMARKER [v1] References: 5.6.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points or state "no limit": Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points or state "no limit": ***4096.*** Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.4 TEXT [v1] References: 5.6.4 7.5.4.5	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. Is the 'not final' flag allowed: (yes/no) Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. Is the 'not final' flag allowed: (yes/no) ***Yes.*** Other: ***None.***
T.19.5 RESTRICTED TEXT [v1] References: 5.6.5 7.5.4.5 T.25.7 D.4.5.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. Is the 'not final' flag allowed: (yes/no) 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) If yes, specify. For [v3] metafiles, RESTRICTED TEXT TYPE shall be used if this element is used. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. 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.25.7*** For [v3] metafiles, RESTRICTED TEXT TYPE shall be used if this element is used. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.6 APPEND TEXT [v1] References: 5.6.6. 7.5.4.5 D.4.5.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *string* parameter shall follow the rules for graphical text, clause 7.5.4.5. Other: ***None.***
T.19.7 POLYGON [v1] References: 5.6.7 7.5.4.4 D.2.2.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points: Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points: ***4096.*** Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***
T.19.8 POLYGON SET [v1] References: 5.6.8 7.5.4.4 D.2.2.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points: Number of polygons in a set? Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points: ***4096.*** Number of polygons in a set? ***No limit.*** Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***Each individual polygon within a set shall have at least 3 points.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.9 CELL ARRAY [v1] References: 5.6.9 D.4.5.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Limit for nx: Limit for ny: Limit for nx • ny: Are rotated and skewed cell arrays allowed? (yes/no) If yes, specify the graphical meaning. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 GENERALIZED DRAWING PRIMITIVE [v1] References: 5.6.10	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ List all registered GDPs that are allowed: List all profile-defined GDPs that are allowed and attach complete description: NOTE — Only registered GDPs and profile-defined GDPs shall be allowed in profiles. Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ List all the registered GDPs that are allowed: List all profile-defined GDPs that are allowed and attach complete description: Other:

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.11 RECTANGLE [v1] References: 5.6.11 7.5.4.4 D.2.2.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***
T.19.12 CIRCLE [v1] References: 5.6.12 7.5.4.4 D.2.2.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***
T.19.13 CIRCULAR ARC 3 POINT [v1] References: 5.6.13 7.5.4.3 D.2.2.2 D.4.5.4	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPE	Specifications - Model Profile
T.19.14 CIRCULAR ARC 3 POINT CLOSE [v1] References: 5.6.14 7.5.4.4 D.2.2.2 D.4.5.5	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***
T.19.15 CIRCULAR ARC CENTRE [v1] References: 5.6.15 7.5.4.3 D.2.2.2 D.4.5.6	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.16 CIRCULAR ARC CENTRE CLOSE [v1] References: 5.6.16 7.5.4.4 D.2.2.2 D.4.5.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.17 ELLIPSE [v1] References: 5.6.17 7.5.4.4 D.2.2.2 D.4.5.9 D.4.5.10	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***
T.19.18 ELLIPTICAL ARC [v1] References: 5.6.18 7.5.4.3 D.2.2.1 D.4.5.11	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.19 ELLIPTICAL ARC CLOSE [v1] References: 5.6.19 7.5.4.4 D.2.2.2 D.4.5.12	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-area geometric degeneracies shall be as defined in clause 7.5.4.4. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.20 CIRCULAR ARC CENTRE REVERSED [v2] References: 5.6.20 7.5.4.3 D.2.2.1 D.4.5.8	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.21 CONNECTING EDGE [v2] References: 5.6.21 7.5.4.3 D.2.2.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ This element shall be permitted only if BEGIN/END FIGURE is permitted. Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ This element shall be permitted only if BEGIN/END FIGURE is permitted. Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.22 HYPERBOLIC ARC [v3] References: 5.6.22 7.5.4.3 D.2.2.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.23 PARABOLIC ARC [v3] References: 5.6.23 7.5.4.3 D.2.2.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.24 NON-UNIFORM B-SPLINE [v3] References: 5.6.24 7.5.4.3 D.2.2.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Set of spline orders: Maximum number of control points: Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Set of spline orders: ***cubic spline.*** Maximum number of control points: ***4096.*** Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.25 NON-UNIFORM RATIONAL B-SPLINE [v3] References: 5.6.25 7.5.4.3 D.2.2.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Set of spline orders: Maximum number of control points: Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Set of spline orders: ***cubic spline.*** Maximum number of control points: ***4096.*** Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.26 POLYBEZIER [v3] References: 5.6.26 7.5.4.3 D.2.2.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum number of points: Any restrictions on the continuity indicator? Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Maximum number of points: ***4096.*** Any restrictions on the continuity indicator? ***None.*** Zero-length geometric degeneracies shall be as defined in clause 7.5.4.3. Other: ***None.***
T.19.27 POLYSYMBOL [v3] References: 5.6.27 D.2.2.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Point list: Effect of a reference to a symbol index parameter which is not in the symbol library: Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ 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.***

Table 19 - Graphical primitive elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.19.28 BITONAL TILE [v3] References: 5.6.28 D.2.2.1 D.4.5.13	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ List allowable compression types: Requirements on row padding: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 — Work is in progress on registration of JPEG. When JPEG is registered, it may be added to the allowable compression type values in a future edition of this profile.***
T.19.29 TILE [v3] References: 5.6.29 D.2.2.1 D.4.5.13	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ List allowable compression types: Requirements on row padding: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 — Work is in progress on registration of JPEG. When JPEG is registered, it may be added to the allowable compression type values in a future edition of this profile.***

Table 20 - Attribute elements

Element	Specifications - PPF	Specifications - Model Profile
T.20.1 LINE BUNDLE INDEX [v1] References: 5.7.1 7.5.4.2 D.4.6.1 T.17.11	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *line bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *line bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. 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 [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.2 LINE TYPE [v1] References: 5.7.2 5.4.17 D.4.6.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Select 1 or more of the following: ☐ values 1..5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☐ negative values assigned by the LINE AND EDGE TYPE DEFINITION element. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Select 1 or more of the following: ☑ values 1..5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☑ negative values assigned by the LINE AND EDGE TYPE DEFINITION element. Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.3 LINE WIDTH [v1] References: 5.7.3 D.4.6.3	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Is value zero allowed? (yes/no) If yes, specify its meaning. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 LINE COLOUR [v1] References: 5.7.4 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *line colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *line colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.5 MARKER BUNDLE INDEX [v1] References: 5.7.5 7.5.4.2 T.17.12 D.4.6.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *marker bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *marker bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. 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 [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.6 MARKER TYPE [v1] References: 5.7.6 D.4.6.4	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Indicate one or more of the following restrictions: ☐ values 1-5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Indicate one or more of the following restrictions: ☑ values 1..5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description). Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.7 MARKER SIZE [v1] References: 5.7.7 D.4.6.5	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Is value zero allowed? (yes/no) If yes, specify its meaning. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 MARKER COLOUR [v1] References: 5.7.8 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *marker colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *marker colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.9 TEXT BUNDLE INDEX [v1] References: 5.7.9 7.5.4.2 T.17.13 D.4.6.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *text bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *text bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. 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 [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.10 TEXT FONT INDEX [v1] References: 5.7.10 7.5.4.2 T.16.13	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Every referenced index shall refer to an entry in the FONT LIST (see T.16.13). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Every referenced index shall refer to an entry in the FONT LIST (see T.16.13). Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.11 TEXT PRECISION [v1] References: 5.7.11	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.12 CHARACTER EXPANSION FACTOR [v1] References: 5.7.12 D.4.6.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Is value zero allowed? (yes/no) If yes, state the meaning. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 CHARACTER SPACING [v1] References: 5.7.13 D.4.6.8	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***Values shall be restricted to the range of -1.0..5.0.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.14 TEXT COLOUR [v1] References: 5.7.14 7.5.4.1 T.14.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *text colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	 Element is: Required ☐ Permitted ☑ Prohibited ☐ The *text colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.15 CHARACTER HEIGHT [v1] References: 5.7.15 .4.6.9	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Is zero height allowed? (yes/no) If yes, state its meaning. Any restrictions on the parameter? Other:	 Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 CHARACTER ORIENTATION [v1] References: 5.7.16 D.4.6.10	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the following distortion aspects? rotation? skewing? mirroring? aspect ratio? Other:	 Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the following distortion aspects? rotation? ***None.*** skewing? ***None.*** mirroring? ***None.*** aspect ratio? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.17 TEXT PATH [v1] References: 5.7.17 D.4.6.11	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	■■■■■■■■■■ Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.18 TEXT ALIGNMENT [v1] References: 5.7.18 D.4.6.12	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the horizontal and vertical alignment values? Any restrictions on the continuous horizontal and vertical alignment values? Other:	■■■■■■■■■■ Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the horizontal and vertical alignment values? ***None.*** Any restrictions on the continuous horizontal and vertical alignment values? ***None.*** Other: ***None.***
T.20.19 CHARACTER SET INDEX [v1] References: 5.7.19 7.5.4.2 T.16.14 T.16.22 D.4.6.13	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ 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:	■■■■■■■■■■ Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.20 ALTERNATE CHARACTER SET INDEX [v1] References: 5.7.20 7.5.4.2 T.16.14 T.16.22 D.4.6.13	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ 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:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.20.21 FILL BUNDLE INDEX [v1] References: 5.7.21 7.5.4.2 T.17.14 D.4.6.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *fill bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any refereneed bundle shall have an explicit representation definition. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *fill bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. 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 [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.22 INTERIOR STYLE [v1] References: 5.7.22 D.4.6.15	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ For 'hollow' interior style, line type and width of the bounding line: Any restrictions on the parameter value?: Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 FILL COLOUR [v1] References: 5.7.23 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *fill colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *fill colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.24 HATCH INDEX [v1] References: 5.4.18 5.7.24 5.7.4.2 D.4.6.16	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Select 1 or more of the following: ☐ values 1..6; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☐ negative values assigned by the HATCH STYLE DEFINITION element. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Select 1 or more of the following: ☑ values 1..6; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☑ negative values assigned by the HATCH STYLE DEFINITION element. Other: ***None.***
T.20.25 PATTERN INDEX [v1] References: 5.7.25 7.5.4.2	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *pattern index* parameter shall follow the rules for indexes, clause 7.5.4.2. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *pattern index* parameter shall follow the rules for indexes, clause 7.5.4.2. Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.26 EDGE BUNDLE INDEX [v1] References: 5.7.26 7.5.4.2 T.17.15 D.4.6.1	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ The *edge bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *edge bundle index* parameter shall follow the rules for indexes, clause 7.5.4.2. For [v1] metafiles, allowable index values: *1..5*. *index* 1 2 3 4 5 *edge type* 1 2 3 4 5 *edge width* 1.0 1.0 1.0 1.0 1.0 *edge colour* 1 1 1 1 1 For [v2/3] metafiles, any referenced bundle shall have an explicit representation definition. Other: ***None.***
T.20.27 EDGE TYPE [v1] References: 5.4.17 5.7.27 D.4.6.17	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Select 1 or more of the following: ☐ values 1..5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☐ negative values assigned by the LINE AND EDGE TYPE DEFINITION element. Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Select 1 or more of the following: ☑ values 1..5; ☐ subset of registered values (attach list); ☐ profile-defined values (attach complete description); For [v3] metafiles, ☑ negative values assigned by the LINE AND EDGE TYPE DEFINITION element. Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.28 EDGE WIDTH [v1] References: 5.7.28 D.4.6.18	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Is value zero allowed? (yes/no) If yes, specify its meaning. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Is value zero allowed? (yes/no) ***Yes.*** If yes, specify its meaning. ***Minimum available edge width.*** Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.29 EDGE COLOUR [v1] References: 5.7.29 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *edge colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ The *edge colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.30 EDGE VISIBILITY [v1] References: 5.7.30	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.31 FILL REFERENCE POINT [v1] References: 5.7.31	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.32 PATTERN TABLE [v1] References: 5.7.32	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Maximum size for nx: Allowable values for nx: Maximum size for ny: Allowable values for ny: Any restrictions on the number of pattern definitions? Any restrictions on allowable combinations of nx and ny? Any restrictions on the number of colours? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.33 PATTERN SIZE [v1] References: 5.7.33 D.4.6.19	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Must pattern vectors be parallel to coordinate axes? (yes/no) If no, state the meaning of skewed or non-aligned patterns. Other: NOTE — The description of the layout order of pattern cells in the PATTERN SIZE element (5.7.33) contains an error. The error is corrected by a defect report.	Element is: Required ☐ Permitted ☑ Prohibited ☐ Must pattern vectors be parallel to coordinate axes? (yes/no) ***No.*** If no, state the meaning of skewed or non-aligned patterns. Other:
T.20.34 COLOUR TABLE [v1] References: 5.7.34 7.5.4.1 T.14.1	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the length of colour list? Any restrictions on the index values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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 ASPECT SOURCE FLAGS [v1] References: 5.7.35 D.4.6.20	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ 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) Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ 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.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.36 PICK IDENTIFIER [v2] References: 5.7.36	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***
T.20.37 LINE CAP [v3] References: 5.7.37 7.5.7.5 T.25.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values for the line cap indicator? (choose 1 or both) ☐ values 1..5; ☐ subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) ☐ values 1..3; ☐ subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values for the line cap indicator? (choose 1 or both) ☑ values 1..5; ☐ subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) ☑ values 1..3; ☐ subset of registered values (attach list). Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.38 LINE JOIN [v3] References: 5.7.38 7.5.7.5 T.25.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☐ values 1...4; ☐ subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☑ values 1..4; ☐ subset of registered values (attach list). Other: ***None.***
T.20.39 LINE TYPE CONTINUATION [v3] References: 5.7.39 7.5.7.5 T.25.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? ***1..4.*** Other: ***None.***
T.20.40 LINE TYPE INITIAL OFFSET [v3] References: 5.7.40	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.41 TEXT SCORE TYPE [v3] References: 5.7.41	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☐ Values 1..4; ☐ Subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☑ Values 1..4; ☐ Subset of registered values (attach list). Other: ***None.***
T.20.42 RESTRICTED TEXT TYPE [v3] References: 5.7.42 7.5.7.5 T.25.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☐ Values 1..6; ☐ Subset of registered values (attach list). Algorithms for achieving restriction type? (attach) Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☑ Values 1..6; ☐ Subset of registered values (attach list). Algorithms for achieving restriction type? (attach) ***Not specified.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.43 INTERPOLATED INTERIOR [v3] References: 5.7.43	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the number of stages? Any restrictions on the set of values? (choose 1 or both) ☐ Values 1..3; ☐ Subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any limits on the number of stages? ***Maximum number of stages is 8.*** Any restrictions on the set of values? (choose 1 or both) ☑ Values 1..3; ☐ Subset of registered values (attach list). Other: ***None.***
T.20.44 EDGE CAP [v3] References: 5.7.44 7.5.7.5 T.25.7	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values for the edge cap indicator? (choose 1 or both) ☐ values 1..5; ☐ subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) ☐ values 1..3; ☐ subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values for the edge cap indicator? (choose 1 or both) ☑ values 1..5; ☐ subset of registered values (attach list). Any restrictions on the set of values for the dash cap indicator? (choose 1 or both) ☑ values 1..3; ☐ subset of registered values (attach list). Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.45 EDGE JOIN [v3] References: 5.7.45 7.5.7.5 T.25.7	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☐ values 1...4; ☐ subset of registered values (attach list). Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? (choose 1 or both) ☑ values 1..4; ☐ subset of registered values (attach list). Other: ***None.***
T.20.46 EDGE TYPE CONTINUATION [v3] References: 5.7.46 7.5.7.5 T.25.7	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the set of values? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the set of values? ***1..4.*** Other: ***None.***
T.20.47 EDGE TYPE INITIAL OFFSET [v3] References: 5.7.47	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter value? ***None.*** Other: ***None.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.48 SYMBOL LIBRARY INDEX [v3] References: 5.7.48 7.5.4.2 T.16.23	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Every referenced index shall refer to an entry in the SYMBOL LIBRARY LIST (see T.16.23). Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ 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 SYMBOL COLOUR [v3] References: 5.7.49 7.5.4.1 T.14.1 T.16.23 D.4.6.21	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ The *symbol colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ The *symbol colour specifier* parameter shall follow the rules for colour, clause 7.5.4.1 and T.14.1. Any restrictions on the parameter value? Other: ***This element is prohibited because SYMBOL LIBRARY LIST is prohibited.***
T.20.50 SYMBOL SIZE [v3] References: 5.7.50 T.16.23	Same as Model Profile ☐	
	Element is: Required ☐ Permitted ☐ Prohibited ☐ Is value zero is allowed: (yes/no) If yes, specify its meaning. Any restrictions on the parameter value? Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ 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.***

Table 20 - Attribute elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.20.51 SYMBOL ORIENTATION [v3] References: 5.7.51 T.16.23 D.4.6	Same as Model Profile ☐ Element is: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on rotation? Any restrictions on skewing? Any restrictions on mirroring? Any restrictions on distortion of aspect ratio? Other:	Element is: Required ☐ Permitted ☐ Prohibited ☑ 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.***

Table 21 - Escape elements

Element	Specifications - PPF	Specifications - Model Profile
T.21.1 ESCAPE [v1] References: 5.8.1	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ List all registered ESCAPEs that are allowed: List all profile-defined ESCAPEs that are allowed and attach complete description: Other: NOTE — Only registered ESCAPEs and profile-defined ESCAPEs shall be allowed in profiles.	Element: Require ☐ Permitted ☑ Prohibited ☐ 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***

Table 22 - External elements

Element	Specifications - PPF	Specifications - Model Profile
T.22.1 MESSAGE [v1] References: 5.9.1	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Values of the *action required flag* parameter: 'action' Permitted ☐ Prohibited ☐ (if permitted, specify the messages and actions taken) 'no action' Permitted ☐ Prohibited ☐ Any restrictions on the length of the message string, other than those for type SF parameter? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Values of the *action required flag* parameter: 'action' Permitted ☐ Prohibited ☑ (if permitted, specify the messages and actions taken) 'no action' Permitted ☑ Prohibited ☐ Any restrictions on the length of the message string, other than those for SF parameter? ***None.*** Other: ***None.***
T.22.2 APPLICATION DATA [v1] References: 5.9.2	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ 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:	Element: Required ☐ Permitted ☑ Prohibited ☐ 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***

Table 23 - Segment elements

Element	Specifications - PPF	Specifications - Model Profile
T.23.1 COPY SEGMENT [v2] References: 5.10.1 D.4.9.2	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ 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:	Element: Required ☐ Permitted ☑ Prohibited ☐ 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 INHERITANCE FILTER [v2] References: 5.10.2	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the filter selection list? Any limits on the selection setting? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any limits on the filter selection list? ***None.*** An limits on the selection setting? ***None.*** Other: ***None.***
T.23.3 CLIP INHERITANCE [v2] References: 5.10.3 D.4.9.2	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any limits on the parameter? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any limits on the parameter? ***None.*** Other: ***None.***

Table 23 - Segment elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.23.4 SEGMENT TRANS-FORMATION [v2] References: 5.10.4	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the nature of the transformation (e.g., permitting only isotropic transformations)? ***Non-singular***. Other: ***None.***
T.23.5 SEGMENT HIGHLIGHTING [v2] References: 5.10.5	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***None.*** Other: ***None.***
T.23.6 SEGMENT DISPLAY PRIORITY [v2] References: 5.10.6	Same as Model Profile ☐	
	Element: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? ***None.*** Other: ***None.***

Table 23 - Segment elements (continued)

Element	Specifications - PPF	Specifications - Model Profile
T.23.7 SEGMENT PICK PRIORITY [v2] References: 5.10.7	Same as Model Profile ☐ Element: Required ☐ Permitted ☐ Prohibited ☐ Any restrictions on the parameter values? Other:	Element: Required ☐ Permitted ☑ Prohibited ☐ Any restrictions on the parameter values? *None.* Other: *None.*

Table 24 - Generator implementation requirements

Functionality	Specifications - PPF	Specifications - Model Profile
T.24.1 Colour requirements References: 7.5.4.1 7.5.6.2.2	Same as Model Profile ☐	
	Colour mapping is: Permitted ☐ Prohibited ☐ Reduction of the number of colours? Definition of mapping algorithms, metrics, and colour space? For [v1/2] metafiles, implicit colour calibration specifications? Other:	Colour mapping is: Permitted ☒ Prohibited ☐ 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.24.2 Geometric accuracy and latitude References: 7.5.6.2.1	Same as Model Profile ☐	
	Accuracy and latitude for mapping application graphics to CGM graphical primitive elements:	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 ±½ 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 ±½ 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.***

Table 24 - Generator implementation requirements (continued)

Functionality	Specifications - PPF	Specifications - Model Profile
T.24.3 Text accuracy and latitude References: 7.5.6.2.3	Same as Model Profile ☐	
	Is text accuracy and latitude addressed? (yes/no) If yes, specify.	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 ±½ pixel of the intended size, whichever is greater, for the placement and overall extent of each text string.***
T.24.4 Font substitution References: 7.5.6.2.4 annex H	Same as Model Profile ☐	
	Font substitution is: Permitted ☐ Prohibited ☐ Similarity of font visual characteristics? Font metrics? Individual glyph metrics? Other:	Font substitution is: Permitted ☑ Prohibited ☐ Similarity of font visual characteristics? ***Substituted fonts shall have similar visual characteristics (e.g., posture, weight, proportionate width).*** Font metrics? ***Specified in annex H.*** Individual glyph metrics? ***Specified in annex H.*** Other: ***None.***
T.24.5 Preservation of primitives References: 7.5.6.3	Same as Model Profile ☐	
	Is preservation of graphical primitive elements addressed? (yes/no) If yes, specify allowable substitutions.	Is preservation of graphical primitive elements addressed? (yes/no) ***No.*** If yes, specify allowable substitutions.

Table 24 - Generator implementation requirements (continued)

Functionality	Specifications - PPF	Specifications - Model Profile
T.24.6 Semantic latitude References: 7.5.6.4	Same as Model Profile ☐	
	Drawing priority and mode: Clipping: Edge centreing: Meaning of predefined line types and edge types: Meaning of predefined hatch styles: Other:	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: ***The inter-line spacing is not specified. Use the latitudes of annex D.4.6.16 for the angular directions.*** Other: ***None.***
T.24.7 Error processing References: 7.5.6.5	Same as Model Profile ☐	
	Is error processing addressed? (yes/no) If yes, specify the action taken: Classification of error severity? Requirements for error recovery? Requirements for error reporting? Additional areas? Other:	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.***