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Information technology — Font information interchange —

Part 4: Harmonization to Open Font Format

Technologies de l'information — Échange d'information sur les polices de caractères —

Partie 4: Harmonisation au format de police de caractères ouvert

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 9541-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages*.

ISO/IEC 9541 consists of the following parts, under the general title *Information technology — Font information interchange*:

— *Part 1: Architecture*

— *Part 2: Interchange format*

— *Part 3: Glyph shape representation*

— *Part 4: Harmonization to Open Font Format*

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Introduction

ISO/IEC 9541 is a font information interchange standard and is designed to be independent of any concrete font file format. The Open Font Format (ISO/IEC 14496-22) is a font file format specification that is based on the TrueType font file format. With regard to the handling and utilization of the typographic properties stored in OFF file, ISO/IEC 14496-22 describes the implementations on Microsoft Windows or IBM OS/2 only. Therefore, ISO/IEC 14496-22 does not specify the method for defining a font resource in ISO/IEC 9541 architectures from a given OFF file, because it is out of the scope. ISO/IEC 9541-4 fills the gap between OFF file and font resource in ISO/IEC 9541.

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Information technology — Font information interchange —

Part 4:
Harmonization to Open Font Format

1 Scope

ISO/IEC 9541 specifies the architecture of font resources, as well as the formats for font interchange among information processing systems. It also specifies the architecture and formats that can be used to construct font references in general electronic document interchange.

This part of ISO/IEC 9541 specifies the correspondences between ISO/IEC 9541 font resource and ISO/IEC 14496-22 Open Font Format file (OFF), to define ISO/IEC 9541 font resource from a given OFF file. The classification (required or optional), syntax, and possible values of the properties are defined in ISO/IEC 9541-1 and ISO/IEC 9541-2. The glyph shape representation and its interpretation are defined in ISO/IEC 9541-3.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 9541-1, *Information technology — Font information interchange — Part 1: Architecture*

ISO/IEC 9541-2, *Information technology — Font information interchange — Part 2: Interchange format*

ISO/IEC 9541-3, *Information technology — Font information interchange — Part 3: Glyph shape representation*

ISO/IEC 10036, *Information technology — Font information interchange — Procedures for registration of font-related identifiers*

ISO/IEC 10180, *Information technology — Processing languages — Standard Page Description Language (SPDL)*

ISO/IEC 14496-18, *Information technology — Coding of audio-visual objects — Part 18: Font compression and streaming*

ISO/IEC 14496-22, *Information technology — Coding of audio-visual objects — Part 22: Open Font Format*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 9541-1, ISO/IEC 9541-2, ISO/IEC 9541-3, ISO/IEC 14496-22 and the following apply.

NOTE The definitions given in 3.1 and 3.2 take precedence over the definitions of the same terms given in ISO/IEC 9541-1, ISO/IEC 9541-2, ISO/IEC 9541-3 and ISO/IEC 14496-22.

3.1
AFII glyph name
glyph name defined by the Association for Font Information Interchange (AFII)

3.2
italic
script typeface

NOTE 1 In ISO/IEC 9541, “italic” does not refer to the oblique typeface that makes the upright typeface slanted.

NOTE 2 In ISO/IEC 14496-22, “italic” means both the script typeface and the oblique typeface synthesized from the normal typeface.

4 Harmonization to Open Font Format

4.1 Harmonization of the elements in OFF “head” table

4.1.1 “Table version number” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.1.2 “fontRevision” element

This element is used to define ISO/IEC 9541-1 DATAVERSION.

4.1.3 “checkSumAdjustment” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is used by the checksum calculation.

4.1.4 “magicNumber” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because it is constant and specific to OFF file.

4.1.5 “flags” element

The flags element is 16 bit value to describe the feature of the OFF file. The font file of OFF stores this element in big endian and the bit0 means its LSB, bit15 means its MSB. The bit5-10 are used by TrueType fonts designed for Apple Macintosh font manager, but their specification is out of OFF.

a) bit0

Bit0 shows Boolean flag if Baseline is set to y=0 line. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not have per-font Boolean flag for the position of Baseline.

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b) bit1

Bit1 shows Boolean flag if LeftSideBearing is set to x=0 line. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not have per-font Boolean flag for the position of LeftSideBearing.

c) bit2

Bit2 shows Boolean flag if sfnt TrueType glyph procedure depends on pointsize. ISO/IEC 9541-1 and ISO/IEC 9541-2 have no per-font boolean flag for specific glyph shape representation.

d) bit3

Bit3 shows Boolean flag if PPEM is integer. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which depends on glyph shape representation and the glyph shape procedure interpreter.

e) bit4

Bit4 shows Boolean flag if Microsoft instruction to change character width is used. ISO/IEC 9541-1 and ISO/IEC 9541-2 have no per-font Boolean flag for specific glyph shape representation.

f) bit11

Bit11 shows Boolean flag if this OFF file is Agfa MicroType font. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because this value declares the font file compression technology defined in ISO/IEC 14496-18 and has no effects on font properties.

g) bit12

Bit12 shows Boolean flag if this OFF file is converted file. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because this value declares the source of font file and has no effects on font properties.

h) bit13

Bit13 shows Boolean flag if this OFF file is designed for Microsoft ClearType rasterizer. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because it is used by specific implementation.

4.1.6 “unitPerEm” element

This element is used to define ISO/IEC 9541-1 RELUNITS.

4.1.7 “created” element

This element is used to define ISO/IEC 9541-1 DATAVERSION.

4.1.8 “modified” element

This element is used to define ISO/IEC 9541-1 DATAVERSION.

4.1.9 “xMin” element

This element is used to define minx in ISO/IEC 9541-1 MAXFONTEXT.

4.1.10 “yMin” element

This element is used to define miny in ISO/IEC 9541-1 MAXFONTEXT.

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4.1.11 "xMax" element

This element is used to define maxx in ISO/IEC 9541-1 MAXFONTEXT.

4.1.12 "yMax" element

This element is used to define maxy in ISO/IEC 9541-1 MAXFONTEXT.

4.1.13 "macStyle" element

The font file of OFF stores this element in big endian and the bit0 means its LSB, bit15 means its MSB. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value. This element is used by Apple Macintosh to declare an OFF file as an embolden typeface of another typeface. In the matching, the combination of FamilyName and macStyle is used. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not provide such mechanism to relate a typeface to another typeface.

a) bit0

Bit0 shows Boolean flag if the glyph in this OFF file is already emboldened. This element is used to define ISO/IEC 9541-1 WEIGHT.

b) bit1

Bit1 shows Boolean flag if the glyph in this OFF file is Italic or oblique. This element is used to define ISO/IEC 9541-1 POSTURE.

c) bit2

Bit2 shows Boolean flag if the glyph in this OFF file has underline. This element is used to define ISO/IEC 9541-1 DSNGROUP.

d) bit3

Bit3 shows Boolean flag if the glyph in this OFF file is outlined. This element is used to define ISO/IEC 9541-1 DSNGROUP.

e) bit4

Bit4 shows Boolean flag if the glyph in this OFF file is shadowed. This element is used to define ISO/IEC 9541-1 DSNGROUP.

f) bit5

Bit5 shows Boolean flag if the glyph in this OFF file is condensed. This element is used to define ISO/IEC 9541-1 PROPWIDTH.

g) bit6

Bit6 shows Boolean flag if the glyph in this OFF file is extended. This element is used to define ISO/IEC 9541-1 PROPWIDTH.

4.1.14 "LowestRecPPEM" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because it depends on output surface. If the information on the resolution of output surface is available, this value can be related with ISO/IEC 9541-1 MINSIZE.

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4.1.15 “fontDirectionHint” element

This element is used to define ISO/IEC 9541-1 NOMWRMODE.

4.1.16 “indexLocFormat” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.1.17 “glyphDataFormat” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.2 Harmonization of the elements in OFF “name” table

4.2.1 “copyright notice” element

This element is used to define ISO/IEC 9541-1 DSNCOPYRIGHT.

4.2.2 “Font Family Name” element

This element is used to define ISO/IEC 9541-1 FONTFAMILY.

4.2.3 “Font Subfamily Name” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.4 “Unique Font Identifier” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.5 “Full Font Name” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.6 “Version String” element

This element is used to define ISO/IEC 9541-1 DATAVERSION.

4.2.7 “PostScript Name” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is specific to output surface.

4.2.8 “Trademark” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.9 “Manufacture Name” element

This element is used to define ISO/IEC 9541-1 DSNSOURCE.

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4.2.10 “Designer” element

This element is used to define ISO/IEC 9541-1 DSNSOURCE.

4.2.11 “Description” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.12 “URL Vendor” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.13 “License Description” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.14 “Preferred Family” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.15 “Compatible fullname” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.16 “Sample text” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.2.17 “PostScript CID fontname” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.3 Harmonization of the elements in OFF “hhea” table

4.3.1 “Table version number” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.3.2 “Ascender” element

This element is used to define maxy in ISO/IEC 9541-1 MAXFONTEXT.

4.3.3 “Descender” element

This element is used to define miny in ISO/IEC 9541-1 MAXFONTEXT.

4.3.4 “LineGap” element

This element is used to define ISO/IEC 9541-1 MINLINESP.

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4.3.5 “advanceWidthMax” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.3.6 “minLeftSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.3.7 “minRightSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.3.8 “xMaxExtent” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.3.9 “caretSlopeRise” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.3.10 “caretSlopeRun” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.3.11 “caretOffset” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.3.12 “metricDataFormat” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.3.13 “numberofHMetrics” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.4 Harmonization of the elements in OFF “hmtx” table

4.4.1 “advanceWidth” element

This element is used to define ISO/IEC 9541-1 EX.

4.4.2 “leftSideBearning” element

This element is used to define ISO/IEC 9541-1 MINEX.

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4.5 Harmonization of the elements in OFF “vhea” table

4.5.1 “version” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.5.2 ascent-related elements

The data structures of vhea version 1.0 (version element is set to 0x00010000) and 1.1 (version element is set to 0x00011000) are same but the typographic definitions of the element related to ascent are different. In following, the original “ascent” element (used in version 1.0) and “vertTypoAscender” element (used in version 1.1) are described.

4.5.2.1 “ascent” element

This element is used to define ISO/IEC 9541-1 MINLINESP.

4.5.2.2 “vertTypoAscender” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.5.3 descent-related element

The data structures of vhea version 1.0 (version element is set to 0x00010000) and 1.1 (version element is set to 0x00011000) are same but the typographic definitions of the element related to descent are different. In following, the original “descent” element (used in version 1.0) and “vertTypoDescender” element (used in version 1.1) are described.

4.5.3.1 “descent” element

This element is used to define ISO/IEC 9541-1 MINLINESP.

4.5.3.2 “vertTypoDescender” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.5.4 linegap-related element

The data structures of vhea version 1.0 (version element is set to 0x00010000) and 1.1 (version element is set to 0x00011000) are same but the typographic definitions of the element related to linegap are different. In following, the original “lineGap” element (used in version 1.0) and “vertTypoLineGap” element (used in version 1.1) are described.

4.5.4.1 “lineGap” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value, because it is fixed to 0.

4.5.4.2 “vertTypoLineGap” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

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4.5.5 “advanceHeightMax” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.5.6 “minTopSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.5.7 “minBottomSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.5.8 “ymaxExtent” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties.

4.5.9 “caretSlopeRise” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.5.10 “caretSlopeRun” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.5.11 “caretOffset” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is designed for text input user interface.

4.5.12 “metricDataFormat” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.5.13 “numberofVMetrics” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.6 Harmonization of the elements in OFF “vmtx” table

4.6.1 “advanceHeight” element

This element is used to define ISO/IEC 9541-1 EY.

4.6.2 “topSideBearing” element

This element is used to define maxy in ISO/IEC 9541-1 EXT.

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4.7 Harmonization of the elements in OFF “maxp” table

4.7.1 “table version number” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.7.2 “numGlyphs” element

This element is used to define ISO/IEC 9541-1 NUMGLYPHS.

4.7.3 glyph shape representation profiles

Following elements indicates the requirement for TrueType glyph procedure interpreter by included TrueType glyph shape representation data. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not define the detailed implementation of TrueType glyph instruction interpreter; therefore ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not deal with these elements.

- maxPoints
- maxContours
- maxCompositePoints
- maxCompositeContours
- maxZones
- maxTwilightPoints
- maxStorage
- maxFunctionDefs
- maxInstructionDefs
- maxStackElements
- maxComponentElements
- maxComponentDeps

4.8 Harmonization of the elements in OFF “kern” table

The elements in OFF “kern” table are used to define ISO/IEC 9541-1 PEA or CPEA list. The “kern” table consists from a few top level elements and one or more subtables. In OFF, the horizontal or vertical kerning vector of specified glyph pair is calculated by the composition of the values in all subtables for specified writing mode. ISO/IEC 9541-1 and ISO/IEC 9541-2 can interchange the composed kerning vector via the properties ISO/IEC 9541-1 PEA or CPEA, but does not interchange the contents of each subtables separately. As the recommendations of OFF specification notes, there are the implementation specific limitations in the composition of kerning values; the direction of kerning vector, the range of supported subtable format and the maximum number of subtables to be composed. The interpretation of the values in kern table should consider these limitation of the target implementation that the OFF file is designed for.

4.8.1 “version” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

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4.8.2 “nTables” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.8.3 The subtable elements

4.8.3.1 “version” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.8.3.2 “length” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.8.3.3 “coverage” element

The font file of OFF stores this element in big endian and the bit0 means its LSB, bit15 means its MSB. This element consists of 16 Boolean elements.

a) bit0: “horizontal” element

This element is used to declare the writing mode of the subtable. It is used to choose the appropriate ISO/IEC 9541-1 WRMODE to assign the values of the subtable.

b) bit1: “minimum” element

This element affects the composition algorithm for this subtable. ISO/IEC 9541 has no property to interchange this flag transparently.

c) bit2: “cross-stream” element

This element affects the composition algorithm for this subtable. ISO/IEC 9541 has no property to interchange this flag transparently.

d) bit3: “override” element

This element affects the composition algorithm for this subtable. ISO/IEC 9541 has no property to interchange this flag transparently.

e) bit8-15: format element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.8.3.4 Harmonization of the elements in OFF “kern” subtable in format 0

The “kern” subtable in format 0 provides the list of paired glyph index and horizontal kerning value in FUnits. The kerning value is used to define ISO/IEC 9541-1 PEAS.

4.8.3.5 Harmonization of the elements in OFF “kern” subtable in format 2

The “kern” subtable in format 0 provides the list of paired glyph index and horizontal kerning value in FUnits. The kerning value is used to define ISO/IEC 9541-1 CPEAI.

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4.9 Harmonization of the elements in OFF "post" table

4.9.1 "Version" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.9.2 "italicAngle" element

The "italic" in this element means a slanted typeface mathematically transformed from normal regular typeface. This element is used to define ISO/IEC 9541-1 POSTUREANGLE.

4.9.3 "underlinePosition" element

This element is used to define ISO/IEC 9541-1 SCOREOFFSETY.

4.9.4 "underlineThickness" element

This element is used to define ISO/IEC 9541-1 SCORETHICK.

4.9.5 "isFixedPitch" element

This element is used to define ISO/IEC 9541-1 ESCCLASS.

4.9.6 "minMemType42" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is specific to the implementation to rasterize TrueType glyph shape representation directly.

4.9.7 "maxMemType42" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is specific to the implementation to rasterize TrueType glyph shape representation directly.

4.9.8 "minMemType1" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is specific to the implementation to rasterize TrueType glyph shape representation via shape conversion by ISO/IEC 9541 Type 1 glyph shape representation.

4.9.9 "maxMemType1" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which is specific to the implementation to rasterize TrueType glyph shape representation via shape conversion by ISO/IEC 9541 Type 1 glyph shape representation.

4.10 Harmonization of the elements in OFF "CFF" table

The "CFF" table of OFF file consists of glyph-independent properties per font and the glyph shape representation. The data structure of "CFF" table is described in bibliography [2]. When the "CFF" table is designed for 7 or 8bit character set, the content of CFF table must provide the data that is sufficient to define a SPDL indexed font. Therefore, the syntaxes of some values in CFF table are restricted to be compatible with SPDL indexed font.

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4.10.1 Harmonization of the elements in Top DICT

4.10.1.1 "version" element

This element is used to define ISO/IEC 9541-1 DATAVERSION. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.1.

4.10.1.2 "Notice" element

ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.3 "Copyright" element

This element is used to define ISO/IEC 9541-1 DSNCOPYRIGHT, but SPDL indexed font does reserve the property for this element.

4.10.1.4 "FullName" element

ISO/IEC 9541 font resource does not reserve the property for this element, but SPDL indexed font requires this property. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.2.

4.10.1.5 "FamilyName" element

This element is used to define ISO/IEC 9541-1 FAMILYNAME. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.3.

4.10.1.6 "Weight" element

This element is used to define ISO/IEC 9541-1 WEIGHT. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.4.

4.10.1.7 "isFixedPitch" element

This element is used to define ISO/IEC 9541-1 ESCCLASS. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.6.

4.10.1.8 "ItalicAngle" element

This element is used to define ISO/IEC 9541-1 POSTUREANGLE. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.5.

4.10.1.9 "UnderlinePosition" element

This element is used to define ISO/IEC 9541-1 SCOREOFFSETY. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.7.

4.10.1.10 "UnderlineThickness" element

This element is used to define ISO/IEC 9541-1 SCORETHICK. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.8.

4.10.1.11 "PaintType" element

This element is used to define ISO/IEC 9541-3 PAINTTYPE for Type 1 glyph shape representation (described in ISO/IEC 9541-3:1994, 2.6.1.2). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.3.

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4.10.1.12 "CharstringType" element

This element is used to define ISO/IEC 9541-3 GSHAPES for Type 1 glyph shape representation (described in ISO/IEC 9541-3:1994, 1.7.2). In SPDL indexed font, the value should be consistent with FontType property described in ISO/IEC 10180:1995, C.4.2.4.

4.10.1.13 "FontMatrix" element

This element is used to define ISO/IEC 9541-1 RELUNITS. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.5.

4.10.1.14 "UniqueID" element

This element is used to define ISO/IEC 9541-3 UNIQUEID (described in ISO/IEC 9541-3:1994, 2.6.1.3). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.8.

4.10.1.15 "FontBBox" element

This element is used to define ISO/IEC 9541-1 MAXFONTEXT. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.1.16 "StrokeWidth" element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

4.10.1.17 "XUID" element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

4.10.1.18 "charset" element

This element is an offset used by CFF font interpreter internally to access the charset dictionary. ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.19 "Encoding" element

This element is an offset used by CFF font interpreter internally to access the encoding dictionary. ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.20 "CharStrings" element

This element is an offset used by CFF font interpreter internally to access the glyph procedures. ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.21 "Private" element

This element is a pair of an offset and data length used by CFF font interpreter internally to access Private DICT. ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.22 "SyntheticBase" element

ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.23 "PostScript" element

ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

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4.10.1.24 "BaseFontName" element

ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.25 "BaseFontBlend" element

ISO/IEC 9541 and SPDL indexed font do not reserve the property for this element.

4.10.1.26 Harmonization of the additional elements for CIDFonts

ISO/IEC 9541 and SPDL indexed font do not reserve the properties for following elements.

- ROS
- CIDFontVersion
- CIDFontRevision
- CIDFontType
- CIDCount
- UIDBase
- FDArray
- FDSelect
- FontName

4.10.2 Harmonization of the elements in charset DICT

The relationship between charset DICT and ISO/IEC 9541 font resource and SPDL indexed font resource is described.

4.10.3 Harmonization of the elements in Encoding DICT

The relationship between charset DICT and ISO/IEC 9541 font resource and SPDL indexed font resource is described.

4.10.4 Harmonization of the elements in Private DICT

4.10.4.1 "BlueValues" element

This element is used to define ISO/IEC 9541-3 ISO/IEC 9541-1 MAXFONTEXT. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.2 "OtherBlues" element

This element is used to define ISO/IEC 9541-3 otherblues (described in ISO/IEC 9541-3:1994, 2.6.2.2). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.6.

4.10.4.3 "FamilyBlues" element

This element is used to define ISO/IEC 9541-3 familyblues (described in ISO/IEC 9541-3:1994, 2.6.2.3). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.6.

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4.10.4.4 “FamilyOtherBlues” element

This element is used to define ISO/IEC 9541-3 familyotherblues (described in ISO/IEC 9541-3:1994, 2.6.2.4). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.6.

4.10.4.5 “BlueScale” element

This element is used to define ISO/IEC 9541-3 bluescale (described in ISO/IEC 9541-3:1994, 2.6.2.5). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.6 “BlueShift” element

This element is used to define ISO/IEC 9541-3 blueshift (described in ISO/IEC 9541-3:1994, 2.6.2.6). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.7 “BlueFuzz” element

This element is used to define ISO/IEC 9541-3 bluefuzz (described in ISO/IEC 9541-3 2.6.2.7). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.8 “StdHW” element

This element is used to define ISO/IEC 9541-3 std-hw (described in ISO/IEC 9541-3:1994, 2.6.2.8.1). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.9 “StdVW” element

This element is used to define ISO/IEC 9541-3 std-vw (described in ISO/IEC 9541-3:1994, 2.6.2.8.2). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.10 “StemSnapH” element

This element is used to define ISO/IEC 9541-3 stem-snap-h (described in ISO/IEC 9541-3:1994, 2.6.2.8.4). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.11 “StemSnapV” element

This element is used to define ISO/IEC 9541-3 stem-snap-v (described in ISO/IEC 9541-3:1994, 2.6.2.8.4). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.12 “ForceBold” element

This element is used to define ISO/IEC 9541-3 force-bold (described in ISO/IEC 9541-3:1994, 2.6.2.8.5). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.13 “LanguageGroup” element

This element is used to define ISO/IEC 9541-3 language-group (described in ISO/IEC 9541-3:1994, 2.6.2.8.6). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.14 “ExpansionFactor” element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

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4.10.4.15 "initialRandomSeed" element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

4.10.4.16 "Subrs" element

This element is used to define ISO/IEC 9541-3 subrs (described in ISO/IEC 9541-3:1994, 2.6.3.4). The syntax of value is described in ISO/IEC 10180:1995, C.4.2.7.

4.10.4.17 "defaultWidthX" element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

4.10.4.18 "nominalWidthX" element

ISO/IEC 9541 font resource and SPDL indexed font do not reserve the property for this element.

4.11 Harmonization of the elements in OFF "OS/2" table

4.11.1 "version" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.11.2 "xAvgCharWidth" element

This element is used to define ISO/IEC 9541-1 AVGESCX.

4.11.3 "usWeightClass" element

This element is used to define ISO/IEC 9541-1 WEIGHT.

4.11.4 "usWidthClass" element

This element is used to define ISO/IEC 9541-1 PROPWIDTH.

4.11.5 "fsType" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because it is designed to control the restriction of OFF file printing, embedding and subsetting. Such restriction is out of scope of ISO/IEC 9541.

4.11.6 "ySubscriptXOffset" element

This element is used to define ISO/IEC 9541-1 VSOFFSETX.

4.11.7 "ySubscriptYOffset" element

This element is used to define ISO/IEC 9541-1 VSOFFSETY.

4.11.8 "ySubscriptXSize" element

This element is used to define ISO/IEC 9541-1 VSSCALEX.

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4.11.9 “ySubscriptYSize” element

This element is used to define ISO/IEC 9541-1 VSSCALEY.

4.11.10 “ySuperscriptXOffset” element

This element is used to define ISO/IEC 9541-1 VSOFFSETX.

4.11.11 “ySuperscriptYOffset” element

This element is used to define ISO/IEC 9541-1 VSOFFSETY.

4.11.12 “ySuperscriptXSize” element

This element is used to define ISO/IEC 9541-1 VSSCALEX.

4.11.13 “ySuperscriptYSize” element

This element is used to define ISO/IEC 9541-1 VSSCALEY.

4.11.14 “sFamilyClass” element

This element is used to define ISO/IEC 9541-1 DSNGROUP, ISO/IEC 9541-1 TYPEFACECLASS-PROP.

4.11.15 “Panose” element

OS/2 table of OFF file allocates 10 octets storage to store “Panose” element, in all versions of OS/2 table. The name of each octet refers the names of digits in “Latin Text” (bibliography [3]). In OFF, OS/2 table since version 3 defines the name of each octet but no definition of the values. Earlier versions have their own definitions, i.e. bFamilyStyle=2 means the typeface is “Text and Display”.

4.11.15.1 bFamilyStyle

This element is used to define ISO/IEC 9541-1 DSNGROUP.

4.11.15.2 bSerifStyle

This element is used to define ISO/IEC 9541-1 SERIFSTYLE.

4.11.15.3 bWeight

This element is used to define ISO/IEC 9541-1 WEIGHT.

4.11.15.4 bProportion

This element is used to define ISO/IEC 9541-1 PROPWIDTH.

4.11.15.5 StrokeVariation

This element is used to define ISO/IEC 9541-1 DSNGROUP

4.11.15.6 bArmStyle

This element is used to define ISO/IEC 9541-1 DSNGROUP

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4.11.15.7 bLetterform

This element is used to define ISO/IEC 9541-1 DSNGROUP

4.11.15.8 bMidLine

This element is used to define ISO/IEC 9541-1 DSNGROUP

4.11.15.9 bXHeight

This element is used to define ISO/IEC 9541-1 DSNGROUP and ISO/IEC 9541-1 LCHEIGHT.

4.11.16 "ulUnicodeRange1" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.17 "ulUnicodeRange2" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.18 "ulUnicodeRange3" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.19 "ulUnicodeRange4" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.20 "achVendID" element

This element is used to define ISO/IEC 9541-1 DATASOURCE.

4.11.21 "fsSelection" element

The font file of OFF stores this element in big endian and the bit0 means its LSB, bit15 means its MSB.

a) bit0

Bit0 shows Boolean flag if the glyph in this OFF file is Italic or oblique. This element is used to define ISO/IEC 9541-1 DSNGROUP

b) bit1

Bit1 shows Boolean flag if the glyph in this OFF file is underscored. This element is used to define ISO/IEC 9541-1 DSNGROUP

c) bit2

Bit2 shows Boolean flag if the glyph in this OFF file is negative (painted background and unpainted glyph). This element is used to define ISO/IEC 9541-1 DSNGROUP

d) bit3

Bit3 shows Boolean flag if the glyph in this OFF file is outlined (the outline of glyph is painted but background and internal of glyph is not painted). This element is used to define ISO/IEC 9541-1 DSNGROUP

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e) bit4

Bit4 shows Boolean flag if the glyph in this OFF file is over struck. This element is used to define ISO/IEC 9541-1 DSNGROUP

f) bit5

Bit5 shows Boolean flag if the glyph in this OFF file is already emboldened. This element is used to define ISO/IEC 9541-1 DSNGROUP

g) bit6

Bit6 shows Boolean flag if this OFF file is regular. This element is used to define ISO/IEC 9541-1 DSNGROUP

h) bit9

Bit9 shows Boolean flag if this OFF file is an oblique. An OFF file for the oblique typeface should set both of bit0 and bit9. An OFF file for the italic typeface should set bit0 to 1 and set bit9 to 0.

4.11.22 "usFirstCharIndex" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.23 "usLastCharIndex" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.24 "sTypoAscender" element

This element is used to define ISO/IEC 9541-1 ALIGNMENT.

4.11.25 "sTypoDescender" element

This element is used to define ISO/IEC 9541-1 ALIGNMENT.

4.11.26 "sTypoLineGap" element

This element is used to define ISO/IEC 9541-1 ALIGNMENT.

4.11.27 "usWinAscent" element

This element is used to define maxy in ISO/IEC 9541-1 MAXFONTEXT.

4.11.28 "usWinDescent" element

This element is used to define miny in ISO/IEC 9541-1 MAXFONTEXT.

4.11.29 "ulCodePageRange1" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

4.11.30 "ulCodePageRange2" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS.

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4.11.31 "sxHeight" element

This element is used to define ISO/IEC 9541-1 DSNGROUP and ISO/IEC 9541-1 LCHEIGHT.

4.11.32 "sCapHeight" element

This element is used to define ISO/IEC 9541-1 CAPHEIGHT.

4.11.33 "usBreakChar" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.11.34 "usMaxContext" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.12 Harmonization of the elements in OFF "PCLT" table

The contents in OFF "PCLT" table are used to specify the font resource stored in PCL5 printer without sending OFF file to printer. Therefore, the values may be designed to be substituted by similar but different font resource.

4.12.1 "version" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value which describes the concrete file structure.

4.12.2 "FontNumber" element

This element is used to define ISO/IEC 9541-1 DATAVERSION.

4.12.3 "Pitch" element

This element is used to define ISO/IEC 9541-1 RELUNITS.

4.12.4 "xHeight" element

This element is used to define ISO/IEC 9541-1 DSNGROUP and ISO/IEC 9541-1 LCHEIGHT.

4.12.5 "Style" element

4.12.5.1 bits5-9

This element is used to define ISO/IEC 9541-1 DSNGROUP.

4.12.5.2 bits2-4

This element is used to define ISO/IEC 9541-1 PROPWIDTH.

4.12.5.3 bits0-1

This element is used to define ISO/IEC 9541-1 POSTURE.

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4.12.6 "TypeFamily" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value because this element is vendor-name based font family classification.

4.12.7 "CapHeight" element

This element is used to define ISO/IEC 9541-1 CAPHEIGHT.

4.12.8 "SymbolSet" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS. The values of this element must be chosen from a registered list maintained by Hewlett-Packard (bibliography [7]).

4.12.9 "Typeface" element

This element may be used to define ISO/IEC 9541-1 TYPEFACE. The syntax of the value is designed by the naming convention of PCL5, the FamilyName element in OFF "name" table is preferred.

4.12.10 "CharacterComplement" element

This element is used to define ISO/IEC 9541-1 INCGLYPHCOLS. The values of this element must be chosen from a registered list maintained by Hewlett-Packard (bibliography [7]).

4.12.11 "FileName" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this value.

4.12.12 "StrokeWeight" element

This element is used to define ISO/IEC 9541-1 WEIGHT.

4.12.13 "WidthType" element

This element is used to define ISO/IEC 9541-1 PROPWIDTH.

4.12.14 "SerifStyle" element

This element is used to define ISO/IEC 9541-1 SERIFSTYLE.

4.13 Harmonization of the elements in OFF "VORG" table

4.13.1 "defaultVertOriginY" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to relate the coordinate systems of horizontal writing mode with that of vertical writing mode. In ISO/IEC 9541-1 and ISO/IEC 9541-2, two coordinate systems are completely distinguished.

4.13.2 "vertOriginY" element

This element is used to define ISO/IEC 9541-1 PY for vertical writing mode.

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4.14 Harmonization of the elements in OFF “VDMX” table

The elements in OFF “VDMX” table are used to control the rasterization of the scalable glyph shape representation. ISO/IEC 9541-1 and ISO/IEC 9541-2 does not deal with these values that are specific glyph shape representation and the rasterizer.

5 Harmonization to the glyph names in OFF file

The relationship between glyph names in ISO/IEC 9541 and OFF is described. Many OFF files uses AFII glyph name, Adobe Glyph List (bibliography [3],[4]), or hexadecimal /uniXXXX.

6 Layout Tag Registry and ISO/IEC 10036

A group of the tags in the clause 5.4.3.1 of ISO/IEC 14496-22:2007 is used for simple 1-to-1 glyph substitution regardless with the context of glyph. Such a substitution can be carried out by the glyph identifiers registered by ISO/IEC 10036 with appropriate additional information.

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Annex A
(informative)

Harmonization of numerical properties to OFFS

A.1 General

This annex specifies the harmonization of numerical properties to OFFS.

A.2 Comparison of the definitions of metric properties in OFFS and ISO/IEC 9541

Some numerical metric properties are called by different but similar names in OFFS and ISO/IEC 9541. Therefore some properties are not clear if they are independent with each other, or some consistency is required. In this section, the definitions of the numerical metric properties are compared.

A.2.1 Horizontal metric properties

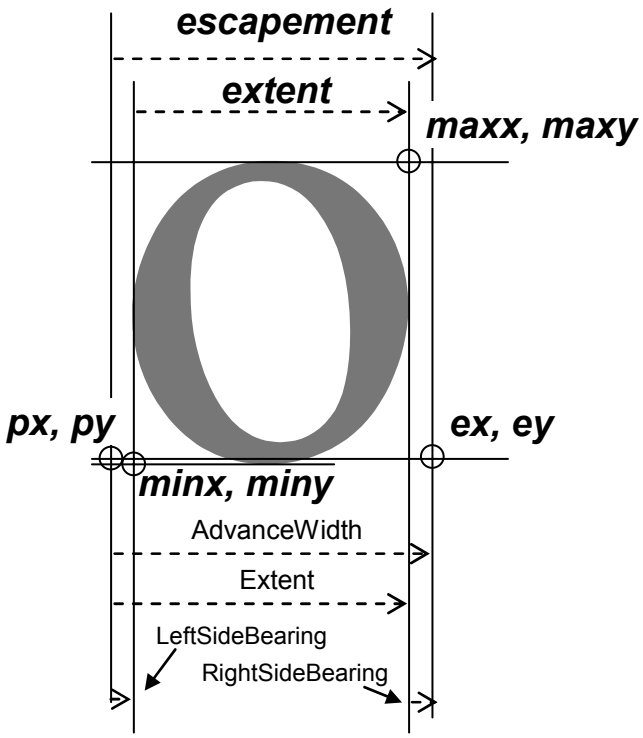


Figure A.1 — Horizontal metric properties of OFFS and ISO/IEC 9541

The properties noted by normal text is the properties of OFFS, those noted by oblique text is the properties of ISO/IEC 9541.

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The definition of horizontal metric properties of OFFS and ISO/IEC 9541 are shown in Figure A.1. The definition of horizontalAdvance of OFFS is exactly same as the horizontal escapmenet of ISO/IEC 9541 in horizontal writing mode. ISO/IEC 9541-1 and ISO/IEC 9541-2 have no predefined properties to interchange the values of LeftSideBearing and RightSideBearing of OFFS. However, these values must be consistent with the boundaries of the per-glyph bounding box (minx, miny, maxx, maxy) and the pen and escape positions (px, py, ex, ey).

It should be noted that the definition of the extent is different in OFFS and ISO/IEC 9541. In ISO/IEC 9541, the extent is horizontal width of the inked portion of the glyph. In OFFS, the origin to measure the extent is the pen position, so it can be different from the extent in ISO/IEC 9541. In OFFS, the terminology “extent” is only used for the statistical value in “hhea” table.

A.2.2 Vertical metric properties

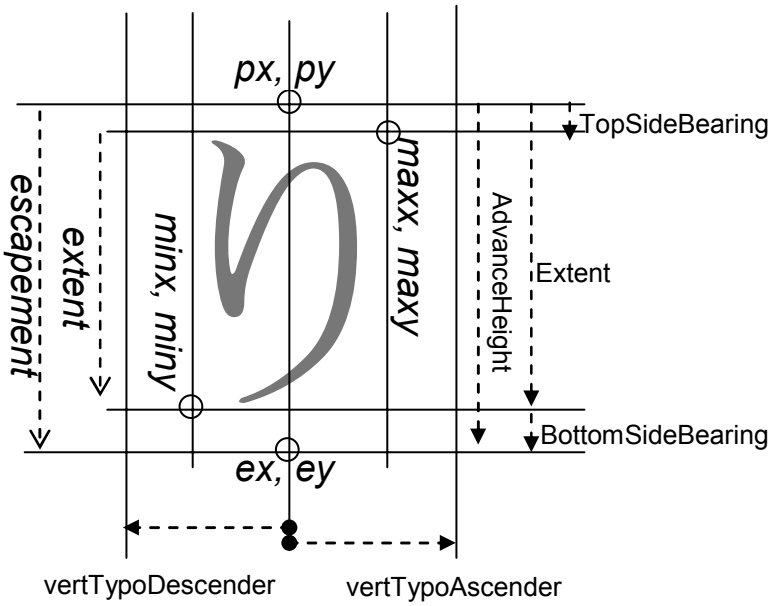


Figure A.2 — Vertical metric properties of OFFS and ISO/IEC 9541

The properties noted by normal text is the properties of OFFS, those noted by oblique text is the properties of ISO/IEC 9541.

The definition of vertical metric properties of OFFS and ISO/IEC 9541 are shown in Figure A.2. The definition of verticalAdvance of OFFS is exactly same as the vertical escapmenet of ISO/IEC 9541 in vertical writing mode. ISO/IEC 9541-1 and ISO/IEC 9541-2 have no predefined properties to interchange the values of TopSideBearing and BottomSideBearing of OFFS. However, these values must be consistent with the boundaries of the per-glyph bounding box (minx, miny, maxx, maxy) and the pen and escape positions (px, py, ex, ey).

It should be noted that the definition of the extent is different in OFFS and ISO/IEC 9541. In ISO/IEC 9541, the extent is vertical height of the inked portion of the glyph. In OFFS, the origin to measure the extent is the pen position, so it can be different from the extent in ISO/IEC 9541. In OFFS, the terminology “extent” is only used for the statistical value in “vhea” table.

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A.3 Harmonization of the numerical elements in OFF tables

A.3.1 Harmonization of the elements in OFF "head" table

A.3.1.1 “unitPerEm” element

The definition of ISO/IEC 9541-1 RELUNITS is the height of the body size of the font which is normalized by the minimum unit of length in this font. The definition of unitPerEm in TrueType font is the length of "em" by the minimum unit of length in this font. The original definition of "em" was the width of the Latin alphabet "M", but the modern typography defines it as the number of the point size. It is recommended to interpret unitPerEm element to ISO/IEC 9541-1 RELUNITS by the identical value. When any scaling is applied in the interpretation, other size-related properties in this Annex should be scaled. Both of ISO/IEC 9541 and ISO/IEC 14496-22 has no special properties to differentiate the "em" length from the body size. In most CFF OpenType, "unitPerEm" is taken as 1000 that is same as common value of ISO/IEC 9541. On the other hand, in most TrueType font "unitPerEm", the popular value is 1024, 512 or 256.

A.3.1.2 “xMin” element

This element is used to define minx in ISO/IEC 9541-1 MAXFONTEXT. The properties in the ISO/IEC 9541-1 MAXFONTEXT are given by relative rational number which the denominator is ISO/IEC 9541-1 RELUNITS. On the other hand, xMin element is an integer normalized by the minimum unit of length in this font. It is recommended to interpret xMin element to max-minx in ISO/IEC 9541-1 MAXFONTEXT by the normalized value xMin / unitPerEm.

A.3.1.3 “yMin” element

It is recommended to interpret yMin element to max-miny in ISO/IEC 9541-1 MAXFONTEXT by the normalized value yMin / unitPerEm.

A.3.1.4 “xMax” element

It is recommended to interpret xMax element to max-maxx in ISO/IEC 9541-1 MAXFONTEXT by the normalized value xMax / unitPerEm.

A.3.1.5 “yMax” element

It is recommended to interpret yMax element to max-maxy in ISO/IEC 9541-1 MAXFONTEXT by the normalized value yMax / unitPerEm.

A.3.1.6 “lowestRecPPEM” element

The unit of ISO/IEC 9541-1 MINSIZE is millimeter, but the unit of "LowestRecPPEM" element is pixel. In ISO/IEC 14496-22, there's no property to declare the designed resolution of output surface. Therefore the interpretation requires the information about the resolution that the font is designed for (e.g. 72dpi/96dpi like CRT monitors or 600dpi/1200dpi like the printers). In most TrueType fonts, this element is used to provide the maximum pixel size of the embedded bitmap glyphs, instead of the designed minimum size of the scalable glyphs in pixel.

A.3.2 Harmonization of the elements in OFF “hhea” table

A.3.2.1 “Ascender” element

This element is not used by Microsoft platform. If the OFF file is assured to be designed for Microsoft platform, this element should not be interpreted. It is recommended to interpret Ascender element to max-maxy in ISO/IEC 9541-1 MAXFONTEXT by the normalized value Ascender / unitPerEm. The highest ascender line can be different from yMax in head table which is the highest line of the glyph bounding box. If they are different, the element max-maxy in ISO/IEC 9541-1 MAXFONTEXT should be defined by the higher value of yMax or Ascender elements.

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A.3.2.2 "Descender" element

This element is not used by Microsoft platform. If the OFF file is assured to be designed for Microsoft platform, this element should not be interpreted. It is recommended to interpret Descender element to max-miny in ISO/IEC 9541-1 MAXFONTEXT by the normalized value Descender / unitPerEm. The highest ascender line can be different from yMin in head table which is the lowest line of the glyph bounding box. If they are different, the element max-miny in ISO/IEC 9541-1 MAXFONTEXT should be defined by the lower value of yMin or Descender elements.

A.3.2.3 "LineGap" element

This element is not used by Microsoft platform. If the OFF file is assured to be designed for Microsoft platform, this element should not be interpreted. It is recommended to interpret LineGap element to minlinesp-right and minlinesp-left of ISO/IEC 9541-1 MINLINESP, by LineGap / unitPerEm. In the interpretation from OFF font to ISO/IEC 9541 font, both values should be identical.

A.3.2.4 "advanceWidthMax" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that this element is consistent with the maximum value of ex-value in ISO/IEC 9541-1 EX for all glyphs. Although ISO/IEC 9541 allows that a specified glyph can take multiple horizontal escapements for various writing mode (left-to-right and right-to-left), TrueType font allows only one horizontal advance. In the interpretation from OFF font to ISO/IEC 9541 font, it is recommended to handle the value is for left-to-right writing mode, as far as the fontDirection element in head table is not set to negative value.

A.3.2.5 "minLeftSideBearing" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that this element is consistent with the minimum difference between minx in ISO/IEC 9541-1 EXT versus px-value in ISO/IEC 9541-1 PX.

A.3.2.6 "minRightSideBearing" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that this element is consistent with the minimum difference between maxx in ISO/IEC 9541-1 EXT versus ex-value in ISO/IEC 9541-1 EX.

A.3.2.7 "xMaxExtent" element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that this element is consistent with the maximum value among maxx in ISO/IEC 9541-1 EXT subtracted by px-value in ISO/IEC 9541-1 PX.

A.3.3 Harmonization of the elements in OFF "hmtx" table

A.3.3.1 "advanceWidth" element

This element is used to define ISO/IEC 9541-1 EXThe advanceWidth of TrueType font is an advance from the position point to the escape point (not from the coordinate origin point), the horizontal distance between px-value in ISO/IEC 9541-1 PX and ex-value in ISO/IEC 9541-1 EX.

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A.3.3.2 “leftSideBearning” element

This element is used to define ISO/IEC 9541-1 MINEX. The left side bearing of TrueType font is an advance from the position point to the left side edge of the glyph shape representation data, the horizontal distance between px-value in ISO/IEC 9541-1 PX and minx in ISO/IEC 9541-1 EXT.

A.3.4 Harmonization of the elements in OFF “vhea” table

In original TrueType font typography, the coordinate system of a glyph shape representation for vertical writing mode has been same as that for horizontal writing mode. The latest "vhea" table is updated to support vertical writing mode correctly. The interpretation of the elements in "vhea" table depends on the version number.

A.3.4.1 ascent-related elements

A.3.4.1.1 “ascent” element

It is recommended to interpret ascent element to ISO/IEC 9541-1 MINLINESP, by ascent / unitPerEm. This element describes the space between the vertical centerline of this line and the nearest inked portion of previous line. Because there are two cases of the location of previous line, there are two cases of the interpretation. If the vertical text line is stacked from right to left, this element should be interpreted to minlinesp-right. If the vertical text line is stacked from left to right, this element should be interpreted to minlinesp-left. In "vhea" version 1.0 table, the centerline is assumed to be the alignment line for vertical writing mode. For the font that vertical alignment line is shifted from the centerline, the shift should be added in the interpretation. However, the shift is not written in "vhea" version 1.0 table, it must be obtained from external resource.

A.3.4.1.2 “vertTypoAscender” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not handle this element. This element corresponds to the difference between the alignment line for vertical writing mode and the escape position in horizontal writing mode, when vertical and horizontal coordinates are drawn on the same glyph. In ISO/IEC 9541, there is no property for designed width of the glyphs in vertical writing mode. Therefore this element can not be interpreted in any properties in ISO/IEC 9541.

A.3.4.2 descent-related elements

A.3.4.2.1 "descent" element

It is recommended to interpret ascent element to ISO/IEC 9541-1 MINLINESP, by ascent / unitPerEm. This element describes the space between the vertical centerline of this line and the nearest inked portion of previous line. Because there are two cases of the location of previous line, there are two cases of the interpretation. If the vertical text line is stacked from right to left, this element should be interpreted to minlinesp-left. If the vertical text line is stacked from left to right, this element should be interpreted to minlinesp-right. In "vhea" version 1.0 table, the centerline is assumed to be the alignment line for vertical writing mode. For the font that vertical alignment line is shifted from the centerline, the shift should be added in the interpretation. However, the shift is not written in "vhea" version 1.0 table, it must be obtained from external resource.

A.3.4.2.2 “vertTypoDescender” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not handle this element. This element corresponds to the difference between the alignment line for vertical writing mode and the pen position in horizontal writing mode, when vertical and horizontal coordinates are drawn on the same glyph. In ISO/IEC 9541, there is no property for designed width of the glyphs in vertical writing mode. Therefore this element can not be interpreted in any properties in ISO/IEC 9541.

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A.3.4.3 linegap-related elements

A.3.4.3.1 “lineGap” element

In "vhea" version 1.0 table, this element is not used because this is fixed to 0.

A.3.4.3.2 “vertTypoLineGap” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not handle this element. This element describes the length subtracted the designed width of the glyph from ISO/IEC 9541-1 MINLINESP. In ISO/IEC 9541, there is no property for designed width of the glyphs in vertical writing mode. Therefore this element can not be interpreted in any properties in ISO/IEC 9541.

A.3.4.4 “advanceHeightMax” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that normalized value of this element (advanceHeightMax / unitPerEm) is consistent with the maximum value of the differences between py-value in ISO/IEC 9541-1 PY and ey-value in EY for all glyphs.

A.3.4.5 “minTopSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that normalized value of this element (minTopSideBearing / unitPerEm) is consistent with the minimum value of the differences between py-value in ISO/IEC 9541-1 PY and maxy in ISO/IEC 9541-1 EXT for all glyphs.

A.3.4.6 “minBottomSideBearing” element

ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that normalized value of this element (minBottomSideBearing / unitPerEm) is consistent with the minimum value of the differences between ey-value in EY and miny in ISO/IEC 9541-1 EXT for all glyphs.

A.3.4.7 “ymaxExtent” element

ISO/IEC 9541-1, -2 and -3 have no predefined property to interchange this statistical value, it should be consistent with the value calculated from per-glyph properties. It is expected that normalized value of this element (ymaxExtent / unitPerEm) is consistent with the maximum value of the differences between py-value in ISO/IEC 9541-1 PY and maxy in ISO/IEC 9541-1 EXT for all glyphs.

A.3.5 Harmonization of the elements in OFF “vmtx” table

A.3.5.1 “advanceHeight” element

This element is used to define ISO/IEC 9541-1 EY. It is expected that normalized value of this element (advanceHeight / unitPerEm) is consistent with the differences between py-value in ISO/IEC 9541-1 PY and ey-value in EY for all glyphs.

A.3.5.2 “topSideBearing” element

This element is used to define maxy in ISO/IEC 9541-1 EXT. It is expected that normalized value of this element (minTopSideBearing / unitPerEm) is consistent with the differences between py-value in ISO/IEC 9541-1 PY and maxy in ISO/IEC 9541-1 EXT for all glyphs.

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A.3.6 Harmonization of the elements in OFF “kern” table

If the pairwise kerning of the source OFF font is designed to make the glyphs touched, the pean-value of ISO/IEC 9541-1 PEAN should be set to TOUCH. Otherwise, it should be set to KERN by default. If the kerning values are pair kerning that are interpreted from the "kern" table or other sources, the ISO/IEC 9541-1 EAI should be set to 1 (the code for scale/letterspace-adjusting). Otherwise, if no kerning value is defined, the ISO/IEC 9541-1 EAI should be set to 3 (the code for non-adjusting).

A.3.6.1.1 Harmonization of the elements in OFF “kern” subtable in format 0

The "kern" subtable in format 0 provides the list of paired glyph index and horizontal kerning value in FUnits. The kerning value is used to define ISO/IEC 9541-1 PEAS. The pair kerning values should be grouped by the name of the first glyph. A group sharing same first glyph should be assigned to the ISO/IEC 9541-1 PEAS property (a set of ISO/IEC 9541-1 PEA) of the first glyph. The name of the second glyph name should be interpreted to the ISO/IEC 9541-1 PEASN in ISO/IEC 9541-1 PEA. The normalized kerning value (value / unitPerEm) should be interpreted to the pea-adj in ISO/IEC 9541-1 PEA. The "kern" table of OFF file provides only the 1-dimensional kerning value in nominal writing mode. If the nominal writing mode is horizontal, ISO/IEC 9541-1 PEAy should be empty. If the nominal writing mode is vertical, ISO/IEC 9541-1 PEAy should be empty.

A.3.6.1.2 Harmonization of the elements in OFF “kern” subtable in format 2

The kerning values in ISO/IEC 9541 font resource correspond to the integrated value that all valid subtables in OFF "kern" table are considered. Therefore, the classes used in each OFF "kern" subtables do not correspond to the class in ISO/IEC 9541 font resource; because each OFF "kern" subtables can use private class definitions that are incompatible among the subtables (e.g. the first class of the first subtable contains numerical digits and the first class of the second subtable contains lowercase Latin alphabets).

A.3.7 Harmonization of the elements in OFF "post" table

A.3.7.1 “italicAngle” element

The "italic" in this element means a slanted typeface mathematically transformed from normal regular typeface. This element is used to define ISO/IEC 9541-1 POSTUREANGLE. Both unit system is in degree, but ISO/IEC 9541-1 POSTUREANGLE is restricted to fit in the range from -360 to +360.

A.3.7.2 “underlinePosition” element

This element is used to define ISO/IEC 9541-1 SCOREOFFSETY. This element is the difference the nominal alignment line and the nearest inked portion of the underline, it is not the difference between the nominal alignment line and the centerline of the underline. It is recommended to interpret underlinePosition element to ISO/IEC 9541-1 SCOREOFFSETY by the normalized value (underlinePosition - 0.5 * underlineThickness) / unitPerEm.

A.3.7.3 “underlineThickness” element

This element is used to define ISO/IEC 9541-1 SCORETHICK. It is recommended to interpret underlineThickness element to ISO/IEC 9541-1 SCORETHICK by the normalized value underlineThickness / unitPerEm.

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A.3.8 Harmonization of the elements in OFF “CFF” table

A.3.8.1 Harmonization of the elements in Top DICT

A.3.8.1.1 “UnderlinePosition” element

This element is used to define ISO/IEC 9541-1 SCOREOFFSETY. The syntax of value is described in ISO/IEC 10180:1995, C.4.2.1.7. The interpretation is different from "underlinePosition" element in "post" table.

A.3.9 Harmonization of the elements in OFF “OS/2” table

A.3.9.1 “xAvgCharWidth” element

This element is used to define ISO/IEC 9541-1 AVGESCX, by the normalized value xAvgCharWidth / unitPerEm. In the OS/2 table older than version 3.0, this element is calculated from the lower case Latin alphabets, so it is recommended to interpret this element to AVGLCESCX. This element was originally introduced to estimate the horizontal length of Latin text from the number of glyphs, so there is a possibility that the xAvgCharWidth element is calculated by the weighted average, with the consideration of the frequency of appearance. In such case, this element should not be interpreted to any ISO/IEC 9541 property.

A.3.9.2 “usWeightClass” element

This element is used to define ISO/IEC 9541-1 WEIGHT. This element is numerically defined but ISO/IEC 9541-1 WEIGHT is not. Following map is designed to map the median of each region matches with the weight names in OFFS.

numerical value of “usWeightClass” element	weight code of ISO/IEC 9541	symbolic name for the weight code of ISO/IEC 9541	notes
0-150	1	ultra light	In OFFS, the name of this weight is thin. ultra right is dealt as same as extra right
150-250	2	extra light	
250-350	3	light	
350-450	4	semi light	In OFFS, the name of this weight is normal. the name semi light is not used in OFFS
450-550	5	medium	
550-650	6	semi bold	
650-750	7	bold	
750-850	8	extra bold	
850-	9	ultra bold	In OFFS, the name of this weight is black. ultra bold is dealt as same as extra bold

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A.3.9.3 "usWidthClass" element

This element is used to define ISO/IEC 9541-1 PROPWIDTH. This element should be interpreted to the ISO/IEC 9541-1 PROPWIDTH with same syntax name of width.

numerical value of "usWidthClass" element		numerical value of ISO/IEC 9541-1 PROPWIDTH	symbolic name for the width code of ISO/IEC 9541
1	Ultra-condensed	1	ultra condensed
2	Extra-condensed	2	extra condensed
3	Condensed	3	condensed
4	Semi-condensed	4	semi condensed
5	Medium (normal)	5	medium
6	Semi-expanded	6	semi expanded
7	Expanded	7	expanded
8	Extra-expanded	8	extra expanded
9	Ultra-expanded	9	ultra expanded

A.3.9.4 "ySubscriptXOffset" element

This element is used to define ISO/IEC 9541-1 VSOFFSETX in the case that ISO/IEC 9541-1 VSNAME is LEFT-VSCRIPT, by normalized value ySubscriptXOffset / unitPerEm.

A.3.9.5 "ySubscriptYOffset" element

This element is used to define ISO/IEC 9541-1 VSOFFSETY in the case that ISO/IEC 9541-1 VSNAME is LEFT-VSCRIPT, by normalized value ySubscriptYOffset / unitPerEm.

A.3.9.6 "ySubscriptXSize" element

This element is used to define ISO/IEC 9541-1 VSSCALEX in the case that ISO/IEC 9541-1 VSNAME is LEFT-VSCRIPT, by normalized value ySubscriptXSize / unitPerEm.

A.3.9.7 "ySubscriptYSize" element

This element is used to define ISO/IEC 9541-1 VSSCALEY in the case that ISO/IEC 9541-1 VSNAME is LEFT-VSCRIPT, by normalized value ySubscriptYSize / unitPerEm.

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A.3.9.8 “ySuperscriptXOffset” element

This element is used to define ISO/IEC 9541-1 VSOFFSETX in the case that ISO/IEC 9541-1 VSNAME is RIGHT-VSCRIPT, by normalized value ySubscriptXOffset / unitPerEm.

A.3.9.9 “ySuperscriptYOffset” element

This element is used to define ISO/IEC 9541-1 VSOFFSETY in the case that ISO/IEC 9541-1 VSNAME is RIGHT-VSCRIPT, by normalized value ySubscriptXOffset / unitPerEm.

A.3.9.10 “ySuperscriptXSize” element

This element is used to define ISO/IEC 9541-1 VSSCALEX in the case that ISO/IEC 9541-1 VSNAME is RIGHT-VSCRIPT, by normalized value ySubscriptXOffset / unitPerEm.

A.3.9.11 “ySuperscriptYSize” element

This element is used to define ISO/IEC 9541-1 VSSCALEY in the case that ISO/IEC 9541-1 VSNAME is RIGHT-VSCRIPT, by normalized value ySubscriptXOffset / unitPerEm.

A.3.9.12 “usWinAscent” element

It is recommended to interpret yMax element to max-maxy in ISO/IEC 9541-1 MAXFONTEXT by the normalized value usWinAscent / unitPerEm. If the font is designed for Microsoft platform, this element should be prioritized than yMax element in head table.

A.3.9.13 “usWinDescent” element

It is recommended to interpret yMin element to max-miny in ISO/IEC 9541-1 MAXFONTEXT by the normalized value usWinDescent / unitPerEm. If the font is designed for Microsoft platform, this element should be prioritized than yMin element in head table.

A.3.10 Harmonization of the elements in OFF “PCLT” table

The PCLT table is strongly discouraged in OFFS, so the values interpreted from this table should not be prioritized than the values interpreted from other tables.

A.3.10.1 “Pitch” element

This element is used to define ISO/IEC 9541-1 RELUNITS. Precisely, the width this element refers is the white space, not the glyph of "M". For the proportional fonts, this element should not be interpreted.

A.3.10.2 “xHeight” element

This element is used to define ISO/IEC 9541-1 DSNGROUP and ISO/IEC 9541-1 LCHEIGHT. Precisely, the height of this element is not the measured height of the glyph of "x", but the optical line describing the height of the glyph of "x", both may be different. In OFFS, there's no other properties to be related with the xheight, so this element is the only available source to estimate the xheight. But this element should not be interpreted if the accuracy is important.

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A.3.10.2.1 bits2-4

This element is used to define ISO/IEC 9541-1 PROPWIDTH. This element is a 3-bit value to indicate the appearance width in the PCL device output, which is classified by a number from 0 to 7. The width class is not ordered numerically, the interpretation should be based on the name of width class. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not provide the class that the compression is stronger than "ultra condensed", so "ultra compressed" is mapped to "ultra condensed" class. The proportionate width is written in WidthType element, so the value interpreted from this element should be prioritized.

The numerical value defined by bits2-4	The symbolic name of weight in OFFS	The symbolic name of weight in ISO/IEC 9541
0	normal	medium
1	condensed	condensed
2	compressed, extra condensed	extra condensed
3	extra compressed	ultra condensed
4	ultra compressed	ultra condensed
5	reserved	not applicable
6	expanded	expanded
7	extra expanded, extra extended	extra expanded

A.3.10.3 “CapHeight” element

This element is used to define ISO/IEC 9541-1 CAPHEIGHT. Precisely, the height of this element is not the measured height of the glyph of "X", but the optical line describing the glyph of "H". In OFFS, there's no other properties to be related with the height of capitals, so this element is the only available source to estimate. But this element should not be interpreted if the accuracy is important.

--`,,```,,,,````-`-`,,`,,`,`,,`---

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A.3.10.4 "WidthType" element

This element is used to define ISO/IEC 9541-1 PROPWIDTH. The interpretation should be based on the name of width class. ISO/IEC 9541-1, ISO/IEC 9541-2 and ISO/IEC 9541-3 do not provide the class that the compression is stronger than "ultra condensed", so "ultra compressed" is mapped to "ultra condensed" class.

The numerical value of WidthType element	The symbolic name of WeightType in OFFS	The symbolic name of corresponding weight in ISO/IEC 9541
-5	ultra compressed	ultra condensed
-4	extra compressed	ultra condensed
-3	compressed, extra condensed	extra condensed
-2	condensed	condensed
-1		semi-condensed
0	normal	medium
1		semi-expanded
2	expanded	expanded
3	extra expanded	extra expanded
4		ultra expanded
5		ultra expanded

A.3.11 Harmonization of the elements in OFF "VORG" table

A.3.11.1 "vertOriginY" element

This element is used to define ISO/IEC 9541-1 PY for vertical writing mode. It is recommended to interpret vertOriginY element to py-value in ISO/IEC 9541-1 PY by the normalized value vertOriginY / unitPerEm.

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