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Information technology — Font information interchange —

Part 2: Interchange format

Technologies de l'information — Échange d'informations sur les fontes —

Partie 2: Format d'échange

Reference number
ISO/IEC 9541-2:1991(E)

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Contents

Page

1 Scope **1**

2 Conformance **1**

3 Normative references **2**

4 Definitions **2**

5 Subsets **2**

5.1 Minimum font description subset **2**

5.2 Minimum modal metric subset **3**

5.3 Minimum glyph metric subset **3**

6 Formats **3**

6.1 ASN.1 ..... **3**

6.2 SGML **11**

Annexes

A Font reference **15**

A.1 ASN.1 ..... **15**

A.2 SGML **22**

B Structured-Names **26**

B.1 General **26**

B.2 Object name **26**

B.3 Representation of structured names **26**

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

International Standard ISO/IEC 9541-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

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: Application-specific requirements*

Part 1 of ISO/IEC 9541 specifies the architecture of a font resource, i.e., the font description, font metrics, glyph description and glyph metrics properties required for font references and the interchange of font resources.

Part 2 of ISO/IEC 9541 specifies the interchange formats for font information, and the minimum subsets of that information required for interchange.

Part 3 of ISO/IEC 9541 specifies the architecture and interchange formats for glyph shape representations.

Part 4 of ISO/IEC 9541 specifies the architecture and interchange format extensions for application specific (e.g. typesetting of mathematics) requirements.

Annexes A and B form an integral part of this part of ISO/IEC 9541.

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Introduction

The use of open networks for the interchange of documents in both office and publishing environments has shown the need for a mechanism enabling the interchange of font information.

It is foreseen that publishing and office technologies will merge and that this development will be facilitated by definition of a standard font resource architecture and a limited number of standard font resource interchange formats.

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Information technology — Font information interchange —

Part 2:
Interchange format

1 Scope

ISO/IEC 9541, as a whole, specifies the architecture of font resources, as well as the formats for font interchange amongst 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 interchange formats for font information, and the minimum subsets of that information required for interchange. This part of ISO/IEC 9541 requires the property definitions as defined in ISO/IEC 9541-1.

Font subsets defined by this part of ISO/IEC 9541 establish the minimum set of font properties that must occur within an ISO font resource. To accommodate the broad range of document and text processing functions found in office and publishing environments, it is anticipated that ISO font resources will contain more than the minimum number of font properties.

Font resources defined by this part of ISO/IEC 9541 are used in various document processing environments in which ASN.1 or SGML parsing algorithms are recognised. The format of font resource information as defined in this part of ISO/IEC 9541 is specified in both ASN.1 and SGML for consistent generation of font resources for use in these processing environments.

2 Conformance

A font resource conforming to this part of ISO/IEC 9541 shall contain property values for all of the minimum subset font properties specified in this part of ISO/IEC 9541, clause 5. A conforming font resource may contain more ISO or non-ISO properties than specified in this part of ISO/IEC 9541, clause 5. In addition, all properties contained in a conforming font resource shall be formatted as defined in one of the two interchange formats defined in this part of ISO/IEC 9541, clause 6.

A font resource using system (one which receives font information for subsequent processing) may claim conformance to this part of ISO/IEC 9541 if it has the ability to syntactically interpret and semantically process the relevant font subset(s) specified in this part of ISO/IEC 9541, clause 5.

A font resource supplying system (one which creates or modifies font information for subsequent supply to a font resource using system) may claim conformance to this part of ISO/IEC 9541 if it has the ability to create a syntactically correct instance of a conforming font resource.

A font resource transmission system (one which receives, optionally holds, and subsequently transmits font information) may claim conformance to this part of ISO/IEC 9541 if it has the ability to receive and send a syntactically correct instance of a conforming font resource without loss of information.

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3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9541. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 9541 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8824:1990, *Information technology — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1).*

ISO 8825:1990, *Information technology — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

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

ISO/IEC 9070:1991, *Information technology — SGML support facilities — Registration procedures for public text owner identifiers.*

ISO/IEC 9541-1:1991, *Information technology — Font information interchange — Part 1: Architecture.*

4 Definitions

For the purposes of this part of ISO/IEC 9541, the definitions given in ISO/IEC 9541-1 and the following definition apply.

4.1 (font) subset: A set or collection of font properties, usually associated by application usage and functional capability.

5 Subsets

This clause defines the minimum set of font properties which shall occur within a font resource conforming to this part of ISO/IEC 9541. The required set of font resource properties is divided into font subsets representing three major groupings of required font resource information (font description information, modal metric information, and glyph metric information). ISO font subsets consist entirely of ISO font properties, as those properties are defined in ISO/IEC 9541-1.

NOTE 1 Glyph shape information may be resident within a presentation device and not interchanged with the other font resource information. The shape information may be interchanged with a font resource, but is not a required subset of an ISO font resource.

5.1 Minimum font description subset

The minimum subset of font description information includes identification of the font resource and descriptive information about the font resource.

This font subset consists of the following properties (higher order property-lists containing these properties are also required):

```
FONTNAME              Font Resource Name
STANDARDVERSION       Standard Version Number
DSNSOURCE             Design Source Name
FONTFAMILY            Font Family Name
POSTURE               Posture Code
WEIGHT                Weight Code
PROPWIDTH             Proportionate Width Code
INCGLYPHCOLS          Included Glyph Collection(s)  | One or
INCGLYPHS             Included Glyph(s)             | Both
```

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DSNSIZE	Design Size
MINSIZE	Minimum Size
MAXSIZE	Maximum Size
DSNGROUP	Design Group Codes
STRUCTURE	Structure Code

5.2 Minimum modal metric subset

The minimum subset of modal metric information includes identification of at least one writing mode and modal metric values for the collection of all glyphs in the font resource.

This subset consists of the following properties, which are repeated for each writing mode supported by the font resource (higher order property-lists containing these properties are also required):

WRMODENAME	Writing Mode Name	
NOMESCDIR	Nominal Escapement Direction	
ESCCLASS	Escapement Class	
AVGESCX	Average x-Escapement	x or y must be present, depending on writing mode
AVGESCY	Average y-Escapement	
AVGLCESCX	Average Lower Case x-Escapement	
AVGLCESCY	Average Lower Case y-Escapement	
AVGCAPESCX	Average Capital x-Escapement	
AVGCAPESCY	Average Capital y-Escapement	
TABESCX	Tabular x-Escapement	
TABESCY	Tabular y-Escapement	
MAXFONTEXT	Maximum Font Extents	

5.3 Minimum glyph metric subset

The minimum subset of glyph metric information includes identification of each glyph contained in the font resource and metric information for each of those identified glyphs.

This subset consists of the following properties, which are repeated for each writing mode supported by the font resource and for each glyph supported in that writing mode (higher order property-lists containing these properties are also required):

GNAME	Glyph Structured Name	
EX	X Escapement Point	One or both
EY	Y Escapement Point	
EXT	Extents	

6 Formats

ISO font resources for interchange shall be defined using either the ASN.1 Structure or SGML Document Type Definition defined below.

NOTE 2 The architecture of ISO/IEC 9541-1 and the interchange formats of this part of ISO/IEC 9541 permit the existence of empty property-lists, however, there are no assumed values associated with such lists.

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6.1 ASN.1

```
ISO-STANDARD-9541-FONT-RESOURCE  {1 0 9541 2 1}
DEFINITIONS ::= BEGIN

IMPORTS Structured-Name FROM {1 0 9541 2 3}

Font-Resource                  ::= SEQUENCE {
  name-prefixes                     [0] IMPLICIT SET OF Name-Prefix OPTIONAL,
  iso-standard-9541-fontname        [1] IMPLICIT Global-Name                ,
  iso-standard-9541-fontdescription [2] IMPLICIT Font-Description           ,
  iso-standard-9541-wrmodes         [3] IMPLICIT Writing-Modes              ,
  iso-standard-9541-shapes          [4] IMPLICIT Glyph-Shapes       OPTIONAL,
  non-iso-properties                [5] IMPLICIT Property-List      OPTIONAL }

Font-Description               ::= SET {
  iso-standard-9541-dataversion     [0] IMPLICIT Data-Version       OPTIONAL,
  iso-standard-9541-standardversion [1] IMPLICIT Cardinal                   ,
  iso-standard-9541-datasource      [2] IMPLICIT Global-Name        OPTIONAL,
  iso-standard-9541-datacopyright   [3] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-dsnsource       [4] IMPLICIT Global-Name                ,
  iso-standard-9541-dsncopyright    [5] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-relunits        [6] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-typeface        [7] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-fontfamily      [8] IMPLICIT Match-String               ,
  iso-standard-9541-posture         [9] IMPLICIT Posture-Code               ,
  iso-standard-9541-postureangle    [10] IMPLICIT Angle             OPTIONAL,
  iso-standard-9541-weight          [11] IMPLICIT Weight-Code               ,
  iso-standard-9541-propwidth       [12] IMPLICIT Width-Code                ,
  iso-standard-9541-glyphcomp       [13] IMPLICIT Glyph-Complement          ,
  iso-standard-9541-nomwrmode       [14] IMPLICIT Global-Name       OPTIONAL,
  iso-standard-9541-dsnsize         [15] IMPLICIT Rational                  ,
  iso-standard-9541-minsize         [16] IMPLICIT Rational                  ,
  iso-standard-9541-maxsize         [17] IMPLICIT Rational                  ,
  iso-standard-9541-capheight       [18] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-lcheight        [19] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-dsngroup        [20] IMPLICIT Design-Group              ,
  iso-standard-9541-structure       [21] IMPLICIT Structure-Code            ,
  iso-standard-9541-minfeatsz       [22] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-nomcapstemwidth [23] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-nomlcstemwidth  [24] IMPLICIT Rel-Rational      OPTIONAL,
  non-iso-properties                [25] IMPLICIT Property-List     OPTIONAL }

Name-Prefix                    ::= SEQUENCE {
                    -- see global name note at the end of this clause
  index                             [0] IMPLICIT Code,
  prefix                            [1] IMPLICIT Structured-Name }

Data-Version                   ::= SEQUENCE {
  major                             [0] IMPLICIT Cardinal           OPTIONAL,
  minor                             [1] IMPLICIT Cardinal           OPTIONAL,
  timestamp                         [2] IMPLICIT UTCTime            OPTIONAL }

Posture-Code ::= INTEGER { not applicable   (0),
                           upright          (1),
                           oblique-forward  (2),
                           oblique-backward (3),
                           italic-forward   (4),
                           italic-backward  (5),
                           other            (6) }

Weight-Code ::= INTEGER {  not applicable   (0),
```

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```
                              ultra-light       (1),
                              extra-light       (2),
                              light             (3),
                              semi-light        (4),
                              medium            (5),
                              semi-bold         (6),
                              bold              (7),
                              extra-bold        (8),
                              ultra-bold        (9) }

Width-Code ::= INTEGER {    not applicable    (0),
                              ultra-condensed   (1),
                              extra-condensed   (2),
                              condensed         (3),
                              semi-condensed    (4),
                              medium            (5),
                              semi-expanded     (6),
                              expanded          (7),
                              extra-expanded    (8),
                              ultra-expanded    (9) }

Glyph-Complement                ::= SEQUENCE {
                            -- at least one included glyph list or at least one
                            -- included glyph collection list is mandatory
  iso-standard-9541-numglyphs       [0] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-incglyphcols    [1] IMPLICIT SET OF Global-Name OPTIONAL,
                                    -- at least one is required
  iso-standard-9541-excglyphcols    [2] IMPLICIT SET OF Global-Name OPTIONAL,
                                    -- at least one is required
  iso-standard-9541-incglyphs       [3] IMPLICIT SET OF Global-Name OPTIONAL,
                                    -- at least one is required
  iso-standard-9541-excglyphs       [4] IMPLICIT SET OF Global-Name OPTIONAL,
                                    -- at least one is required
  non-iso-properties                [5] IMPLICIT Property-List      OPTIONAL }

Design-Group                    ::= SEQUENCE {
                            -- see 9541-1 Annex-A for code values
  group-code                        [0] IMPLICIT Code,
  subgroup-code                     [1] IMPLICIT Code,
  specific-group-code               [2] IMPLICIT Code }

Structure-Code ::= INTEGER {  not applicable    (0),
                              solid             (1),
                              outline           (2) }

Writing-Modes                   ::= SET {
  iso-standard-9541-wrmode          [0] IMPLICIT SET OF Writing-Mode        ,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Writing-Mode                    ::= SEQUENCE {
  iso-standard-9541-wrmodename      [0] IMPLICIT Global-Name,
  wrmode-properties                 [1] IMPLICIT Modal-Properties }

Modal-Properties                ::= SET {
  iso-standard-9541-nomescdir       [0] IMPLICIT Angle                      ,
  iso-standard-9541-escclass        [1] IMPLICIT Esc-Class-Code             ,
  iso-standard-9541-avgescx         [2] IMPLICIT Rel-Rational               ,
  iso-standard-9541-avgescy         [3] IMPLICIT Rel-Rational               ,
  iso-standard-9541-avglcescx       [4] IMPLICIT Rel-Rational               ,
  iso-standard-9541-avglcescy       [5] IMPLICIT Rel-Rational               ,
  iso-standard-9541-avgcapescx      [6] IMPLICIT Rel-Rational               ,
  iso-standard-9541-avgcapescy      [7] IMPLICIT Rel-Rational               ,
```

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```
  iso-standard-9541-tabescx        [8] IMPLICIT Rel-Rational                ,
  iso-standard-9541-tabescy        [9] IMPLICIT Rel-Rational                ,
  iso-standard-9541-maxfontext     [10] IMPLICIT Max-Extents                ,
  iso-standard-9541-sectors        [11] IMPLICIT Sectors           OPTIONAL,
  iso-standard-9541-escadjs        [12] IMPLICIT SET OF Adjusts    OPTIONAL,
  iso-standard-9541-minescadjsze   [13] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-maxescadjsze   [14] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-scores         [15] IMPLICIT Scores            OPTIONAL,
  iso-standard-9541-vscripts       [16] IMPLICIT Variant-Scripts   OPTIONAL,
  iso-standard-9541-minlinesp      [17] IMPLICIT Alignment-Spacing OPTIONAL,
  iso-standard-9541-minanascale    [18] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-maxanascale    [19] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-nomalign       [20] IMPLICIT Font-Global-Name  OPTIONAL,
  iso-standard-9541-alignmodes     [21] IMPLICIT Alignment-Modes   OPTIONAL,
  iso-standard-9541-copyfits       [22] IMPLICIT Copyfits          OPTIONAL,
  iso-standard-9541-dsnwordadd     [23] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-dsnwordampl    [24] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-minwordadd     [25] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-minwordampl    [26] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-maxwordadd     [27] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-maxwordampl    [28] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-dsnletteradd   [29] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-dsnletterampl  [30] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-minletteradd   [31] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-minletterampl  [32] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-maxletteradd   [33] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-maxletterampl  [34] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-glyphmetrics   [35] IMPLICIT Glyph-Metrics              ,
  non-iso-properties               [36] IMPLICIT Property-List     OPTIONAL }

Esc-Class-Code ::= INTEGER { not applicable   (0),
                             monospace        (1),
                             proportional     (2)  }

Max-Extents                  ::= SEQUENCE {
  max-minx                        [0] IMPLICIT Rel-Rational,
  max-miny                        [1] IMPLICIT Rel-Rational,
  max-maxx                        [2] IMPLICIT Rel-Rational,
  max-maxy                        [3] IMPLICIT Rel-Rational }

Sectors                      ::= SET {
  iso-standard-9541-sector        [0] IMPLICIT SEQUENCE OF Sector OPTIONAL,
  non-iso-properties              [1] IMPLICIT Property-List      OPTIONAL }

Sector                       ::= SEQUENCE {
  sector-left                     [0] IMPLICIT Rel-Rational,
  sector-right                    [1] IMPLICIT Rel-Rational }

Adjusts                      ::= SET {
  iso-standard-9541-adjust        [0] IMPLICIT SET OF Adjust,
  non-iso-properties              [1] IMPLICIT Property-list      OPTIONAL }

Adjust                       ::= SET {
  iso-standard-9541-escadjname    [0] IMPLICIT Global-Name,
  adjust-properties               [1] IMPLICIT Adjust-Properties }

Adjust-Properties            ::= SET {
  iso-standard-9541-cpea          [0] IMPLICIT CPEA-Properties    OPTIONAL,
  iso-standard-9541-sec           [1] IMPLICIT SEC-Properties     OPTIONAL,
  non-iso-properties              [2] IMPLICIT Property-List      OPTIONAL }

CPEA-Properties              ::= SET {
```

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  iso-standard-9541-ncpeaforwd      [0] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-ncpeabackwd     [1] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-cpeax           [2] SEQUENCE OF Rel-Rational    OPTIONAL,
                                        -- at least one required
  iso-standard-9541-cpeay           [3] SEQUENCE OF Rel-Rational    OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List      OPTIONAL }

SEC-Properties                ::= SET {
  iso-standard-9541-secx            [0] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Rational,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-secy            [1] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Rational,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  non-iso-properties                [2] IMPLICIT Property-List      OPTIONAL }

Scores                        ::= SET {
  iso-standard-9541-score           [0] IMPLICIT SET OF Score       OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Score                         ::= SEQUENCE {
  iso-standard-9541-scorename       [0] IMPLICIT Global-Name,
  score-property-list               [1] IMPLICIT Score-Properties }

Score-Properties              ::= SET {
  iso-standard-9541-scoreoffsetx    [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-scoreoffsety    [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-scorethick      [2] IMPLICIT Rel-Rational       OPTIONAL,
  non-iso-properties                [3] IMPLICIT Property-List      OPTIONAL }

Variant-Scripts               ::= SET {
  iso-standard-9541-vscript         [0] IMPLICIT SET OF Vscript     OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Vscript                       ::= SEQUENCE {
  iso-standard-9541-vsname          [0] IMPLICIT Global-Name,
  vscript-property-list             [1] IMPLICIT Vscript-Properties }

Vscript-Properties            ::= SET {
  iso-standard-9541-vsoffsetx       [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-vsoffsety       [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-vsscalex        [2] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-vsscaley        [3] IMPLICIT Rational           OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List      OPTIONAL }

Alignment-Spacing             ::= SEQUENCE {
  minlinesp-left                    [0] IMPLICIT Rel-Rational,
  minlinesp-right                   [1] IMPLICIT Rel-Rational }

Alignment-Modes               ::= SET {
  iso-standard-9541-align           [0] IMPLICIT SET OF Alignment   OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Alignment                     ::= SEQUENCE {
  iso-standard-9541-alignname       [0] IMPLICIT Global-Name,
  alignment-property-list           [1] IMPLICIT Align-Properties }

Align-Properties              ::= SET {
  iso-standard-9541-alignoffsetx    [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-alignoffsety    [1] IMPLICIT Rel-Rational       OPTIONAL,
```


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```
  iso-standard-9541-alignscalex     [2] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-alignscaley     [3] IMPLICIT Rational          OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List     OPTIONAL }

Copyfits                        ::= SET {
  iso-standard-9541-copyfit         [0] IMPLICIT SET OF Copyfit    OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List     OPTIONAL }

Copyfit                         ::= SEQUENCE {
  iso-standard-9541-copyfitname     [0] IMPLICIT Global-Name,
  copyfit-properties                [1] IMPLICIT Copyfit-Properties }

Copyfit-Properties              ::= SET {
  iso-standard-9541-copyfitmeasure  [0] IMPLICIT Rational          OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List     OPTIONAL }

Glyph-Metrics                   ::= SET {
  iso-standard-9541-gmetric         [0] IMPLICIT SET OF Glyph-Property-List ,
  non-iso-properties                [1] IMPLICIT Property-List     OPTIONAL }

Glyph-Property-List             ::= SEQUENCE {
  iso-standard-9541-gname           [0] IMPLICIT Global-Name,
  glyph-properties                  [1] IMPLICIT Glyph-Properties }

Glyph-Properties                ::= SET {
  iso-standard-9541-px              [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-py              [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-ex              [2] IMPLICIT Rel-Rational                ,
  iso-standard-9541-ey              [3] IMPLICIT Rel-Rational                ,
  iso-standard-9541-ext             [4] IMPLICIT Extents                     ,
  iso-standard-9541-lgs             [5] IMPLICIT Ligatures         OPTIONAL,
  iso-standard-9541-peas            [6] IMPLICIT P-Adjusts         OPTIONAL,
  iso-standard-9541-cpeai           [7] IMPLICIT C-Indicator       OPTIONAL,
  iso-standard-9541-eai             [8] IMPLICIT E-Code            OPTIONAL,
  iso-standard-9541-minex           [9] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-miney          [10] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-maxex          [11] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-maxey          [12] IMPLICIT Rel-Rational      OPTIONAL,
  non-iso-properties               [13] IMPLICIT Property-List     OPTIONAL }

Extents                         ::= SEQUENCE {
  minx                              [0] IMPLICIT Rel-Rational,
  miny                              [1] IMPLICIT Rel-Rational,
  maxx                              [2] IMPLICIT Rel-Rational,
  maxy                              [3] IMPLICIT Rel-Rational }

Ligatures                       ::= SET {
  iso-standard-9541-lg              [0] IMPLICIT SET OF Ligature   OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List     OPTIONAL }

Ligature                        ::= SEQUENCE {
  iso-standard-9541-lgn             [0] IMPLICIT Global-Name,
  iso-standard-9541-lgsn            [1] SEQUENCE OF Global-Name }
                                        -- at least one required

P-Adjusts                       ::= SET {
  iso-standard-9541-pea             [0] IMPLICIT SET OF P-Adjust   OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List     OPTIONAL }

P-Adjust                        ::= SEQUENCE {
  iso-standard-9541-pean            [0] IMPLICIT Global-Name,
  p-adjust-property-list            [1] IMPLICIT P-Adjust-Properties }
```

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```
P-Adjust-Properties             ::= SET {
  iso-standard-9541-peax              [0] SEQUENCE OF {
                                          -- at least one required
                                          [0] IMPLICIT Global-Name,
                                          [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-peay              [1] SEQUENCE OF {
                                          -- at least one required
                                          [0] IMPLICIT Global-Name,
                                          [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-speaforwdx        [2] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speaforwdy        [3] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speabackwdx       [4] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speabackwdy       [5] SEQUENCE OF Rel-Rational    OPTIONAL,
  non-iso-properties                  [6] IMPLICIT Property-List      OPTIONAL }

C-Indicator                     ::= SEQUENCE {
  c-forward                           [0] IMPLICIT Cardinal,
  c-backward                          [1] IMPLICIT Cardinal }

E-Code          ::= INTEGER {  not applicable (0),
                               letter-space   (1),
                               word-space     (2),
                               no-adjust      (3)  }


Glyph-Shapes                    ::= SET OF Glyph Shapes
  Glyph Shape                   ::= EXTERNAL
                                    { -- see 9541-3 Glyph Shape Representation  }


     -- The following Data Types are used in the above structures

Property                        ::= SEQUENCE {
  property-name                       [0] Global-Name,
  property-value                      [1] Property-Value }

Property-Value                  ::= CHOICE {
  value                               [0] Value,
  value-list                          [1] Value-List,
  ordered-value-list                  [2] Ordered-Value-List,
  property-list                       [3] Property-List,
  ordered-property-list               [4] Ordered-Property-List  }

Value-List                      ::= SET OF Value

Ordered-Value-List              ::= SEQUENCE OF Value

Property-List                   ::= SET OF Property

Ordered-Property-List           ::= SEQUENCE OF Property

Value                           ::= CHOICE {
                                    [0] Global-Name,
                                    [1] Match-String,
                                    [2] Message,
                                    [3] OCTET STRING,
                                    [4] BOOLEAN,
                                    [5] Integer,
                                    [6] Cardinal,
                                    [7] Code,
```

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```
                                [8] Rational,
                                [9] Rel-Rational,
                                [10] Angle,
                                [11] Proprietary-Data  }

Global-Name                 ::= SEQUENCE {
                    -- see global name note at the end of this clause
  prefix-index                  [0] IMPLICIT Code               OPTIONAL,
  name-value                    [1] IMPLICIT Structured-Name              }

Match-String                ::= CHOICE {
  numeric                       [0] NumericString,
  printable                     [1] PrintableString,
  teletex                       [2] TeletexString,
  videotex                      [3] VideotexString,
  visible                       [4] VisibleString,
  ia5                           [5] IA5String,
  graphic                       [6] GraphicString,
  general                       [7] GeneralString  }

Message                     ::= CHOICE {
  numeric                       [0] NumericString,
  printable                     [1] PrintableString,
  teletex                       [2] TeletexString,
  videotex                      [3] VideotexString,
  visible                       [4] VisibleString,
  ia5                           [5] IA5String,
  graphic                       [6] GraphicString,
  general                       [7] GeneralString  }

Integer                     ::= INTEGER {first(-2147483648),last(2147483647)}

Cardinal                    ::= INTEGER {first(0),last(4294967295)}

Code                        ::= INTEGER {first(0),last(255)}

Rational                    ::= SEQUENCE {
  numerator                     [0] IMPLICIT Integer,
  denominator                   [1] IMPLICIT INTEGER
                                       {first(1),last(2147483647) OPTIONAL }
                                -- denominator defaults to 1

Rel-Rational                ::= Rational
                                -- expresses glyph coordinate units
                                -- denominator defaults to relunits or 1

Angle                       ::= Rational
                                -- expresses units of degrees, with a
                                -- value range of -360 to +360
                                -- denominator defaults to 1

Proprietary-Data            ::= SEQUENCE {
  prop-data-message             [0] IMPLICIT Message            OPTIONAL,
  prop-data-key                 [1] IMPLICIT OCTET STRING       OPTIONAL,
  prop-data                     [2] IMPLICIT OCTET STRING                 }

END
```

NOTE 3 The Global-Name and Name-Prefix properties represent an encoding efficiency that permits the use of short Structured-Names (as short as one Object-Name-Component) within the body of a font resource or font reference. The Name-Prefixes property is an indexed list of Structured-Name values (see annex B for the definition of Structured-Names) that are to be pre-pended to the Structured-Name value of any Global-Name containing a corresponding prefix-index value. If no

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prefix-index value is provided in a Global-Name, then the Structured-Name value specified is a fully qualified Structured-Name. Caution should be exercised in the creation of Name-Prefixes since no validation checking can be performed to verify the fully qualified Structured-Name resulting from the combination.

6.2 SGML

```
<!-- (C) International Organization for Standardization 1991 Permission
     to copy in any form is granted for use with conforming SGML systems
     and applications as defined in ISO 8879:1986, provided this notice
     is included in all copies.  -->

<!-- Public document type definition. Typical invocation:

     <!DOCTYPE fontres PUBLIC "ISO 9541-2:1991//DTD Font Resource//EN">   -->

<!ENTITY % simval  "msg | str | int | card | code | propdata |
                    relr | ratl | bool | glbname | octstr |
                    ang | time"                                            >
<!ENTITY % compval "vlist | ovlist | plist | oplist"                        >

<!ELEMENT fontres    - -  (namencd? , namtabl? , fontname , fontdes ,
                           wrmodes , gshapes? , niprop* ) -- FONT RESOURCE -->
<!ELEMENT namencd    - o (octstr)                  -- char encoding for names -->
<!ELEMENT namtabl    - o (prefix , strucnm)+          -- name prefix table,
                          see global name note at the end of this clause -->
<!ELEMENT prefix     - o (code)                              -- prefix index -->
<!ELEMENT fontname   - o (glbname)                              -- FONTNAME -->

<!-- Descriptive properties -->

<!ELEMENT fontdes    - o (dataver?  & stdver    & datasrce? & datacopy? &
                          dsnsrce   & dsncopy?  & relunits? & typeface? &
                          fontfam   & posture   & postang?  & weight    &
                          propwdth  & glycomp   & nomwrmde? & dsnsize   &
                          minsize   & maxsize   & caphght?  & lchght?   &
                          dsngroup  & structur  & mnfeatsz? & nomcsw?   &
                          nomlcsw?  & niprop*   )       -- FONTDESCRIPTION -->

<!ELEMENT dataver    - o (card? , card? , time?)            -- DATAVERSION -->
<!ELEMENT stdver     - o (card)                          -- STANDARDVERSION -->
<!ELEMENT datasrce   - o (glbname)                          -- DATASOURCE -->
<!ELEMENT datacopy   - o (msg)                           -- DATACOPYRIGHT -->
<!ELEMENT dsnsrce    - o (glbname)                          -- DSNSOURCE -->
<!ELEMENT dsncopy    - o (msg)                           -- DSNCOPYRIGHT -->
<!ELEMENT relunits   - o (card)                             -- RELUNITS -->
<!ELEMENT typeface   - o (msg)                              -- TYPEFACE -->
<!ELEMENT fontfam    - o (str)                           -- FONTFAMILY -->
<!ELEMENT posture    - o (code)                             -- POSTURE -->
<!ELEMENT postang    - o (ang)                           -- POSTUREANGLE -->
<!ELEMENT weight     - o (code)                             -- WEIGHT -->
<!ELEMENT propwdth   - o (code)                            -- PROPWIDTH -->
<!ELEMENT glycomp    - o ( numglyph? , iglycols? , xglycols? ,
                           iglys?    , xglys?    , niprop* )
                                                           -- GLYPHCOMP -->
<!ELEMENT numglyph   - o (int)                             -- NUMGLYPHS -->
<!ELEMENT (iglycols | xglycols | iglys | xglys)
                     - o (glbname+)     -- INC/EXCGLYPHCOLS,INC/EXCGLYPHS -->
<!ELEMENT nomwrmde   - o (glbname)                          -- NOMWRMODE -->
<!ELEMENT (dsnsize | minsize | maxsize)
                     - o (ratl)              -- DSNSIZE, MINSIZE, MAXSIZE -->
<!ELEMENT (caphght | lchght)  - o (relr)        -- CAPHEIGHT, LCHEIGHT -->
<!ELEMENT dsngroup   - o (code,code,code)                     -- DSNGROUP -->
<!ELEMENT structur   - o (code)                             -- STRUCTURE -->
```

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```
<!ELEMENT mnfeatsz   - o (relr)                                  -- MINFEATSZ -->
<!ELEMENT (nomcsw | nomlcsw)  - o (relr)          -- NOMCAP/NOMLCSTEMWIDTH -->

<!-- Writing mode dependent properties -->

<!ELEMENT wrmodes    - o (wrmode* & niprop*)                     -- WRMODES -->
<!ELEMENT wrmode     - o (wrmdnam , ( nescdir   & escclass  &
                         (avgescx   & avgescy   & avlcescx  & avlcescy  &
                          avcpescx  & avcpescy  & tabescx   & tabescy ) &
                          mxfntext  & sectors?  & escadjs?  &
                          mineas?   & maxeas?   & scores?   & varscrps? &
                          minlinsp? & minanasc? & maxanasc? & nomalign? &
                          algnmds?  & copyfits? &
                         (dsnwdadd? & dsnwdamp? & minwdadd? & minwdamp? &
                          maxwdadd? & maxwdamp? & dsnltadd? & dsnltamp? &
                          minltadd? & minltamp? & maxltadd? & maxltamp?)&
                          glyphs    & niprop*))                  -- WRMODE -->

<!ELEMENT wrmdnam    o o (glbname)                              -- WRMODENAME -->
<!ELEMENT nescdir    - o (ang)                                   -- NOMESCDIR -->
<!ELEMENT escclass   - o (code)                                  -- ESCCLASS -->
<!ELEMENT (avgescx | avgescy)   - o (relr)                      -- AVGESCX/Y -->
<!ELEMENT (avlcescx | avlcescy) - o (relr)                   -- AVGLCESCX/Y -->
<!ELEMENT (avcpescx | avcpescy) - o (relr)                  -- AVGCAPESCX/Y -->
<!ELEMENT (tabescx | tabescy)   - o (relr)                      -- TABESCX/Y -->
<!ELEMENT mxfntext   - o (relr , relr , relr , relr)           -- MAXFONTEXT -->
<!ELEMENT sectors  - o (sector* & niprop*)                       -- SECTORS -->
<!ELEMENT sector   - o (relr , relr)           -- SECTOR (left and right) -->
<!ELEMENT escadjs  - o (ascadj* & niprop*)                       -- ESCADJS -->
<!ELEMENT escadj   - o (adjname , (cpea? & sec? & niprop*) )    -- ESCADJ  -->
<!ELEMENT adjname  o o (glbname)                               -- ESCADJNAME -->
<!ELEMENT cpea     - o (ncpeafwd & ncpeabwd &
                        cpeax? & cpeay? & niprop*)                 -- CPEA -->
<!ELEMENT (ncpeafwd | ncpeabwd)  - o (card)      -- NCPEAFORWD,NCPEABACKWD -->
<!ELEMENT (cpeax | cpeay)       - o (relr+)                     -- CPEAX/Y -->
<!ELEMENT sec      - o (secx? & secy? & niprop*)                   -- SEC -->
<!ELEMENT (secx | secy)         - o ((ratl, relr)+)             -- SECX/Y -->
<!ELEMENT (mineas | maxeas)     - o (ratl)             -- MIN/MAXESCADJSZE -->
<!ELEMENT scores    - o (score+ & niprop*)                      -- SCORES -->
<!ELEMENT score     - o (scname, (scoffx? & scoffy? & scthick? & niprop* ))
                                                                -- SCORE -->
<!ELEMENT scname    o o (glbname)                              -- SCORENAME -- >
<!ELEMENT (scoffx | scoffy)  - o (relr)                  -- SCOREOFFSETX/Y -->
<!ELEMENT scthick   - o (relr)                                 -- SCORETHICK -->
<!ELEMENT varscrps  - o (varscrp* & niprop*)                    -- VSCRIPTS -->
<!ELEMENT varscrp   - o (vsname    , (vsoffx?  & vsoffy? &
                           vsscalex? & vsscaley? & niprop* ) )  -- VSCRIPT -->
<!ELEMENT vsname    o o (glbname)                               -- VSNAME -->
<!ELEMENT (vsoffx | vsoffy)  - o (relr)                    -- VSOFFSETX/Y -->
<!ELEMENT (vsscalex | vsscaley)  - o (ratl)                  -- VSSCALEX/Y -->
<!ELEMENT minlinsp   - o (relr , relr)                        -- MINLINESP -->
<!ELEMENT (minanasc | maxanasc) - o (ratl)               -- MIN/MAXANASCALE -->
<!ELEMENT nomalign   - o (glbname)                             -- NOMALIGN -->
<!ELEMENT algnmds    - o (align* & niprop*)                    -- ALIGNMODES -->
<!ELEMENT align      - o (alname  , (aloffx?  & aloffy?  & ascalex?  &
                                 ascaley? & niprop*)  )        -- ALIGN -->
<!ELEMENT alname     o o (glbname)                             -- ALIGNNAME -->
<!ELEMENT (aloffx | aloffy)    - o (relr)                 -- ALIGNOFFSETX/Y -->
<!ELEMENT (ascalex | ascaley)  - o (ratl)                   -- ALIGNSCALEX/Y -->
<!ELEMENT copyfits   - o (copyfit* & niprop*)                  -- COPYFITS -->
<!ELEMENT copyfit    - o (cfname , (cfmeas? & niprop*) )       -- COPYFIT -->
<!ELEMENT cfname     o o (glbname)                          -- COPYFITNAME -->
```


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```
<!ELEMENT cfmeas      - o (ratl)                                  -- COPYFITMEASURE -->
<!ELEMENT (dsnwdadd | minwdadd | maxwdadd | dsnltadd | minltadd |
           maxltadd) - o (relr)        -- word and letter space additions -->
<!ELEMENT (dsnwdamp | minwdamp | maxwdamp | dsnltamp | minltamp |
           maxltamp) - o (ratl)    -- word and letter space amplifications -->

<!-- Glyph Metric Information

<!ELEMENT gmetrics    - o (gmetric+ & niprop*)              -- GLYPHMETRICS -->
<!ELEMENT gmetric     - o (glname , (px     & py     & ex      & ey     &
                           ext    & lgs?    & peas?  & cpeai?  & eai?   &
                           minex? & miney?  & maxex? & maxey?  & niprop*) )  >
<!ELEMENT glname      o o (glbname)                                  -- GNAME -->
<!ELEMENT (px | py | ex | ey)  - o (relr)                    -- PX,PY,EX,EY -->
<!ELEMENT ext         - o (relr , relr , relr , relr)                -- EXT -->
<!ELEMENT lgs         - o (lg* & niprop*)                            -- LGS -->
<!ELEMENT lg          - o (lgn, lgsn)                                 -- LG -->
<!ELEMENT lgn         o o (glbname)                                  -- LGN -->
<!ELEMENT lgsn        - o (glbname+)                                -- LGSN -->
<!ELEMENT peas        - o (pea* & niprop*)                          -- PEAS -->
<!ELEMENT pea         - o (pean , ( peax?  & peay?  & spfx?  &
                          spfy?    & spbx?   & spby?  & niprop* ) ) -- PEA -->
<!ELEMENT pean        o o (glbname)                                  -- PEAN -->
<!ELEMENT (peax | peay)  - o ((glbname, relr)+)              -- PEAX, PEAY -->
<!ELEMENT (spfx | spfy | spbx | spby)
                      - o (relr+)                            -- SPEA Extents -->
<!ELEMENT cpeai       - o (card , card)                              -- CPEAI -->
<!ELEMENT eai         - o (code)                                      -- EAI -->
<!ELEMENT (minex | miney | maxex | maxey)  - o (relr)     -- MINEX/Y,MAXEX/Y -->


<!-- Glyph Shape information

     <!DOCTYPE gshapes PUBLIC "ISO 9541-3:1991//DTD Glyph Shapes//EN">   -->

<!-- 'Non-ISO Property' and elemental type definitions -->

<!ELEMENT niprop      - - (name , value )  -- for non-ISO properties.
                           NB. only ISO-defined value types allowed. -->
<!ELEMENT name        o o (glbname)                                    >
<!ELEMENT value       o o (%simval; | %compval;)   -- elemental value types -->
<!ELEMENT (plist | oplist)  - o (defnmpre? , niprop)+     -- property-lists -->
<!ELEMENT (vlist | ovlist)  - o ((%simval;)+)                -- value lists -->
<!ELEMENT glbname     o o (prefix? , strucnm)   -- global name,
                           see global name note at the end of this clause -->
<!ELEMENT str         o o (strtype , strvalue)  -- machine parsable string -->
<!ELEMENT strtype     o o (code)    -- identifier of character string type -->
<!ELEMENT strvalue    - o (#PCDATA)                      -- character string -->
<!ELEMENT msg         o o (msgtype , msgvalue)   -- human-readable message -->
<!ELEMENT msgtype     o o (code)    -- identifier of character string type -->
<!ELEMENT msgvalue    - o (#PCDATA)                      -- character string -->
<!ELEMENT int         o o (#PCDATA) -- integer (-2^31 to 2^31 -1) -->
<!ELEMENT card        o o (#PCDATA)                -- cardinal (0 to 2^32 -1) -->
<!ELEMENT code        o o (#PCDATA)   -- code or "short integer" (0 to 255) -->
<!ELEMENT time        o o (#PCDATA)                 -- ASN.1 UTCTime String -->
<!ELEMENT octstr      o o (#PCDATA)                          -- octet string -->
<!ELEMENT ratl        o o (num , den?)         -- denominator defaults to 1 -->
<!ELEMENT relr        o o (num , den?) -- denominator defaults to relunits -->
<!ELEMENT ang         o o (num , den?)               -- angle (in degrees) -->
<!ELEMENT bool        - o EMPTY             -- boolean ('true' or 'false') -->
<!ATTLIST bool       value     (true | false)     "true"                   >
<!ELEMENT propdata    o o (msg? , key? , octstr)       -- proprietary data -->
```

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```
<!ELEMENT  key       - o (octstr)                    -- encryption key -->
<!ELEMENT  num       o o (#PCDATA)                     -- numerator -->
<!ELEMENT  den       - o (#PCDATA)                   -- denominator -->
```

NOTE 4 The glbname and nametbl elements represent an encoding efficiency that permits the use of short Structured-Names (as short as one Object-Name-Component) within the body of a font resource or font reference. The nametbl element is an indexed list of Structured-Name values (see Annex B for the definition of Structured-Names) that are to be pre-pended to the Structured-Name value of any glbname element containing a corresponding prefix value. If no prefix value is provided in a glbname element, then the strucnm value specified is a fully qualified Structured-Name. Caution should be exercised in the creation of namtbl values since no validation checking can be performed to verify the fully qualified Structured-Name resulting from the combination.

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Annex A
(normative)

Font reference

This annex defines an ASN.1 structure and an SGML Document Type Definition of the font information that may be used in a font reference data structure. A font reference is intended for use in the identification and selection of a font resource that matches the set of property values specified in the font reference; glyph metrics, if present, are intended only to aid font selection. A complete font reference needs to be based on the processing and user requirements of the document architecture in which the reference is defined.

The structure defined below retains the same format as a font resource, except all properties are optional and glyph shapes are excluded. The structure may be used directly as a font reference (by specifying the selection semantics), or may be used as a building block for more complex font selection or substitution requirements. Only those properties considered to be relevant to the originator need be specified in a font reference.

A.1 ASN.1

```
ISO-STANDARD-9541-FONT-ATTRIBUTE-SET {1 0 9541 2 2}
DEFINITIONS ::= BEGIN

IMPORTS Structured-Name FROM {1 0 9541 2 3}

Font-Attribute-Set              ::= SEQUENCE {
  name-prefixes                     [0] IMPLICIT SET OF Name-Prefix OPTIONAL,
  iso-standard-9541-fontname        [1] IMPLICIT Global-Name        OPTIONAL,
  iso-standard-9541-fontdescription [2] IMPLICIT Font-Description   OPTIONAL,
  iso-standard-9541-wrmodes         [3] IMPLICIT Writing-Modes      OPTIONAL,
  non-iso-properties                [5] IMPLICIT Property-List      OPTIONAL }

Font-Description                ::= SET {
  iso-standard-9541-dataversion     [0] IMPLICIT Data-Version       OPTIONAL,
  iso-standard-9541-standardversion [1] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-datasource      [2] IMPLICIT Global-Name        OPTIONAL,
  iso-standard-9541-datacopyright   [3] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-dsnsource       [4] IMPLICIT Global-Name        OPTIONAL,
  iso-standard-9541-dsncopyright    [5] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-relunits        [6] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-typeface        [7] IMPLICIT Message            OPTIONAL,
  iso-standard-9541-fontfamily      [8] IMPLICIT Match-String       OPTIONAL,
  iso-standard-9541-posture         [9] IMPLICIT Posture-Code       OPTIONAL,
  iso-standard-9541-postureangle    [10] IMPLICIT Angle             OPTIONAL,
  iso-standard-9541-weight          [11] IMPLICIT Weight-Code       OPTIONAL,
  iso-standard-9541-propwidth       [12] IMPLICIT Width-Code        OPTIONAL,
  iso-standard-9541-glyphcomp       [13] IMPLICIT Glyph-Complement  OPTIONAL,
  iso-standard-9541-nomwrmode       [14] IMPLICIT Global-Name       OPTIONAL,
  iso-standard-9541-dsnsize         [15] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-minsize         [16] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-maxsize         [17] IMPLICIT Rational          OPTIONAL,
  iso-standard-9541-capheight       [18] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-lcheight        [19] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-dsngroup        [20] IMPLICIT Design-Group      OPTIONAL,
  iso-standard-9541-structure       [21] IMPLICIT Structure-Code    OPTIONAL,
  iso-standard-9541-minfeatsz       [22] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-nomcapstemwidth [23] IMPLICIT Rel-Rational      OPTIONAL,
  iso-standard-9541-nomlcstemwidth  [24] IMPLICIT Rel-Rational      OPTIONAL,
  non-iso-properties                [25] IMPLICIT Property-List     OPTIONAL }
```

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```
Name-Prefix                    ::= SEQUENCE {
                        -- see global name note at the end of this clause
  index                              [0] IMPLICIT Code,
  prefix                             [1] IMPLICIT Structured-Name }

Data-Version                   ::= SEQUENCE {
  major                              [0] IMPLICIT Cardinal          OPTIONAL,
  minor                              [1] IMPLICIT Cardinal          OPTIONAL,
  timestamp                          [2] IMPLICIT UTCTime           OPTIONAL }

Posture-Code ::= INTEGER { not applicable   (0),
                           upright          (1),
                           oblique-forward  (2),
                           oblique-backward (3),
                           italic-forward   (4),
                           italic-backward  (5),
                           other            (6) }

Weight-Code ::= INTEGER {  not applicable   (0),
                           ultra-light      (1),
                           extra-light      (2),
                           light            (3),
                           semi-light       (4),
                           medium           (5),
                           semi-bold        (6),
                           bold             (7),
                           extra-bold       (8),
                           ultra-bold       (9) }

Width-Code ::= INTEGER {    not applicable  (0),
                           ultra-condensed  (1),
                           extra-condensed  (2),
                           condensed        (3),
                           semi-condensed   (4),
                           medium           (5),
                           semi-expanded    (6),
                           expanded         (7),
                           extra-expanded   (8),
                           ultra-expanded   (9) }

Glyph-Complement               ::= SEQUENCE {
                        -- at least one included glyph list or at least one
                        -- included glyph collection list is mandatory
  iso-standard-9541-numglyphs      [0] IMPLICIT Cardinal          OPTIONAL,
  iso-standard-9541-incglyphcols   [1] IMPLICIT SET OF Global-Name OPTIONAL,
                                   -- at least one is required
  iso-standard-9541-excglyphcols   [2] IMPLICIT SET OF Global-Name OPTIONAL,
                                   -- at least one is required
  iso-standard-9541-incglyphs      [3] IMPLICIT SET OF Global-Name OPTIONAL,
                                   -- at least one is required
  iso-standard-9541-excglyphs      [4] IMPLICIT SET OF Global-Name OPTIONAL,
                                   -- at least one is required
  non-iso-properties               [5] IMPLICIT Property-List     OPTIONAL }

Design-Group                   ::= SEQUENCE {
                        -- see 9541-1 Annex-A for code values
  group-code                       [0] IMPLICIT Code,
  subgroup-code                    [1] IMPLICIT Code,
  specific-group-code              [2] IMPLICIT Code }

Structure-Code  ::= INTEGER { not applicable  (0),
```

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```
                                solid           (1),
                                outline         (2) }

Writing-Modes                   ::= SET {
  iso-standard-9541-wrmode          [0] IMPLICIT SET OF Writing-Mode OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List       OPTIONAL }

Writing-Mode                    ::= SEQUENCE {
  iso-standard-9541-wrmodename      [0] IMPLICIT Global-Name,
  wrmode-properties                 [1] IMPLICIT Modal-Properties }

Modal-Properties                ::= SET {
  iso-standard-9541-nomescdir       [0] IMPLICIT Angle              OPTIONAL,
  iso-standard-9541-escclass        [1] IMPLICIT Esc-Class-Code     OPTIONAL,
  iso-standard-9541-avgescx         [2] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-avgescy         [3] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-avglcescx       [4] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-avglcescy       [5] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-avgcapescx      [6] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-avgcapescy      [7] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-tabescx         [8] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-tabescy         [9] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-maxfontext     [10] IMPLICIT Max-Extents        OPTIONAL,
  iso-standard-9541-sectors        [11] IMPLICIT Sectors            OPTIONAL,
  iso-standard-9541-escadjs        [12] IMPLICIT SET OF Adjusts     OPTIONAL,
  iso-standard-9541-minescadjsze   [13] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-maxescadjsze   [14] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-scores         [15] IMPLICIT Scores             OPTIONAL,
  iso-standard-9541-vscripts       [16] IMPLICIT Variant-Scripts    OPTIONAL,
  iso-standard-9541-minlinesp      [17] IMPLICIT Alignment-Spacing  OPTIONAL,
  iso-standard-9541-minanascale    [18] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-maxanascale    [19] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-nomalign       [20] IMPLICIT Font-Global-Name   OPTIONAL,
  iso-standard-9541-alignmodes     [21] IMPLICIT Alignment-Modes    OPTIONAL,
  iso-standard-9541-copyfits       [22] IMPLICIT Copyfits           OPTIONAL,
  iso-standard-9541-dsnwordadd     [23] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-dsnwordampl    [24] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-minwordadd     [25] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-minwordampl    [26] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-maxwordadd     [27] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-maxwordampl    [28] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-dsnletteradd   [29] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-dsnletterampl  [30] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-minletteradd   [31] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-minletterampl  [32] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-maxletteradd   [33] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-maxletterampl  [34] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-glyphmetrics   [35] IMPLICIT Glyph-Metrics      OPTIONAL,
  non-iso-properties               [36] IMPLICIT Property-List      OPTIONAL }

Esc-Class-Code ::= INTEGER {  not applicable    (0),
                              monospace         (1),
                              proportional      (2)  }

Max-Extents                     ::= SEQUENCE {
  max-minx                          [0] IMPLICIT Rel-Rational,
  max-miny                          [1] IMPLICIT Rel-Rational,
  max-maxx                          [2] IMPLICIT Rel-Rational,
  max-maxy                          [3] IMPLICIT Rel-Rational }

Sectors                         ::= SET {
  iso-standard-9541-sector          [0] IMPLICIT SEQUENCE OF Sector OPTIONAL,
```

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```
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Sector                          ::= SEQUENCE {
  sector-left                       [0] IMPLICIT Rel-Rational,
  sector-right                      [1] IMPLICIT Rel-Rational }

Adjusts                         ::= SET {
  iso-standard-9541-adjust          [0] IMPLICIT SET OF Adjust,
  non-iso-properties                [1] IMPLICIT Property-list      OPTIONAL }

Adjust                          ::= SET {
  iso-standard-9541-escadjname      [0] IMPLICIT Global-Name,
  adjust-properties                 [1] IMPLICIT Adjust-Properties }

Adjust-Properties               ::= SET {
  iso-standard-9541-cpea            [0] IMPLICIT CPEA-Properties    OPTIONAL,
  iso-standard-9541-sec             [1] IMPLICIT SEC-Properties     OPTIONAL,
  non-iso-properties                [2] IMPLICIT Property-List      OPTIONAL }

CPEA-Properties                 ::= SET {
  iso-standard-9541-ncpeaforwd      [0] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-ncpeabackwd     [1] IMPLICIT Cardinal           OPTIONAL,
  iso-standard-9541-cpeax           [2] SEQUENCE OF Rel-Rational    OPTIONAL,
                                        -- at least one required
  iso-standard-9541-cpeay           [3] SEQUENCE OF Rel-Rational    OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List      OPTIONAL }

SEC-Properties                  ::= SET {
  iso-standard-9541-secx            [0] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Rational,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-secy            [1] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Rational,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  non-iso-properties                [2] IMPLICIT Property-List      OPTIONAL }

Scores                          ::= SET {
  iso-standard-9541-score           [0] IMPLICIT SET OF Score       OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Score                           ::= SEQUENCE {
  iso-standard-9541-scorename       [0] IMPLICIT Global-Name,
  score-property-list               [1] IMPLICIT Score-Properties }

Score-Properties                ::= SET {
  iso-standard-9541-scoreoffsetx    [0] IMPLICIT Rel-Rational        OPTIONAL,
  iso-standard-9541-scoreoffsety    [1] IMPLICIT Rel-Rational        OPTIONAL,
  iso-standard-9541-scorethick      [2] IMPLICIT Rel-Rational        OPTIONAL,
  non-iso-properties                [3] IMPLICIT Property-List      OPTIONAL }

Variant-Scripts                 ::= SET {
  iso-standard-9541-vscript         [0] IMPLICIT SET OF Vscript     OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Vscript                         ::= SEQUENCE {
  iso-standard-9541-vsname          [0] IMPLICIT Global-Name,
  vscript-property-list             [1] IMPLICIT Vscript-Properties }

Vscript-Properties              ::= SET {
  iso-standard-9541-vsoffsetx       [0] IMPLICIT Rel-Rational       OPTIONAL,
```

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

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```
  iso-standard-9541-vsoffsety       [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-vsscalex        [2] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-vsscaley        [3] IMPLICIT Rational           OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List      OPTIONAL }

Alignment-Spacing             ::= SEQUENCE {
  minlinesp-left                    [0] IMPLICIT Rel-Rational,
  minlinesp-right                   [1] IMPLICIT Rel-Rational }

Alignment-Modes               ::= SET {
  iso-standard-9541-align           [0] IMPLICIT SET OF Alignment   OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Alignment                     ::= SEQUENCE {
  iso-standard-9541-alignname       [0] IMPLICIT Global-Name,
  alignment-property-list           [1] IMPLICIT Align-Properties }

Align-Properties              ::= SET {
  iso-standard-9541-alignoffsetx    [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-alignoffsety    [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-alignscalex     [2] IMPLICIT Rational           OPTIONAL,
  iso-standard-9541-alignscaley     [3] IMPLICIT Rational           OPTIONAL,
  non-iso-properties                [4] IMPLICIT Property-List      OPTIONAL }

Copyfits                      ::= SET {
  iso-standard-9541-copyfit         [0] IMPLICIT SET OF Copyfit     OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Copyfit                       ::= SEQUENCE {
  iso-standard-9541-copyfitname     [0] IMPLICIT Global-Name,
  copyfit-properties                [1] IMPLICIT Copyfit-Properties }

Copyfit-Properties            ::= SET {
  iso-standard-9541-copyfitmeasure  [0] IMPLICIT Rational           OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Glyph-Metrics                 ::= SET {
  iso-standard-9541-gmetric         [0] IMPLICIT SET OF Glyph-Property-List
                                                                    OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Glyph-Property-List           ::= SEQUENCE {
  iso-standard-9541-gname           [0] IMPLICIT Global-Name,
  glyph-properties                  [1] IMPLICIT Glyph-Properties }

Glyph-Properties              ::= SET {
  iso-standard-9541-px              [0] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-py              [1] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-ex              [2] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-ey              [3] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-ext             [4] IMPLICIT Extents            OPTIONAL,
  iso-standard-9541-lgs             [5] IMPLICIT Ligatures          OPTIONAL,
  iso-standard-9541-peas            [6] IMPLICIT P-Adjusts          OPTIONAL,
  iso-standard-9541-cpeai           [7] IMPLICIT C-Indicator        OPTIONAL,
  iso-standard-9541-eai             [8] IMPLICIT E-Code             OPTIONAL,
  iso-standard-9541-minex           [9] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-miney          [10] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-maxex          [11] IMPLICIT Rel-Rational       OPTIONAL,
  iso-standard-9541-maxey          [12] IMPLICIT Rel-Rational       OPTIONAL,
  non-iso-properties               [13] IMPLICIT Property-List      OPTIONAL }

Extents                       ::= SEQUENCE {
```

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```
  minx                              [0] IMPLICIT Rel-Rational       OPTIONAL,
  miny                              [1] IMPLICIT Rel-Rational       OPTIONAL,
  maxx                              [2] IMPLICIT Rel-Rational       OPTIONAL,
  maxy                              [3] IMPLICIT Rel-Rational       OPTIONAL }

Ligatures                       ::= SET {
  iso-standard-9541-lg              [0] IMPLICIT SET OF Ligature    OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

Ligature                        ::= SEQUENCE {
  iso-standard-9541-lgn             [0] IMPLICIT Global-Name,
  iso-standard-9541-lgsn            [1] SEQUENCE OF Global-Name }
                                        -- at least one required

P-Adjusts                       ::= SET {
  iso-standard-9541-pea             [0] IMPLICIT SET OF P-Adjust    OPTIONAL,
  non-iso-properties                [1] IMPLICIT Property-List      OPTIONAL }

P-Adjust                        ::= SEQUENCE {
  iso-standard-9541-pean            [0] IMPLICIT Global-Name,
  p-adjust-property-list            [1] IMPLICIT P-Adjust-Properties }

P-Adjust-Properties             ::= SET {
  iso-standard-9541-peax            [0] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Global-Name,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-peay            [1] SEQUENCE OF {
                                        -- at least one required
                                        [0] IMPLICIT Global-Name,
                                        [1] IMPLICIT Rel-Rational } OPTIONAL,
  iso-standard-9541-speaforwdx      [2] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speaforwdy      [3] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speabackwdx     [4] SEQUENCE OF Rel-Rational    OPTIONAL,
  iso-standard-9541-speabackwdy     [5] SEQUENCE OF Rel-Rational    OPTIONAL,
  non-iso-properties                [6] IMPLICIT Property-List      OPTIONAL }

C-Indicator                     ::= SEQUENCE {
  c-forward                         [0] IMPLICIT Cardinal,
  c-backward                        [1] IMPLICIT Cardinal }

E-Code          ::= INTEGER {  not applicable     (0),
                               letter-space       (1),
                               word-space         (2),
                               no-adjust          (3)  }


     -- The following Data Types are used in the above structures

Property                        ::= SEQUENCE {
  property-name                     [0] Global-Name,
  property-value                    [1] Property-Value }

Property-Value                  ::= CHOICE {
  value                             [0] Value,
  value-list                        [1] Value-List,
  ordered-value-list                [2] Ordered-Value-List,
  property-list                     [3] Property-List,
  ordered-property-list             [4] Ordered-Property-List  }

Value-List                      ::= SET OF Value
```

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```
Ordered-Value-List          ::= SEQUENCE OF Value

Property-List               ::= SET OF Property

Ordered-Property-List       ::= SEQUENCE OF Property

Value                       ::= CHOICE {
                                  [0] Global-Name,
                                  [1] Match-String,
                                  [2] Message,
                                  [3] OCTET STRING,
                                  [4] BOOLEAN,
                                  [5] Integer,
                                  [6] Cardinal,
                                  [7] Code,
                                  [8] Rational,
                                  [9] Rel-Rational,
                                  [10] Angle,
                                  [11] Proprietary-Data  }

Global-Name                 ::= SEQUENCE {
                                  -- see global name note at the end of
                                  -- clause 6.1
  prefix-index                    [0] IMPLICIT Code              OPTIONAL,
  name-value                      [1] IMPLICIT Structured-Name           }

Match-String                ::= CHOICE {
  numeric                         [0] NumericString,
  printable                       [1] PrintableString,
  teletex                         [2] TeletexString,
  videotex                        [3] VideotexString,
  visible                         [4] VisibleString,
  ia5                             [5] IA5String,
  graphic                         [6] GraphicString,
  general                         [7] GeneralString  }

Message                     ::= CHOICE {
  numeric                         [0] NumericString,
  printable                       [1] PrintableString,
  teletex                         [2] TeletexString,
  videotex                        [3] VideotexString,
  visible                         [4] VisibleString,
  ia5                             [5] IA5String,
  graphic                         [6] GraphicString,
  general                         [7] GeneralString  }

Integer                     ::= INTEGER {first(-2147483648),last(2147483647)}

Cardinal                    ::= INTEGER {first(0),last(4294967295)}

Code                        ::= INTEGER {first(0),last(255)}

Rational                    ::= SEQUENCE {
  numerator                       [0] IMPLICIT Integer,
  denominator                     [1] IMPLICIT INTEGER
                                  {first(1),last(2147483647)
                                                        OPTIONAL }
                                  -- denominator defaults to 1

Rel-Rational                ::= Rational
                            -- expresses glyph coordinate units
                            -- denominator defaults to relunits or 1
```

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```
Angle                          ::= Rational
                               -- expresses units of degrees, with a
                               -- value range of -360 to +360
                               -- denominator defaults to 1

Proprietary-Data               ::= SEQUENCE {
  prop-data-message                  [0] IMPLICIT Message          OPTIONAL,
  prop-data-key                      [1] IMPLICIT OCTET STRING     OPTIONAL,
  prop-data                          [2] IMPLICIT OCTET STRING     OPTIONAL  }

END
```

A.2 SGML

This clause specifies a standardized SGML representation of a font property set, as defined in this part of ISO/IEC 9541. The specification is in the form of SGML public text, so that it can be referenced from documents without having to duplicate the text.

```
<!-- (C) International Organization for Standardization 1991 Permission
     to copy in any form is granted for use with conforming SGML systems
     and applications as defined in ISO 8879:1986, provided this notice
     is included in all copies.  -->

<!-- Public document type definition. Typical invocation:

<!DOCTYPE fontset PUBLIC "ISO 9541-2:1991//DTD Font Attribute Set//EN">  -->

<!ENTITY % simval  "msg | str | int | card | code | propdata |
                    relr | ratl | bool | glbname | octstr |
                    ang | time"  >
<!ENTITY % compval "vlist | ovlist | plist | oplist"  >

<!ELEMENT fontset    - -  (namencd? , namtabl? , fontname? , fontdes? ,
                           wrmodes? , niprop* )     -- FONT REFERENCE SET -->
<!ELEMENT namencd    - o (octstr)                 -- char encoding for names -->
<!ELEMENT namtabl    - o (prefix , strucnm)+          -- name prefix table -->
                       -- see global name note at the end of this clause -->
<!ELEMENT prefix     - o (code)                              -- prefix index -->
<!ELEMENT fontname   - o (glbname)                               -- FONTNAME -->

<!-- Descriptive properties -->

<!ELEMENT fontdes    - o (dataver?  & stdver?   & datasrce? & datacopy? &
                          dsnsrce?  & dsncopy?  & relunits? & typeface? &
                          fontfam?  & posture?  & postang?  & weight?   &
                          propwdth? & glycomp?  & nomwrmde? & dsnsize?  &
                          minsize?  & maxsize?  & caphght?  & lchght?   &
                          dsngroup? & structur? & mnfeatsz? & nomcsw?   &
                          nomlcsw?  & niprop*   )       -- FONTDESCRIPTION -->

<!ELEMENT dataver    - o (card? , card? , time?)           -- DATAVERSION -->
<!ELEMENT stdver     - o (card)                         -- STANDARDVERSION -->
<!ELEMENT datasrce   - o (glbname)                         -- DATASOURCE -->
<!ELEMENT datacopy   - o (msg)                          -- DATACOPYRIGHT -->
<!ELEMENT dsnsrce    - o (glbname)                          -- DSNSOURCE -->
<!ELEMENT dsncopy    - o (msg)                          -- DSNCOPYRIGHT -->
<!ELEMENT relunits   - o (card)                            -- RELUNITS -->
<!ELEMENT typeface   - o (msg)                             -- TYPEFACE -->
<!ELEMENT fontfam    - o (str)                           -- FONTFAMILY -->
```

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```
<!ELEMENT posture    - o (code)                                    -- POSTURE -->
<!ELEMENT postang    - o (ang)                                  -- POSTUREANGLE -->
<!ELEMENT weight     - o (code)                                     -- WEIGHT -->
<!ELEMENT propwdth   - o (code)                                  -- PROPWIDTH -->
<!ELEMENT glycomp    - o ( numglyph? , iglycols? , xglycols? ,
                           iglys?    , xglys?    , niprop* )
                                                                 -- GLYPHCOMP -->
<!ELEMENT numglyph   - o (int)                                   -- NUMGLYPHS -->
<!ELEMENT (iglycols | xglycols | iglys | xglys)
                     - o (glbname+)     -- INC/EXCGLYPHCOLS,INC/EXCGLYPHS -->
<!ELEMENT nomwrmde   - o (glbname)                               -- NOMWRMODE -->
<!ELEMENT (dsnsize | minsize | maxsize)
                     - o (ratl)              -- DSNSIZE, MINSIZE, MAXSIZE -->
<!ELEMENT (caphght | lchght)  - o (relr)          -- CAPHEIGHT, LCHEIGHT -->
<!ELEMENT dsngroup   - o (code,code,code)                        -- DSNGROUP -->
<!ELEMENT structur   - o (code)                                  -- STRUCTURE -->
<!ELEMENT mnfeatsz   - o (relr)                                  -- MINFEATSZ -->
<!ELEMENT (nomcsw | nomlcsw)  - o (relr)         -- NOMCAP/NOMLCSTEMWIDTH -->

<!-- Writing mode dependent properties -->

<!ELEMENT wrmodes    - o (wrmode* & niprop*)                        -- WRMODES -->
<!ELEMENT wrmode     - o (wrmdnam , ( nescdir?  & escclass? &
                         (avgescx?  & avgescy?  & avlcescx? & avlcescy? &
                          avcpescx? & avcpescy? & tabescx?  & tabescy?) &
                          mxfntext? & sectors?  & escadjs?  &
                          mineas?   & maxeas?   & scores?   & varscrps? &
                          minlinsp? & minanasc? & maxanasc? & nomalign? &
                          algnmds?  & copyfits? &
                         (dsnwdadd? & dsnwdamp? & minwdadd? & minwdamp? &
                          maxwdadd? & maxwdamp? & dsnltadd? & dsnltamp? &
                          minltadd? & minltamp? & maxltadd? & maxltamp?)&
                          glyphs?   & niprop*))                   -- WRMODE -->

<!ELEMENT wrmdnam    o o (glbname)                              -- WRMODENAME -->
<!ELEMENT nescdir    - o (ang)                                   -- NOMESCDIR -->
<!ELEMENT escclass   - o (code)                                  -- ESCCLASS -->
<!ELEMENT (avgescx | avgescy)   - o (relr)                     -- AVGESCX/Y -->
<!ELEMENT (avlcescx | avlcescy) - o (relr)                   -- AVGLCESCX/Y -->
<!ELEMENT (avcpescx | avcpescy) - o (relr)                  -- AVGCAPESCX/Y -->
<!ELEMENT (tabescx | tabescy)   - o (relr)                     -- TABESCX/Y -->
<!ELEMENT mxfntext   - o (relr , relr , relr , relr)           -- MAXFONTEXT -->
<!ELEMENT sectors  - o (sector* & niprop*)                        -- SECTORS -->
<!ELEMENT sector   - o (relr , relr)           -- SECTOR (left and right) -->
<!ELEMENT escadjs  - o (ascadj* & niprop*)                       -- ESCADJS -->
<!ELEMENT escadj   - o (adjname , (cpea? & sec? & niprop*) )     -- ESCADJ  -->
<!ELEMENT adjname  o o (glbname)                              -- ESCADJNAME -->
<!ELEMENT cpea     - o (ncpeafwd & ncpeabwd &
                        cpeax? & cpeay? & niprop*)                  -- CPEA -->
<!ELEMENT (ncpeafwd | ncpeabwd)  - o (card)     -- NCPEAFORWD,NCPEABACKWD -->
<!ELEMENT (cpeax | cpeay)        - o (relr+)                    -- CPEAX/Y -->
<!ELEMENT sec      - o (secx? & secy? & niprop*)                    -- SEC -->
<!ELEMENT (secx | secy)          - o ((ratl, relr)+)            -- SECX/Y -->
<!ELEMENT (mineas | maxeas)      - o (ratl)             -- MIN/MAXESCADJSZE -->
<!ELEMENT scores     - o (score+ & niprop*)                      -- SCORES -->
<!ELEMENT score      - o (scname, (scoffx? & scoffy? & scthick? & niprop* ))
                                                                 -- SCORE -->
<!ELEMENT scname     o o (glbname)                            -- SCORENAME -- >
<!ELEMENT (scoffx | scoffy)  - o (relr)                  -- SCOREOFFSETX/Y -->
<!ELEMENT scthick    - o (relr)                                  -- SCORETHICK -->
<!ELEMENT varscrps   - o (varscrp* & niprop*)                    -- VSCRIPTS -->
<!ELEMENT varscrp    - o (vsname    , (vsoffx?  & vsoffy? &
```

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```
                          vsscalex? & vsscaley? & niprop* ) )  -- VSCRIPT -->
<!ELEMENT vsname     o o (glbname)                                  -- VSNAME -->
<!ELEMENT (vsoffx | vsoffy)  - o (relr)                        -- VSOFFSETX/Y -->
<!ELEMENT (vsscalex | vsscaley)  - o (ratl)                     -- VSSCALEX/Y -->
<!ELEMENT minlinsp    - o (relr , relr)                          -- MINLINESP -->
<!ELEMENT (minanasc | maxanasc) - o (ratl)                  -- MIN/MAXANASCALE -->
<!ELEMENT nomalign    - o (glbname)                                -- NOMALIGN -->
<!ELEMENT algnmds     - o (align* & niprop*)                     -- ALIGNMODES -->
<!ELEMENT align       - o (alname  , (aloffx?  & aloffy?  & ascalex?  &
                                  ascaley? & niprop*)  )       -- ALIGN -->
<!ELEMENT alname      o o (glbname)                              -- ALIGNNAME -->
<!ELEMENT (aloffx | aloffy)    - o (relr)                   -- ALIGNOFFSETX/Y -->
<!ELEMENT (ascalex | ascaley)  - o (ratl)                    -- ALIGNSCALEX/Y -->
<!ELEMENT copyfits    - o (copyfit* & niprop*)                   -- COPYFITS -->
<!ELEMENT copyfit     - o (cfname , (cfmeas? & niprop*) )         -- COPYFIT -->
<!ELEMENT cfname      o o (glbname)                           -- COPYFITNAME -->
<!ELEMENT cfmeas      - o (ratl)                             -- COPYFITMEASURE -->
<!ELEMENT (dsnwdadd | minwdadd | maxwdadd | dsnltadd | minltadd |
           maxltadd) - o (relr)        -- word and letter space additions -->
<!ELEMENT (dsnwdamp | minwdamp | maxwdamp | dsnltamp | minltamp |
           maxltamp) - o (ratl)   -- word and letter space amplifications -->

<!-- Glyph metric properties

<!ELEMENT gmetrics    - o (gmetric+ & niprop*)                 -- GLYPHMETRICS -->
<!ELEMENT gmetric     - o (glname , (px?     & py?     & ex?     & ey?     &
                           ext?    & lgs?    & peas?   & cpeai?  & eai?    &
                           minex? & miney?  & maxex? & maxey?  & niprop*) )  >
<!ELEMENT glname      o o (glbname)                                  -- GNAME -->
<!ELEMENT (px | py | ex | ey)  - o (relr)                    -- PX,PY,EX,EY -->
<!ELEMENT ext         - o (relr , relr , relr , relr)                -- EXT -->
<!ELEMENT lgs         - o (lg* & niprop*)                            -- LGS -->
<!ELEMENT lg          - o (lgn, lgsn)                                 -- LG -->
<!ELEMENT lgn         o o (glbname)                                  -- LGN -->
<!ELEMENT lgsn        - o (glbname+)                                -- LGSN -->
<!ELEMENT peas        - o (pea* & niprop*)                          -- PEAS -->
<!ELEMENT pea         - o (pean , ( peax?  & peay?  & spfx?  &
                          spfy?    & spbx?   & spby?  & niprop* ) ) -- PEA -->
<!ELEMENT pean        o o (glbname)                                 -- PEAN -->
<!ELEMENT (peax | peay)  - o ((glbname, relr)+)                 -- PEAX, PEAY -->
<!ELEMENT (spfx | spfy | spbx | spby)
                      - o (relr+)                              -- SPEA Extents -->
<!ELEMENT cpeai       - o (card , card)                             -- CPEAI -->
<!ELEMENT eai         - o (code)                                     -- EAI -->
<!ELEMENT (minex | miney | maxex | maxey)
                      - o (relr)                             -- MINEX/Y,MAXEX/Y -->


<!-- 'Non-ISO Property' and elemental type definitions -->

<!ELEMENT niprop      - - (name , value )  -- for non-ISO properties.
                                NB. only ISO-defined value types allowed. -->
<!ELEMENT name        o o (glbname)                                   >
<!ELEMENT value       o o (%simval; | %compval;)  -- elemental value types -->
<!ELEMENT (plist | oplist)  - o (defnmpre? , niprop)+   -- property-lists -->
<!ELEMENT (vlist | ovlist)  - o ((%simval;)+)              -- value lists -->
<!ELEMENT glbname     o o (prefix? , strucnm)      -- global name
                           see global name note at the end of clause 6.2 -->
<!ELEMENT str         o o (strtype , strvalue)  -- machine parsable string -->
<!ELEMENT strtype     o o (code)     -- identifier of character string type -->
<!ELEMENT strvalue    - o (#PCDATA)                        -- character string -->
<!ELEMENT msg         o o (msgtype , msgvalue)   -- human-readable message -->
```


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```
<!ELEMENT msgtype    o o (code)    -- identifier of character string type -->
<!ELEMENT msgvalue   - o (#PCDATA)                    -- character string -->
<!ELEMENT int        o o (#PCDATA)              --integer (-2^31 to 2^31 -1) -->
<!ELEMENT card       o o (#PCDATA)               -- cardinal (0 to 2^32 -1) -->
<!ELEMENT code       o o (#PCDATA)   -- code or "short integer" (0 to 255) -->
<!ELEMENT time       o o (#PCDATA)                -- ASN.1 UTCTime String -->
<!ELEMENT octstr     o o (#PCDATA)                     -- octet string -->
<!ELEMENT ratl       o o (num , den?)        -- denominator defaults to 1 -->
<!ELEMENT relr       o o (num , den?) -- denominator defaults to relunits -->
<!ELEMENT ang        o o (num , den?)              -- angle (in degrees) -->
<!ELEMENT bool       - o EMPTY             -- boolean ('true' or 'false') -->
<!ATTLIST bool      value     (true | false)     "true"                    >
<!ELEMENT propdata   o o (msg? , key? , octstr)        -- proprietary data -->
<!ELEMENT key       - o (octstr)                        -- encryption key -->
<!ELEMENT num       o o (#PCDATA)                            -- numerator -->
<!ELEMENT den       - o (#PCDATA)                          -- denominator -->
```

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Annex B
(normative)

Structured-Names

B.1 General

This annex defines the interchange format of structured-name public identifiers for use in font information interchange as defined in this part of ISO/IEC 9541. The application of structured-name public identifiers in this annex is in accordance with the structured name constructs defined in ISO 9070.

B.2 Object name

"Object Name" is an optional sequence of 1 or more alphanumeric or numeric object name components that constitute an unambiguous name within the context of the "Owner Name" of the structured name.

An alphanumeric name element is composed of 1 or more graphic characters from the repertoire: "A-Z, a-z, 0-9, hyphen, and period."

A numeric name element is a graphic character from the repertoire "1-9", followed by 0 or more graphic characters from the repertoire "0-9".

NOTE 5 Numeric name elements have the property that they will compare identically as strings if and only if the integer quantities they represent are equal, and vice versa.

At the discretion of the naming authority, object names may be registered as a hierarchical structure consisting of an arbitrary numer of elements, each level of the hierarchy, in effect, defining a class of objects.

B.3 Representation of structured names

There are three representations for structured name public identifiers:

a) A structure defined in ASN.1 in which each component is an identified element.

b) A structure defined in SGML in which each component is an identified element.

c) A character string form as defined in ISO 9070.

B.3.1 ASN.1

The ASN.1 definition of a structured name is as follows:

```
ISO9541-SN  {1 0 9541 2 3} DEFINITIONS ::= BEGIN

EXPORTS Structured-Name, Owner-Name, Object-Name, Object-Name-Component

Structured-Name                  ::= SEQUENCE {
  owner-name                          [0] IMPLICIT Owner-Name          OPTIONAL,
                                      -- length restricted to 120 characters
  owner-description                   [1] IMPLICIT Message             OPTIONAL,
  object-name                         [2] SEQUENCE OF Object-Name-Component
                                                                       OPTIONAL,
                                      -- length restricted to 100 characters
  object-description                  [3] IMPLICIT Message             OPTIONAL }
```

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```
Owner-Name                      ::= SEQUENCE {
                                    [0] IMPLICIT OBJECT IDENTIFIER  OPTIONAL,
                                    [1] SEQUENCE OF Owner-Name-Component
                                                                    OPTIONAL }

Owner-Name-Component            ::= { [0] VisibleString }
                                    -- except for "//" and "::"

Object-Name-Component           ::= { [0] VisibleString }
                                    -- only characters from the following
                                    -- repertoire:  "A-Z", "a-z", "0-9",
                                    -- Hyphen, and Period.  If the name
                                    -- component is a numeric value, the
                                    -- the first digit is in the range
                                    -- of 1 to 9

Message                         ::= CHOICE {
  numeric                           [0] NumericString,
  printable                         [1] PrintableString,
  teletex                           [2] TeletexString,
  videotex                          [3] VideotexString,
  visible                           [4] VisibleString,
  ia5                               [5] IA5String,
  graphic                           [6] GraphicString,
  general                           [7] GeneralString }
```

B.3.2 SGML

This clause specifies a standardized SGML representation of a structured name, as defined in this part of ISO/IEC 9541. The specification is in the form of SGML public text, so that it can be referenced from documents without having to duplicate the text.

```
<!-- (C) International Organization for Standardization 1991 Permission
     to copy in any form is granted for use with conforming SGML systems
     and applications as defined in ISO 8879:1986, provided this notice
     is included in all copies.  -->

<!-- Public document type definition. Typical invocation:

     <!DOCTYPE strucnm PUBLIC "ISO 9541-2:1991//DTD Structured Name//EN"> -->

<!ELEMENT strucnm        -- structured name public identifier --
                      o o (ownernm?, owndesc?, objnm?, objdesc?)             >
<!ELEMENT ownernm     - o (opre?, ownc*)                      -- owner name -->
<!ELEMENT   opre      o o (#PCDATA)                        -- owner prefix,
                       visible string characters, except for "//" and "::" -->
<!ELEMENT   ownc      o o (#PCDATA)                 -- owner name component,
                       visible string characters, except for "//" and "::" -->
<!ELEMENT owndesc     - o (mtype, mvalue)              -- owner description -->
<!ELEMENT   mtype     o o (code)                          -- message type -->
<!ELEMENT     code    o o (#PCDATA)              -- "short integer" (0-255) -->
<!ELEMENT   mvalue    - o (#PCDATA)                       -- message value -->
<!ELEMENT objnm       - o (obnc*)                           -- object name -->
<!ELEMENT   obnc      - - (#PCDATA)                -- object name component
                           only characters from the following repertoire:
                           "A-Z", "a-z", "0-9", Hyphen, and Period, with
                           the first digit being in the range of 1 to 9
```

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```
                        if the name component is a number              -->
<!ELEMENT objdesc    - o (mtype, mvalue)            -- object description -->
```

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

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