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**Information processing — Volume and  
file structure of CD-ROM for information  
interchange**

**AMENDMENT 1**

*Traitement de l'information — Structure de volume et de fichier des  
disques optiques compacts à mémoire fixe (CD-ROM) destinés à  
l'échange d'information*

*AMENDEMENT 1*



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Published in Switzerland

## Foreword

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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.

Amendment 1 to ISO 9660:1988 was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 23, *Digitally Recorded Media for Information Interchange and Storage*.

This amendment is intended to bring harmonization between ISO 9660 and widely used "Joliet Specification".



# Information processing — Volume and file structure of CD-ROM for information interchange

## AMENDMENT 1

*In subclause 6.7 "Volume descriptors", after the line*

*- Supplementary Volume Descriptor*

*insert the following line.*

*- Enhanced Volume Descriptor*

*Add the following subclause 6.7.1.3 after subclause 6.7.1.2*

6.7.1.3 The sequence may contain zero or more Enhanced Volume Descriptors (see 8.5) each recorded at least once.

An Enhanced Volume Descriptor shall describe the Volume Space, and identify the attributes of the volume, the locations of a Root Directory and of group Path Tables, and the number of volumes in the Volume Set. It shall also identify the coded graphic character set used within selected fields of this descriptor, and of the fields in associated File Descriptors, Directory Descriptors and Path Tables.

*Renumber subclauses 6.7.1.3 to 6.7.1.4, 6.7.1.4 to 6.7.1.5, and 6.7.1.5 to 6.7.1.6.*

*In subclause 6.8.2 replace the following sentence*

*The root of the hierarchy, called the Root Directory, shall be a directory identified either in a Primary Volume Descriptor or in a Supplementary Volume Descriptor.*

*with*

The root of the hierarchy, called the Root Directory, shall be a directory identified in a Primary Volume Descriptor, Supplementary Volume Descriptor or Enhanced Volume Descriptor.

*In subclause 6.8.2.1 replace the following sentences*

*The number of levels in the hierarchy shall not exceed eight. In addition, for each file recorded, the sum of the following shall not exceed 255:*

*with*

For a Directory Hierarchy identified in a Primary Volume Descriptor or in a Supplementary Volume Descriptor, the number of levels in the hierarchy shall not exceed eight. For a Directory Hierarchy identified in an Enhanced Volume Descriptor, the number of levels in the hierarchy may exceed eight. In addition, for each file recorded, the sum of the following shall not exceed 255:

*In subclause 6.8.3 replace following sentence*

*Each additional Directory Hierarchy shall be identified in a Supplementary Volume Descriptor.*

*with*

Each additional Directory Hierarchy shall be identified in a Supplementary Volume Descriptor or an Enhanced Volume Descriptor.

*In subclause 6.9.1 replace following sentence*

*If two Directory Identifiers do not contain the same number of byte positions, the shorter Directory Identifier shall be treated as if it were padded on the right with all padding bytes set to (20), and as if both Directory Identifiers contained the identical number of byte positions.*

*with*

If two Directory Identifiers do not contain the same number of byte positions, the shorter Directory Identifier shall be treated as if it were padded on the right with all padding bytes set to FILLER (see 7.4.3.2), and as if both Directory Identifiers contained the identical number of byte positions.

*Replace subclause 7.4.3 "Separators"*

#### *7.4.3 Separators*

*The characters separating the components of a File Identifier shall be*

*SEPARATOR 1 represented by the bit combination (2E)*

*SEPARATOR 2 represented by the bit combination (3B)*

*with*

#### 7.4.3 Separators and Filler

##### 7.4.3.1 Separators

The characters separating the components of a File Identifier within a Directory Hierarchy that is identified in a Primary Volume Descriptor or in a Supplementary Volume Descriptor shall be

SEPARATOR 1 represented by the bit combination (2E)

SEPARATOR 2 represented by the bit combination (3B)

A File Identifier within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor shall not be separated into components.

SEPARATORS are not specified for a File Identifier within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor.

## 7.4.3.2 Filler

The character filling any byte position which is specified by this International Standard to be characters shall be referred to as FILLER.

Within a volume that is identified by a Primary Volume Descriptor or by a Supplementary Volume Descriptor, the bit combination of FILLER shall be (20).

Within a volume that is identified by an Enhanced Volume Descriptor, the bit combination of FILLER shall be subject to agreement between the originator and the recipient of the volume.

*In following subclauses replace all "(20)" with "FILLER".*

7.4.5, 8.4.20, 8.4.21, 8.4.22, 8.4.23, 8.4.24, 8.4.25, 8.5.14, 8.5.15, 8.5.16, 8.5.17, 8.5.18, 8.5.19, 9.3 a), 9.3 b)

*Add the following lines at the end of subclause 7.4.4*

The character in the fields of the following descriptors is the subject of an agreement between the originator and the recipient of the volume.

- Directory Records within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor;
- Path Table Records within a Path Table Group identified in an Enhanced Volume Descriptor;
- Extended Attribute Records identified in a directory of a Directory Hierarchy that is identified in an Enhanced Volume Descriptor.

*In subclause 7.5.1 "File Identifier format" replace following line*

*This sequence shall meet the following requirements:*

*with*

Within a Directory Hierarchy that is identified in a Primary Volume Descriptor or in a Supplementary Volume Descriptor, this sequence shall meet the following requirements:

*Add the following lines at the end of subclause 7.5.1 "File Identifier format"*

Within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor, this sequence shall meet the following requirements:

- the Length of File Name shall not exceed 207.
- no SEPARATORS are specified.
- no File Name Extension is present.
- no File Version Number is present.

Within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor, a File Identifier shall not be specified as certain character sequences. These sequences shall be subject to agreement between the originator and recipient of the volume.

NOTE - 207 (the maximum length of the File Name) is the 254 (the maximum Directory Record Length), subtracted by 33 (the minimum length of Directory Record excluding the File Identifier) and by 14 (the CD-ROM XA System Use Extension Information) (see PHILIPS and SONY, System Description CD-ROM XA, 1991-05).

*Replace subclause 7.5.2 "File Identifier length"*

*7.5.2 File Identifier length*

*The length of the File Identifier shall be the sum of the following:*

- if there is a File Name, the length of the File Name,*
- if there is a File Name Extension, the length of the File Name Extension,*
- the number of digits in the File Version Number,*
- 2 (the number of SEPARATORS).*

*with*

*7.5.2 File Identifier length*

*The length of the File Identifier shall be the sum of the following:*

- if there is a File Name, the length of the File Name,*
- if there is a File Name Extension, the length of the File Name Extension,*
- if there is a File Version Number, the number of digits in the File Version Number,*
- if SEPARATORS are specified, 2 (the number of SEPARATORS).*

*Add the following lines at the end of subclause 7.6.1 "Directory Identifier Format"*

Within a volume identified by an Enhanced Volume Descriptor, a Directory Identifier can be sequence of characters rather than d-characters or d1-characters. The sequence shall be subject to agreement between the originator and recipient of the volume.

*Replace subclause 7.6.3 "Directory Identifier length"*

*7.6.3 Directory Identifier length*

*The length of a Directory Identifier shall not exceed 31.*

*with*

*7.6.3 Directory Identifier length*



Within a Directory Hierarchy that is identified in a Primary Volume Descriptor or in a Supplementary Volume Descriptor, the length of a Directory Identifier shall not exceed 31.

Within a Directory Hierarchy that is identified in an Enhanced Volume Descriptor, the length of a Directory Identifier shall not exceed 207.

*In subclause 8.1.1 "Volume Descriptor Type (BP 1)" replace the line  
Number 2 shall mean that the Volume Descriptor is a Supplementary Volume Descriptor;*

*with*

Number 2 shall mean that the Volume Descriptor is a Supplementary Volume Descriptor or an Enhanced Volume Descriptor;

*In subclause 8.4.30 "File Structure Version (BP 882)" replace the line  
1 shall indicate the structure of this International Standard.*

*with*

For a Primary Volume Descriptor or for a Supplementary Volume Descriptor, 1 shall indicate the structure of this International Standard. For an Enhanced Volume Descriptor, 2 shall indicate the structure of this International Standard.

*In subclause 8.5 "Supplementary Volume Descriptor" replace the following line  
8.5 Supplementary Volume Descriptor*

*with*

8.5 Supplementary Volume Descriptor and Enhanced Volume Descriptor

*In subclause 8.5 replace the following description  
The Supplementary Volume Descriptor shall identify the volume,*

*with*

The Supplementary Volume Descriptor or the Enhanced Volume Descriptor shall identify the volume,

*Replace the title of Table 6  
Table 6 - Supplementary Volume Descriptor*

*with*

Table 6 - Supplementary Volume Descriptor and Enhanced Volume Descriptor

*In Table 6, replace four "a1-characters" with "a1-characters\*\*".*

*In Table 6, replace two "d1-characters" with "d1-characters\*\*".*

*In Table 6, replace the three "d1-characters, SEPARATOR 1, SEPARATOR 2" with "d1-characters, SEPARATOR 1, SEPARATOR 2\*\*".*

*Add the following footer note to Table 6*

NOTE - "\*" denotes case of Supplementary Volume Descriptor.

*In subclause 8.5.1 "Volume Descriptor Type (BP 1)" replace the following line*

*This field shall specify an 8-bit number indicating that the Volume Descriptor is a Supplementary Volume Descriptor.*

*with*

This field shall specify an 8-bit number indicating that the Volume Descriptor is a Supplementary Volume Descriptor or is an Enhanced Volume Descriptor.

*In subclause 8.5.2 "Volume Descriptor Version (BP 7)" replace the following lines*

*This field shall specify an 8-bit number indicating that the Volume Descriptor is a Supplementary Volume Descriptor.*

*1 shall indicate the structure of this International Standard.*

*with*

This field shall specify an 8-bit number indicating that the Volume Descriptor is a Supplementary Volume Descriptor or is an Enhanced Volume Descriptor.

For a Supplementary Volume Descriptor, 1 shall indicate the structure of this International Standard. For an Enhanced Volume Descriptor, 2 shall indicate the structure of this International Standard.

*In subclause 8.5.4 "System Identifier (BP 9 to 40)" replace the following line*

*The characters in this field shall be a1-characters.*

*with*

Within a Supplementary Volume Descriptor, the characters in this field shall be a1-characters. Within an Enhanced Volume Descriptor, the characters in this field shall be subject to agreement between the originator and recipient of the volume.

*In subclause 8.5.5 "Volume Identifier (BP 41 to 72)" replace the following line*

*The characters in this field shall be d1-characters.*

*with*

Within a Supplementary Volume Descriptor, the characters in this field shall be d1-characters. Within an Enhanced Volume Descriptor, the characters in this field shall be subject to agreement between the originator and recipient of the volume.

*In subclause 8.5.13 "Volume Set Identifier (BP 191 to 318)" replace the following line*

*The characters in this field shall be d1-characters.*

*with*

Within a Supplementary Volume Descriptor, the characters in this field shall be d1-characters. Within an Enhanced Volume Descriptor, the characters in this field shall be subject to agreement between the originator and recipient of the volume.

*In subclauses 8.5.14 "Publisher Identifier (BP 319 to 446)", 8.5.15 "Data Preparer Identifier (BP 447 to 574)" and 8.5.16 "Application Identifier (BP 575 to 702)" replace the following line*

*The characters in this field shall be a1-characters.*

*with*

Within a Supplementary Volume Descriptor, the characters in this field shall be a1-characters. Within an Enhanced Volume Descriptor, the characters in this field shall be subject to agreement between the originator and recipient of the volume.

*In subclauses 8.5.17 "Copyright File Identifier (BP 703 to 739)", 8.5.18 "Abstract File Identifier (BP 740 to 776)" and 8.5.19 "Bibliographic File Identifier (BP 777 to 813)" replace the following line*

*The characters in this field shall be d1-characters, SEPARATOR 1 and SEPARATOR 2.*

*with*

Within a Supplementary Volume Descriptor, the characters in this field shall be d1-characters, SEPARATOR 1 and SEPARATOR 2. Within an Enhanced Volume Descriptor, the characters in this field shall be subject to agreement between the originator and recipient of the volume.

*In subclause 10.1 "Level 1" replace the following line*

*At Level 1 the following restrictions shall apply:*

*with*

At Level 1 the following restrictions shall apply to a volume identified by a Primary Volume Descriptor or by a Supplementary Volume Descriptor:

*Add the following lines at the end of subclause 10.1*

At Level 1 the following restrictions shall apply to a volume identified by an Enhanced Volume Descriptor:

- each file shall consist of only one File Section.

*In subclause 12.3.2 replace the following lines*

*The implementation shall allow the data preparer to supply the information that is to be recorded in the descriptor fields listed below, and shall not record the Supplementary Volume Descriptor if the data preparer does not supply the information.*

*For each Supplementary Volume Descriptor:*

*with*

The implementation shall allow the data preparer to supply the information that is to be recorded in the descriptor fields listed below, and shall not record the Supplementary Volume Descriptor or the Enhanced Volume Descriptor if the data preparer does not supply the information.

For each Supplementary Volume Descriptor or Enhanced Volume Descriptor:

*In subclause 13.3.2 replace the following line*

*For each Supplementary Volume Descriptor:*

*with*

For each Supplementary Volume Descriptor or Enhanced Volume Descriptor:

*In subclause 13.5.1 replace the following lines*

*- the information that constitutes the files identified in a Directory Hierarchy that is identified in a Supplementary Volume Descriptor;*

*- the information that is recorded in the descriptor fields of a Supplementary Volume Descriptor and of the associated Path Table Records, associated Directory Records, and Extended Attribute Records identified by the associated Directory Records.*

*with*

- the information that constitutes the files identified in a Directory Hierarchy that is identified in a Supplementary Volume Descriptor or in an Enhanced Volume Descriptor;

- the information that is recorded in the descriptor fields of a Supplementary Volume Descriptor or the descriptor fields of an Enhanced Volume Descriptor and of the associated Path Table Records, associated Directory Records, and Extended Attribute Records identified by the associated Directory Records.

*Add the following Annex B “Changes from ISO 9660:1988 and Joliet Specification” after Annex A*

## Annex B (informative)

### Changes from ISO 9660:1988 and Joliet Specification

#### B.1 Changes from ISO 9660:1988 to this International Standard

##### B.1.1 Major changes

Enhanced Volume Descriptor was added. The following specifications were introduced for the Enhanced Volume Descriptor.

- a) The Volume Descriptor Version is changed to indicate the new structure;

Version number 2 indicated the new specification.

- b) The File Structure Version is changed to indicate the new structure;

Version number 2 indicated the new specification.

- c) The limitation in the Depth of Hierarchy is lifted;

The levels in the hierarchy can exceed eight.

- d) The File Identifier is not separated to components;

The SEPARATORS are not specified.

A complex file name can be expressed.

- e) The File Identifier does not have File Version Numbers;

File with and without Version Numbers should not exist in the same directory.

- f) The character used for filling byte positions which are specified to be characters is subject to agreement between the originator and the recipient of the volume;

- g) The length of File Identifier is limited to 207;

Long file name can be expressed.

- h) The length of a Directory Identifier is limited to 207;

Long directory name can be expressed.

NOTE: Without using the Enhanced Volume Descriptor, this International Standard can be read as ISO 9660:1988.

##### B.1.2 Details of the changes

- a) The limitation in the Depth of Hierarchy is lifted by using Enhanced Volume Descriptor.

6.8.2.1

b) FILLER was defined.

7.4.3.2

(20) Changed to FILLER

6.9.1, 7.4.5, 8.4.20, 8.4.21, 8.4.22, 8.4.23, 8.4.24, 8.4.25, 8.5.14, 8.5.15, 8.5.16, 8.5.17, 8.5.18, 8.5.19, 9.3

c) Within the Volume that identified by Enhanced Volume Descriptor, the SEPARATORS are not specified.

7.4.3.1

d) Enhanced Volume Descriptor was added to use of characters.

7.4.4, 8.5.4, 8.5.5, 8.5.13, 8.5.14, 8.5.15, 8.5.15, 8.5.16, 8.5.17, 8.5.18, 8.5.19

e) File Identifier format for Enhanced Volume Descriptor was added.

7.5.1

f) Directory Identifier for Enhanced Volume Descriptor was added.

7.6.1, 7.6.3

g) File Structure Version number for Enhanced Volume Descriptor was specified.

8.4.30

h) Enhanced Volume Descriptor was added to Volume Descriptors.

6.7, 6.7.1.3, 8.5, Table 6

i) Enhanced Volume Descriptor was added in Volume Descriptor Type and Volume Descriptor Version.

8.5.1, 8.5.2

j) Interchange Level 1 for a Volume identified by an Enhanced Volume Descriptor was added.

10.1

k) Other changes which have relation to Enhanced Volume Descriptor.

6.8.2, 6.8.3, 7.5.2, 8.1.1, 12.3.2, 13.3.2, 13.5.1

l) Other changes which do not have relation to Enhanced Volume Descriptor.

Annex B

## **B.2 “Joliet Specification”**

“Joliet Specification” defines a Volume Space, which is almost same concept to Volume Space identified by EVD of this International Standard.

“Joliet Specification” defines an extended Volume Space which identified by SVD, change details are as follows:

a) In subclause 6.8.2.1

The number of levels in the hierarchy may exceed eight.

For each file recorded, the sum of the following shall not exceed 240 bytes:

- the length of the File Identifier (see 7.5.2);
- the length of the Directory Identifiers (see 7.6.3) of all relevant directories;
- the number of relevant directories.

b) In subclause 8.5.3

SVD Volume Flags Field Bit 0: ZERO

c) In subclause 8.5.6

Escape Sequences Field shall be set to (25 2F 40), (25 2F 43) or (25 2F 45), by UCS-2 Level.

d) In subclause 7.4.2

c-characters shall be recorded in most significant byte first.

c-characters are all UCS-2 code points, except for the following UCS-2 code points:

All code points between (00 00) and (00 1F), inclusive. (Control Characters)

(00 2A) '\*' (Asterisk)

(00 2F) '/' (Solidus)

(00 3A) ':' (Colon)

(00 3B) ';' (Semicolon)

(00 3F) '?' (Question Mark)

(00 5C) '\' (Reverse Solidus)

c-characters shall be recorded in most significant byte first (see subclause 7.2.2).

a1-characters and d1-characters are not specified.

e) In subclause 7.4.3.1

SEPARATOR 1 represented by the bit combination (00 2E)

SEPARATOR 2 represented by the bit combination (00 3B)

f) In subclause 7.4.3.2

The bit combination of FILLER shall be (00).

g) In subclause 7.5.1

File Version Number shall be recoded in c-characters (UCS-2).

The sum of following may be up to 128 bytes (64 UCS-2 characters) in length.

- If there is a File Name, the length of the File Name;
- If there is a File Name Extension, the length of File Name Extension.

h) In subclause 7.6.3

Because of d1-characters not specified, the Directory Identifiers may contain File Name Extension.

The Directory Identifiers may be up to 128 bytes (64 UCS-2 characters) in length.

Length of the Directory Identifiers shall be calculated same as File Identifier length. (see 7.5.2)

i) In subclause 9.3 c)

Padding byte for File Version Number is (00)





