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# Information technology — Volume and file structure of disk cartridges for information interchange

*Technologies de l'information — Volume et structure des fichiers des cartouches à disquette pour l'échange d'information*

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ISO/IEC 9293:1994(E)

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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.

The first edition of International Standard ISO/IEC 9293 was prepared by the ECMA (as Standard ECMA-107) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This second edition cancels and replaces the first edition (ISO 9293:1987); it incorporates the capabilities of new disk cartridges (both optical and magnetic).

Annex A forms an integral part of this International Standard. Annexes B to F are for information only.

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## Introduction

For many purposes ISO 7665 provides a satisfactory data interchange between different types of information-processing systems. However, it imposes some restrictions on the operation of a system as follows:

a) Each individual file must be recorded on the disk in a sequential, "batch-processing" mode. After a set of files has been recorded on the disk, a file cannot be extended beyond its pre-determined length.

It is common practice in small systems for the user to interact continuously with the system to update files. Files having a suitable structure for this purposes are not within the provision of ISO 7665.

The interchange cartridge has to be created by an "export" copy process from the application's files, after the application has terminated. A similar "import" process is required in the receiving system.

b) Limitations on the number of file labels permitted on an interchange disk cartridge prevent the full use of the disk space if the average size of files is significantly less than, say 20 kbytes. For conventional data processing purposes such an average file size is usually satisfactory. However, the file sizes typically encountered in text processing and small single-user systems are very much smaller and would lead to very inefficient use of the disk space.

In view of these requirements it was decided to develop a second standard for volume and file structure of disk cartridges, the provisions of which were to be based on already existing practice in general use world-wide. Hence this International Standard has the following beneficial characteristics, in addition to those of ISO 7665:

a) Direct updating of the interchange file by an interactive application is possible;

b) There will be no limit on the number of individual files on a disk, within the overall limitation of available space for holding files. Any file can be extended whenever required.

The characteristics are advantageous for:

a) Interchange of sets of text files or of small files, or of multiple-part document files;

b) Interchange of any file when sender and recipient wish to carry out frequent update of the file between interchange cycles, for example files of commercial transactions.

Since the publication of the first version of this International Standard, many types of high capacity Flexible Disk Cartridges (FDCs) and Optical Disk Cartridges (ODCs) have come in use. All the descriptions (except annex B) of an FDC, throughout this International Standard, can be applied to an ODC as well. It is intended that existing file systems for FDCs, possibly slightly modified, are applicable to ODCs. ODC specific volume and file structure standards are, e.g., ISO/IEC 13346 and ISO/IEC 13490. This International Standard is applicable to the new types of storage media because of revision at the following points:

a) Addition of the extended FDC Descriptors (clause 9) to the existing FDC Descriptors;

b) Adoption of 16-bit File Allocation Table (FAT) entries (10.2) in addition to the existing 12-bit FAT entries;

c) Obsoletion of the Medium Identifier field (table 3 and subclause 9.2.9) because available values are exhausted and the field is no more used.

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# Information technology - Volume and file structure of disk cartridges for information interchange

## Section 1 - General

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### 1 Scope

This International Standard specifies the volume and file structure of disk cartridges for the interchange of information between users of information processing systems. It also specifies an optional record structure.

Note - All the descriptions (except those in annex B) of Flexible Disk Cartridges (FDC) can be applied to Optical Disk Cartridges (ODC) as well.

This International Standard is applicable to various types of disk cartridges including those identified in clause 3, and other types which may be the subject of future International Standards.

This International Standard specifies the location of files of information on an FDC and also specifies a set of recorded descriptors which identifies:

- the files which may be interchanged;
- the locations of the files;
- the attributes of the files;
- the location of unused space for recording on the FDC;
- the location of defective recording space on the FDC;
- the attributes of the FDC and of the descriptors recorded on it.

This International Standard also specifies requirements for the processes which are provided within information processing systems to enable information to be interchanged between different systems, utilizing recorded FDCs as the medium of interchange. For this purpose it specifies the functions within systems which are intended to originate or to receive FDCs which conform to this International Standard.

This International Standard provides a method for the allocation of space that is independent of the number of files which are recorded on the volume. It also enables the sizes of the recorded files to be expanded or contracted during processing, subject only to the availability of unused recording space when needed.

The content and organization of the files are not specified by this International Standard and are subject to agreement between the originator and the recipient of the interchanged FDC.

### 2 Conformance

#### 2.1 Conformance of an FDC

An FDC shall be in conformance with this International Standard when all information recorded on it conforms to the requirements of section two of this International Standard.

A prerequisite to such conformance is the conformance of the FDC to the appropriate International Standard for data interchange by means of FDCs.

#### 2.2 Conformance of an information processing system

An information processing system shall be in conformance with this International Standard if it meets the set of requirements specified in section three of this International Standard either for an originating system, or for a receiving system, or for both types of system. A statement of conformance shall identify which of these sets of requirements is met by the system.

Conformance with this International Standard does not require conformance with section 4.

## 3 Normative references

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

ISO/IEC 646:1991, *Information technology - ISO 7-bit coded character set for information interchange.*

ISO 7487-1:1993, *Information technology - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides*
*Part 1: Dimensional, physical and magnetic chaacteristics.*

ISO 7487-3:1986, *Information processing - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides*
*Part 3: Track format B.*

ISO 7665:1983, *Information processing - File structure and labelling of flexible disk cartridges for information interchange.*

ISO 8378-1:1986, *Information processing - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 3,8 tpmm (96 tpi), on both sides*
– *Part 1: Dimensional, physical and magnetic characteristics.*

ISO 8378-3:1986, *Information processing - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 3,8 tpmm (96 tpi), on both sides*
– *Part 3: Track format B.*

ISO 8630-1:1987, *Information processing - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 13 262 ftprad, on 80 tracks on each side*
– *Part 1: Dimensional, physical and magnetic characteristics.*

ISO 8630-3:1987, *Information processing - Data interchange on 130 mm (5,25 in) flexible disk cartridges using modified frequency modulation recording at 13 262 ftprad, on 80 tracks on each side*
– *Part 3: Track format B for 80 tracks.*

ISO 8860-1:1987, *Information processing - Data interchange on 90 mm (3,5 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, on 80 tracks on each side*
– *Part 1: Dimensional, physical and magnetic characteristics.*

ISO 8860-2:1987, *Information processing - Data interchange on 90 mm (3,5 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, on 80 tracks on each side*
– *Part 2: Track format.*

ISO/IEC 9171-1:1990, *Information technology - 130 mm optical disk cartridge, write once, for information interchange*
– *Part 1: Unrecorded optical disk cartridge.*

ISO/IEC 9171-2:1990, *Information technology - 130 mm optical disk cartridge, write once, for information interchange*
– *Part 2: Recording format.*

ISO/IEC 9529-1:1989, *Information processing systems - Data interchange on 90 mm (3,5 in) flexible disk cartridges using modified frequency modulation recording at 15 916 ftprad, on 80 tracks on each side*
– *Part 1: Dimensional, physical and magnetic characteristics.*

ISO/IEC 9529-2:1989, *Information processing systems - Data interchange on 90 mm (3,5 in) flexible disk cartridges using modified frequency modulation recording at 15 916 ftprad, on 80 tracks on each side*
– *Part 2: Track format.*

ISO/IEC 10089:1991, *Information technology - 130 mm rewritable optical disk cartridge for information interchange.*

ISO/IEC 10090:1992, *Information technology - 90 mm optical disk cartridges, rewritable and read only, for data interchange.*

ISO/IEC 10994:1992, *Information technology - Data interchange on 90 mm flexible disk cartridges using modified frequency recording at 31 831 ftprad on 80 tracks on each side - ISO type 303.*

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ISO/IEC 11560:1992, *Information technology - Information interchange on 130 mm optical disk cartridges using the magneto-optical effect, for write once, read multiple functionality.*

ISO/IEC 13422:- [1], *Information technology - Data Interchange on 90 mm flexible disk cartridges 10 Mbytes capacity using sector servo tracking - ISO type 304.*

ISO/IEC 13481:1993, *Information technology - Data interchange on 130 mm optical disk cartridges - Capacity: 1 gigabyte per cartridge.*

ISO/IEC 13549:1993, *Information technology - Data interchange on 130 mm optical disk cartridges - Capacity: 1,3 gigabytes per cartridge.*

ISO/IEC 13842:- [1], *Information technology - 130 mm optical disk cartridges - Capacity: 2 Gbytes per cartridge - For information interchange.*

ISO/IEC 13963:1994, *Information technology - Data interchange on 90 mm optical disk cartridges - Capacity: 230 megabytes per cartridge.*

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## 4 Definitions

For the purposes of this International Standard the following definitions apply.

**4.1 byte** : A string of binary digits operated upon as a unit. In this International Standard this term designates an 8-bit byte.

**4.2 data field of a sector** : A fixed-length field containing the data of a sector.

**4.3 data interchange standard** : A standard which defines the physical and magnetic characteristics, the recording method, and the track format of an FDC.

**4.4 defective sector** : A sector which cannot be read or written without error.

**4.5 descriptor** : A recorded structure containing descriptive information about the volume or a file.

**4.6 FDC** : Flexible Disk Cartridge.

Note - All the descriptions of an FDC (except those in annex B) can be applied to an Optical Disk Cartridge as well.

**4.7 file** : A named collection of information.

**4.8 formatting** : Writing the control information establishing the physical addresses of sectors on the surfaces of an FDC.

**4.9 implementation** : A set of processes which enable an information processing system to behave as an originating system, or as a receiving system, or as both types of system.

**4.10 initialization** : Writing descriptors initiaally required to be on the FDC prior to the commencement of general processing or use.

**4.11 ODC :** Optical Disk Cartridge

**4.12 originating system** : An information processing system which can record files on an FDC for the purpose of data interchange with another system.

**4.13 receiving system** : An information processing system which can read files from an FDC which has been recorded by another system for the purpose of data interchange.

**4.14 sector** : That part of a track on an FDC that can be accessed independently of other parts of the track by the heads of the FDC.

**4.15 physical track** : That part of an FDC that can be accessed by a single head that is stationary while the disk makes a complete revolution.

**4.16 user** : A person or other entity (for example an application program) that causes the invocation of the services provided by an implementation.

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[1] to be published