INTERNATIONAL STANDARD

ISO 11506

First edition
2009-06-15

Document management applications — Archiving of electronic data — Computer output microform (COM)/Computer output laser disc (COLD)

Applications de gestion de documents — Archivage de données électroniques — Microforme de sortie d'ordinateur (COM)/Disque laser de sortie d'ordinateur (COLD)

Reference number
ISO 11506:2009(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member 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 shall not be held responsible for identifying any or all such patent rights.

ISO 11506 was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 1, *Quality*.

Introduction

Businesses, administrations and organizations of all shapes and sizes are becoming more and more electronic in the way they operate, either by digitizing their paper documents, or by doing business purely electronically (networked procedures and declarations, on-line administrative forms, creating contracts electronically, etc.). In addition to facilitating the process of using, processing and transferring information, these practices reduce the volume of written information in relation to their paper equivalent.

The change towards electronic resources concerns information of all levels of importance or seriousness, from internal documents to medical files to accounting records, tax declarations, banking transactions and e-commerce. Questions concerning the authenticity and traceability of legal documents are therefore of critical importance. Many countries have made changes to their legislation in order to regulate the use of electronic processes in the presentation of evidence. The implication of questions of evidence regarding archiving techniques can therefore not be ignored, in an increasingly connected world, where cross-border transactions are common, and where the use of processes described as “paper free” only fuels the need for solutions that offer sufficient guarantees in terms of information integrity and durability.

Thus, and regardless of the motives, this new situation is creating a major problem: how to archive reliably and potentially for a very long period of time, data that have been created, converted to, or received in, electronic form. In effect, with regard to archiving techniques, it should be noted that an electronic document is linked to the software and hardware that is capable of interpreting it, displaying it and making it intelligible. This means that preserving an electronic document cannot be limited to storing, bit by bit, the digital data as a stored physical object due to the rapid obsolescence of computer hardware, software and peripherals. Archiving needs to make this information independent of the originating software and hardware storage platform, so as to guarantee its preservation during the required retention periods.

While this International Standard recognizes the need to preserve documents using micrographic technology, significant advances have been made with standardization of file formats like PDF, PDF/A, as well as others. This International Standard supports the continued use of film as a deep reference archive to electronic formats and media.

For centuries, paper was the preferred material for the archiving of written work, allowing information to be saved, managed, transmitted and proved. A single medium is not conceivable for electronic data, since accessing and consulting on-line is a dynamic approach, while archiving and presentation of evidence is a static approach, and these are thus antinomic. It then becomes necessary to analyse separately correlative technical resources – to avoid confusing the “consumable” part of the electronic information with the part whose durability is essential for saving work.

The questions relating to the conditions in which the electronic data concerning nominative or sensitive information are stored are part of this issue. Dynamically storing such data presents a potential danger for privacy (see Annex A).

This demonstrates a real need for clarification, and this International Standard has been prepared to help economic and social partners to archive their electronic data with great care. It will help them answer questions relating to legal aspects as and when they arise, as well as those relating to the preservation of privacy and individual rights.

Document management applications — Archiving of electronic data — Computer output microform (COM)/Computer output laser disc (COLD)

1 Scope

This International Standard specifies techniques for archiving electronic data to ensure their long-term integrity, accessibility, usability, readability and reliability, in order to protect the evidential value of the data.

In this International Standard, long term is considered to be a period of time lasting more than a century (see ISO 5466).

Black-and-white microforms processed with liquid chemicals are used in this International Standard because the result is always an irreversible record and because of the proven quality of microforms as a long-term preservation media.

This International Standard also specifies procedures for the parallel recording, by a single production unit, of COM and COLD output from the same data.

It applies to many different types of electronic data, such as text and two-dimensional graphic data which can be represented as a black-and-white image.

It is not applicable to the following:

— animated images or sounds;

— three-dimensional images;

— images in shades of grey or in colour;

— X-ray images.

Neither is this International Standard applicable to microforms created from dry thermal processes, since they offer insufficient guarantees in terms of irreversibility and longevity.

2 Normative references

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

ISO 6196-1, *Micrographics — Vocabulary — Part 1: General terms*

ISO 6196-2, *Micrographics — Vocabulary — Part 2: Image positions and methods of recording*

ISO 6196-3, *Micrographics — Vocabulary — Part 3: Film processing*

ISO 6196-4, *Micrographics — Vocabulary — Part 4: Materials and packaging*

ISO 6196-7, *Micrographics — Vocabulary — Part 7: Computer micrographics*

ISO 6196-8, *Micrographics — Vocabulary — Part 8: Use*

ISO 8514-1, *Micrographics — Alphanumeric computer output microforms — Quality control — Part 1: Characteristics of the test slide and test data*

ISO 8514-2, *Micrographics — Alphanumeric computer output microforms — Quality control — Part 2: Method*

ISO/IEC 8859-1, *Information Technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO 11928-1, *Micrographics — Quality control of graphic COM recorders — Part 1: Characteristics of the test frames*

ISO 11928-2, *Micrographics — Quality control of graphic COM recorders — Part 2: Quality criteria and control*

ISO 14648-1, *Micrographics — Quality control of COM recorders that generate images using a single internal display system — Part 1: Characteristics of the software test target*

ISO 14648-2, *Micrographics — Quality control of COM recorders that generate images using a single internal display system — Part 2: Method of use*

ISO 18901, *Imaging materials — Processed silver-gelatin type black-and-white films — Specifications for stability*

ISO 18911, *Imaging materials — Processed safety photographic films — Storage practices*

ISO 18917, *Photography — Determination of residual thiosulfate and other related chemicals in processed photographic materials — Methods using iodine-amylose, methylene blue and silver sulfide*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6196-1, ISO 6196-2, ISO 6196-3, ISO 6196-4, ISO 6196-7 and ISO 6196-8 and the following apply.

3.1
integrity
established result from the immutability of an information

3.2
irreversibility
result of a recording process depending on the physical transformation of a recordable medium into a non-recordable medium

3.3
COM
computer output microform
〈process〉 structuring and recording of electronic documents on microforms

NOTE 1 Equipment for the production of microforms can use a generator of graphics (e.g. CRT, led, laser and plasma screen), allowing the recording of electronic images on silver halide film.

NOTE 2 The official definition of the term COM in ISO 6196-7 does not take into account important evolutions of this technique in recent years.

3.4
COLD
computer output laser disc
process in which electronic data is structured and archived on laser disks, such as CD-R or DVD-R

3.5
COLD medium
electronic data archiving medium, created from a COLD production

3.6
COM-COLD dual recording
parallel recording, by a single production unit, producing a double COM and COLD output from the same file

3.7
modular COM-COLD system
COM production unit with a COLD module, capable of structuring and performing a COM-COLD dual recording

3.8
evidentiary copy
reproduction made by technical means specially chosen so as not to interrupt the evidentiary effects of the reproduced document

4 Electronic data archiving

4.1 Archiving functions

The archiving of electronic data is based on a few important functions. In this International Standard, the following functions are explained:

a) memorization;

b) accessibility;

c) usability;

d) legibility;

e) integrity.

These functions are interlinked. They have technical consequences and can also have legal consequences.

4.2 Functional specifications

a) the memorization function requires the use of durable media with quantifiable longevity;

b) the accessibility function requires the use of processes containing ways of retrieving information and making it available and transmittable;

c) the usability function requires the use of methods that have no risk of being rendered impracticable or incompatible due to tools becoming obsolete or operational methods disappearing;

d) the legibility function requires the use of signs or symbols that have a clear and consistent meaning;

e) the integrity function requires the use of recording and memorization methods that reveal any change in the information after it has been recorded.

5 Specifications related to micrographics options

5.1 Choice of principles

Computer micrographics can be used to archive electronic data to ensure their authenticity and/or meet the need for long-term archiving:

— Using computer micrographics is recommended, even in the very short term, when the identity and the integrity of the electronic data need to be guaranteed.

— Using computer micrographics is recommended for data which is to be archived for more than three years.

5.2 Choice of microform type

The choice of the type of microform shall be based on technical essentials and constraints specific to the application chosen, as well as on organizational preferences or constraints (see Table 1).

The choice of microform type should be linked to the level of miniaturization that it implies, so that the capacities to produce all the significant details within the file are real.

NOTE See Annex B.

Table 1 — Main characteristics of COM microforms

Microform type	Direct or sequential access	Segmentation [a]	Chaining [b]	Immediate processing [c]
Microfiche	Direct	Yes	Yes	Yes
16 mm roll	Sequential	No	Yes	No
35 mm roll	Sequential	No	Yes	No
Aperture card [d]	Direct	Yes	No	No

[a] Segmentation – facilitating breaks, dispatching, accessibility and selective mobility of information.

[b] Chaining – linking together a large number of pages.

[c] Immediate processing – linking recording and processing in one machine.

[d] Aperture cards – designed for archiving of technical drawings.

6 Specifications related to micrographic recording

6.1 Encoding formats

6.1.1 General

Files to be archived are created in formats based on the software used. The diversity of these code formats most often requires converting them into a format recognized by COM systems.[1)]

For production in COM, two large file categories shall be defined: files in line mode and files in image mode.

1) This conversion is comparable to one which is carried out from a paper print. Paper printing, however, has only one unique production format. When printing on paper, the print driver should start by converting the file's original format (e.g. ".doc", ".pdf", ".jpg"), into one single format recognized by the printer (e.g. ".pcl"). This operation is carried out automatically and is not visible to the user.

6.1.2 Line mode

Alphanumeric COM recorders typically use ASCII as the internal code for 8-bit character sets (such as the Latin alphabet).

Files created in ASCII shall be sent directly to the COM recorder without any conversion.

Files using 8-bit character encoding, but encoded in a code other than ASCII, shall be converted into ASCII prior to COM production.

16-bit coded character sets (also known as “unicode characters”), such as the Oriental and Asian alphabets, raise two distinct issues:

a) they are supported by specific versions of COM systems (a Kanji COM recorder, for example). These shall be sent directly to the COM recorder without any conversion;

b) they require a conversion in image mode (see 6.1.3).

6.1.3 Image mode

Graphic COM recorders typically support image files in black-and-white TIFF format.

The characteristics of the image in TIFF format shall take into account the requirements of the graphics COM recorder used for recording, especially concerning compression and resolution.

ITU[2)] G3 or ITU G4 compression is generally accepted by graphic COM recorders.

The resolution shall be adapted to the COM recorder resolution capacities. Since individual models of COM recorders can have different resolution capabilities, the selection of the COM recorder shall be based on the requirement of the resolution for the data being archived. When the resolution of the file differs from the COM recorder resolution capacities, it might be necessary to convert the file in order to avoid changing the scale of the images in relation to the expected reduction ratio.

Files in black-and-white TIFF format accepted by a COM recorder shall be sent directly to the COM recorder without any conversion.

Files in a different image format, as well as text files, the coding of which is not supported by the COM recorder, shall be converted into compatible black-and-white TIFF format so that they can be recorded on microforms.

6.1.4 Form overlays

6.1.4.1 General

The processing of certain files requires the use of form overlays, which may be in optical or electronic format.

6.1.4.2 Optical form overlays

These are made up of the physical image produced by a photographic image on a glass (or other transparent) plate. The image of the form is flashed simultaneously when each page in the file is created, with the two types of data being combined on the same image using a prism.

2) Formerly CCITT.

6.1.4.3 Electronic form overlays

This is the image of the form produced as a file stored in the memory of the COM recorder. The image of the form overlay is recreated by the COM recorder at the same time as the data from the production file, with the two types of data being combined on the same image. Electronic form overlay systems enable the recording of files requiring multiple form overlay formats within the same file.

6.2 Conversion

6.2.1 General

When necessary, any conversion into text format or image format recognized by a COM recorder shall be carried out with the help of tools which retain the integrity of the content of the original data. Conversion processes shall not significantly affect the presentation of the data.

6.2.2 Conversion of files in line mode

For converting files with 8-bit encoded characters, the file's external code (e.g. EBCDIC) shall be converted into the COM recorder's internal code (ASCII) by conversion tables contained in the COM recorder. ISO/IEC 8859-1 shall be applied to ensure an exact “sign by sign” conversion.

6.2.3 Conversion of files in image mode

Files that only contain image data (which can be an image of text), files mixed with line mode and image mode, or files in line mode requiring a transfer into image mode so they can be recorded on microform, shall be converted. The conversion procedure shall be identical in the three cases.

For formats requiring this type of conversion, the transfer shall be carried out, either by using the “export” or “save as” function in the original software or by using dedicated conversion software for this format.

When the image file is created by word processor software, the character font tables shall be taken into account in the conversion parameters.

6.3 COM recording process

6.3.1 Production parameters

All the elements that characterize the processing of a given application shall be put together and stored in the form of a set of commands and parameters (a program commonly known as a “JOB”).

Each “JOB” shall integrate the description of the format of the file to be processed, the management of electronic form overlay, if any, titling and indexing, breaks, the reduction ratio and recording or page direction, as well as other additional elements (banner pages, links with other JOBs, etc.).

6.3.2 Form overlays

Form overlays are typically only used in the production of microfiche and 16 mm microfilm.

Form overlays (optical or electronic) shall reproduce all the significant elements of the form they represent and shall ensure the correct reciprocal alignment of the form with the associated data.

Form overlay quality shall be good enough for it to be read efficiently.

6.3.3 Data reception

6.3.3.1 Transmission

Electronic data for COM recording can be transmitted by network or by exchangeable computer media.

6.3.3.2 Network transmission

During a network transmission, only transmission protocols that guarantee the identity and the integrity of transmitted and received data shall be used. The transmission and reception monitors shall indicate any transmission faults that arise.

The protocol concerned shall be capable of detecting, and dealing with, any transmission errors (e.g. an untimely interruption), either by an automatic restart where the fault took place or by erasing and rewriting the file.

A file whose reception remains defective shall be indicated as such.

6.3.3.3 Computer media

Medium containing data to be processed shall be chosen depending on how reliable it is for storing and reading. When it is a reversible medium, it shall not have exceeded the number of rewrites designed for the type of medium considered (for example, magnetic tapes are generally limited to 100 successful rewrites).

If an off-line COM recorder (see 6.3.4.3) is used, it is recommended that computer media that can be read directly by the COM recorder be used.

Generally, media for digital storage, whether magnetic or optical, are only acceptable on the condition that they are not dependent on any equipment or operating system which has been discontinued or which has become unusable. They shall be devoid of any fault that could prevent or alter the reading of the data that they contain.

The media created from an electronic document management (EDM) system are only acceptable if the export of data in printable format is allowed.

6.3.4 Data recording modes

6.3.4.1 General

A COM recorder receives the data to be stored in the following ways. Either

— it receives data direct from the computer sending the file when the COM recorder is on-line, or

— it reads data from an electronic medium, if the COM recorder is off-line.

The COM recorder operating system shall ensure that the incoming data are checked for parity and other errors.

When a parity or another error arises, the COM recorder shall report the error and return control to the operator. Production shall not restart until the error has been identified and rectified.

6.3.4.2 On-line recording

With this type of recording, the data file sent to the COM recorder shall contain beforehand all commands necessary for the loading and automatic starting of the job that contains the processing parameters for this file.

In case of a transmission fault, the on-line COM recorder shall interrupt production, report the incident and return control to the operator.

6.3.4.3 Off-line recording

For production using an off-line (stand-alone) COM recorder, the loading and start commands of the job concerned by the application can be either manual or automated. If automated, the file shall contain all the commands necessary for loading and starting the appropriate job.

If the data are sent through the network, producing them on an off-line COM recorder requires recording them on a transition medium that the off-line COM recorder can use.

When the data are transmitted to the off-line COM recorder by a computer medium that can be used by the COM recorder, processing shall be performed by directly reading the computer media. When the transmitted computer medium cannot be used by the off-line COM recorder, an identical copy shall be made on a transfer medium that is compatible with the reading system and devices of the off-line COM recorder.

When a transfer medium is necessary, it shall be exclusively chosen based on recording and reading reliability criteria without its longevity being critical, as this is a transient medium. According to the volume(s) recognized by the COM recorder concerned, the recommended media for COM recorders are closed magnetic media such as “cartridges” or “cassettes”, which shall be used under the reservations expressed in 6.3.3.3 referring to reversible media.

6.3.5 Management of production interruptions or problems/faults/errors

6.3.5.1 Interruptions in processing

The COM recorder shall allow processing to restart in case of interruption or errors.

Processing shall be continued after an interruption (e.g. due to reloading of a film reel, machine breakdown or end of service) on the same machine (unless this is not possible) and with the same types of film and chemicals.

6.3.5.2 Restart due to defects

Any restart necessary due to the occurrence of defects shall involve a new integral recording of the microform(s) concerned. A COM microform that is to be archived shall not have any alterations, cuts or repairs.

Restarts shall be carried out as soon as possible and with the same type of film as in the initial processing. If several COM recorders are involved, then it is also recommended, if possible, to run the restart with the COM recorder that performed the original processing.

When producing microfiche or aperture cards, it is possible to limit the new recording to the microform(s) affected by the defect.

When a defect requires restarting one or several microforms in a series for which time-stamping is important (see 7.2.5), it is necessary to save the defective microform(s), along with the restarted microforms with the note “REDONE”.

6.4 Micrographic process

6.4.1 General

See Annex B.

6.4.2 Development system

According to the type of COM recorder and the format of the microforms, the chemical process can be carried out with a development system included in the COM recorder, or separately by transferring the films containing the latent image to a separate film processor.

6.4.3 Integrated processing

In the case of an integrated process, the COM recorder shall check the settings continuously to ensure the quality of the process, especially including:

— automatic checking and adjustment of the temperature of the chemicals in the processor tanks;

— automatic checking and adjustment of the processing times;

— automatic quantifying of the amount of film that can be processed;

— indication of the necessity of replacing exhausted chemical products.

6.4.4 Separate processing

When carrying out separate processing, the chemical processing shall be performed with minimum delay after the data have been recorded.

The processor shall continuously ensure optimized processing conditions, including:

— automatic checking and adjustment of the temperature of the chemical products in the tanks;

— automatic checking and adjustment of the processing times;

— rinsing in running water, with a temperature between 30° C and 35° C and a total hardness of between 15 TH and 20 TH, or French degrees °F (one degree equals 10 mg of calcium carbonate per 1 litre of water);

— when a replenishment system is installed, its use is recommended.

6.5 Production control

The microforms produced shall be of a quality complying with the specifications in ISO 8514-1, ISO 8514-2, ISO 11928-1, ISO 11928-2, ISO 14648-1 and ISO 14648-2.

The level of the residual thiosulfates shall be determined in accordance with ISO 18901.

This shall be done periodically and at least once a year per film/chemical chain. It shall be systematically carried out in the event of a change in the type of film or in the chemical chain.

When the data archived on COM microforms are intended to exceed a preservation of 10 years, or when they have a formal evidentiary role, it is recommended that the level of residual thiosulfates (determined in accordance with ISO 18901) be checked at least once a month by a laboratory. The reports produced by this laboratory should be archived on microforms.

6.6 Duplication of microforms

When the microforms are created to enable frequent searches, it is recommended that duplicates be made so that damaging or losing a duplicate, or the downgrading of a duplicate, has little consequence.

6.7 Microform preservation

The methods for preserving microforms shall conform to the specifications in ISO 18901, ISO 18911 and ISO 18917.

NOTE See Annex C.

7 Management of recorded data

7.1 General

The production of COM microforms shall be managed using procedures designed to control ways of identifying, segmenting and indexing data, to establish links that allow information to be found and accessed efficiently, and to facilitate its use and transmission.

Ways of managing the data include titling, indexing, segmentation and time-stamping of microforms. The role of the form overlay shall also be taken into account.

A COM microform shall contain at least one relevant item of identification. When the microform groups together several microimages, it shall also contain at least one list of index keys.

A microform to be archived shall not be dependent upon any system likely to become obsolete.

Therefore, each microform shall contain identification and index data, allowing it to be used with the simplest optical methods, so that it will not be affected if specific devices or automated means are no longer available.

The identification elements and the access keys shall be indissociable from the data concerning them and shall have an equivalent irreversibility and longevity.

7.2 Identification and indexing of microforms

7.2.1 Titles

7.2.1.1 Title elements

This involves the recording of eye-legible information on a microform so it can be read without magnification.

It includes microfiche headers, roll film titles, floating titles or marked break points, as well as indications printed on the aperture cards.

The title elements shall provide any relevant information capable of identifying the microform content and subdivisions, and allow selective access to the intended information.

7.2.1.2 Floating titles

These are eye-legible items that can be read without magnification and which are placed on a microform during processing to serve as visual markers, flags or delimiters. They should only be used to provide relevant information (e.g. labelling of a file subdivision).

A floating title fills up the space of a page of data. It can be combined with an index page.

7.2.2 Indexes

7.2.2.1 Index elements

A microform containing several microimages shall contain the means to easily access the microimage containing the intended information. To do this, the COM recorder shall build up the index pages, to which a generation of blips can be associated for 16 mm COM roll microfilms, or punched data for the COM aperture card.

An index page is a microimage that is an integral part of a microform, which shall summarize the index keys corresponding to this microform or to a sequence of this microform, and associate them with a link to locate each microimage in the microform or in the sequence concerned (the choice of indexing per microform or per sequence is organizational).

Generating blips on a 16 mm microfilm is an option that involves linking each index key to a marker position (blip). A special device optically counts these blips to enable the page one is looking for to be accessed automatically.

The punched data option for an aperture card allows the translation of the titling and identification elements into punched data, to enable automated use of the card.

7.2.2.2 Master index

The master index summarizes the index keys of several microforms. It is an option designed to facilitate access to information. It should offer extended access, but should not be a replacement for the title elements or the internal index pages of each microform, such as the ones described above.

Where it exists, the master index shall list the keys in a logical order and indicate opposite each one the identification of the microform in addition to the position of the microimage in this microform. It shall itself be recorded on a microform.

The master index can also be used to create a file or add to a dynamic database.

The use of the microforms for which a master index has been created shall not be dependent upon this master index.

7.2.3 Segmentation

Breaks are voluntary interruptions in filling the COM microforms; they are subdivisions that are necessary or useful for the selective use of the file, like the chapters in a book.

Depending on the requirements of the application, the break commands shall create a microform break, a column break or a row break for a COM microfiche.

The use of breaks shall be motivated by deciding arguments from the information concerned, representative of the file's logical structure, and respond to the need for segmentation. In case of a column or a line break in the microfiche, it is recommended that this rupture be marked with a floating title which represents the motive for the rupture (see 6.1.2).

7.2.4 Form overlays

The use of one or several form overlays specific to the application concerned is required when the formatting or the understanding of the results depend on it.

When a form overlay includes legal information, identifications, marks or logotypes, the quality of this information and these marks or logotypes shall be checked.

7.2.5 Time-stamp

The date on which each COM microform was created shall be indicated in its title elements. Depending on the application concerned, it might be necessary to indicate the time.

Depending on the needs of the application, the time-stamping items can also be indicated on each page of data.

In all cases, the time-stamping shall be clearly separate from the dates coming from the file.

It is recommended that the date be shown as DD/MM/YYYY (the day, month and the year can be separated by dashes or full stops).

When a time is shown, it shall be expressed in the following structure: HH:MM:SS, and use the 24-hour format.

When an application requires a distinct time-stamping for each microform frame, the time should be shown to 1/100 s as HH:MM:SS:CC.

7.3 Indexing COM microfiche

7.3.1 General

When recording a file on COM microfiche, each microfiche shall include a header and at least one index page, which shall include a list of at least one index key.

7.3.2 Titling

The header of a COM microfiche shall include at least one of the following on each microfiche:

— at least one significant identification element indicating the content of the microfiche;

— at least the first index key of the microfiche;

— the date the microfiche was produced;

— at least one sequencing element.

The number of the microfiche shall be located to the right of the header. Several counters can be used. For example, a counter reset to zero after each break (minor counter) and a counter that continues sequential numbering (major counter). When more than one counter is used, it is necessary to show the hierarchy in descending order from right to left. The major counter shall always be located furthest to the right.

For reasons of clarity, it is recommended that no more than two counters be used.

The end of processing shall be indicated by the word “END” placed under the counter of the last microfiche.

7.3.3 Microfiche index page

When the index keys of the microfiche are summarized in one list, the page(s) displaying it shall be placed in the areas as far to the bottom and to the right of each microfiche as possible.

The COM recorder shall automatically reserve the number of frames required to record the list.

When the index page only summarizes the keys by column or row sequences, it shall be placed in the first area at the top of each column for the column index or in the first area at the left of each row for the row index.

A list of column or row index keys shall cover one page only. This page can be combined with a floating title.

7.4 Indexing 16 mm COM microfilm

7.4.1 Titling

A 16 mm roll COM microfilm shall contain a title before the first page(s) of data, including:

— at least one significant identification element indicating the content of the microfilm;

— the date the microfilm was produced;

— at least one sequencing element.

The end of processing shall be indicated by a title containing the word “END” after the last page of data in the last microfilm.

7.4.2 Index pages

Index pages shall be saved on the COM microfilm according to a defined frequency.

It is recommended that relatively short sequences be planned to make manual use easier, if needed.

It is advisable to record the index page at least once every 200 frames.

Regardless of the number of frames recorded on the microfilm, each microfilm shall include at least one index page.

7.4.3 Blip generation

When a blip is used, it shall correspond to the parameters required by the devices to which it is dedicated.

The use of blips shall not replace the titling and indexing requirements specified or recommended above. It should be used in addition only.

The use of a COM microfilm shall not be dependent upon a blip counting retrieval system (see Clause 6 and 7.2.2).

7.5 Indexing 35 mm COM microfilm

7.5.1 Titling

A 35 mm roll COM microfilm shall contain a title before the first page(s) of data, including:

— at least one significant identification element indicating the content of the microfilm;

— the date the microfilm was produced;

— at least one sequencing element.

The end of processing shall be indicated by a title containing the word “END” after the last page of data in the last microfilm.

7.5.2 Index pages

Index pages shall be recorded on the COM microfilm, according to a defined frequency.

It is recommended that relatively short sequences be planned to make manual use easier, if needed.

It is advisable to save the index page once every 200 frames.

Regardless of the number of frames recorded on a microfilm, it shall include at least one index page.

7.6 Indexing COM aperture cards

7.6.1 Titling and indexing

The title of a COM aperture card shall contain:

— at least one significant identification element indicating the content of the microimage;

— the date the aperture card was produced.

The microimage on the microform shall contain all indexing information required to identify and date it. The titling elements on the card shall include this information (frame number, revision index, etc.).

The printing process used shall ensure sufficient longevity of the information[3)] (such as impact or inkjet printers).

7.6.2 Punched data

When a punched data-based indexing system is used, the punched data shall match the encoding of the intended device. The use of “80-column” encoding (see ISO 6586) is recommended because it is the most commonly used since aperture cards were first introduced, and because it offers the possibility of non-automated reading with specific templates.

The punched data shall not replace titles, indexing or dating of the microimage. The use of a COM aperture card shall not be dependent on punched data encoding.

8 Evidentiary aspects of COM recording

8.1 General

Since COM microforms are directly intelligible (e.g. do not need read technology) and have a longevity and usability of more than a century, plus the additional qualities of irreversibility, usability and readability, COM microforms are attributed with noticeable qualities for evidence purposes.

The evidentiary functions should be reserved for first-generation silver microforms created from a liquid chemical process.

A COM microform produced for evidence purposes shall contain no alterations, cuts or repairs.

NOTE See Annex D.

8.2 Integrity of recorded data

8.2.1 Irreversibility

The liquid chemical processing required to produce COM microforms causes an irreversibility that affects the recorded information and cannot be interrupted (copying a microform will not allow one to modify the information).

8.2.2 Integrity of COM microfiche and 16 mm and 35 mm COM microfilm

The irreversibility of these microforms is complete for their entire lifespan. It covers the data pages, the identification elements and the means to use the microforms.

8.2.3 Integrity of COM aperture cards

The irreversibility of these microforms is limited to the 35 mm microfilm segment during its entire lifespan. The titling or indexing details indicated on the card do not have an irreversibility comparable with that of the silver image.

3) It is strongly advised not to use an electrostatic printing-by-transfer process (laser printers, for example).

8.3 Stamping the microform

When the microforms are likely to have evidentiary functions, they shall be stamped in accordance with a number of rules.

The micrographic production unit, whether it is internal or external, shall irreversibly stamp each microform with its identity and its geographical location. The stamp shall also include an indication of the type of COM recorder and the type of film used, as well as the polarity of the microform.

It is advisable to include any distinctive sign or symbol specific to the production unit (such as a trademark or logotype), as well as any technical indications, which may help to specify the type of the microform. The stamp shall be integrated into the title for a microfiche, or into an area preceding the data pages for a 16 mm or 35 mm roll microfilm.

For the aperture cards, the stamp shall appear on the microfilm segment, on the edge of the microimage. If this is not possible, then the microimages should be stored on 35 mm stamped roll microfilm and a copy of this microfilm inserted.

8.4 Time-stamping

The creation date of the microform shall be included in the title. The creation time and the time accuracy should be recorded, where appropriate.

The time-stamp shall conform to the specifications given in 7.2.5.

9 COM-COLD dual recording

9.1 General

Dual recording is a solution that consists of producing a single file in two different formats, one in COM and the other in COLD. This solution is most applicable to situations where data need to be retained in digital format (on-line access, for example) and where the data need to be archived for evidence purposes.

This solution can be used when dynamically recording an electronic version of an updated file that can quickly be transmitted, while at the same time ensuring permanence of the file on COM microforms to make its archiving secure or for evidence purposes.

Applying this principle requires the use of a COM-COLD modular system.

9.2 Recommended COLD media

For COLD production, it is recommended that non-rewritable usual recordable media (physical WORM), such as CD-R, DVD-R, UDO-R be used.

9.3 Uniqueness of the original data

When using COM-COLD dual recording, the same data shall be used for the two recording methods.

COLD systems offer the possibility of multicriteria indexing. When creating additional search keys for COLD, the COLD system shall include the indexing keys of the microforms.

The metadata and indexing techniques for the COLD media shall meet the requirements of the EDMS/ERMS system in use.

9.4 Parallel production

COM-COLD dual recording should be carried out by the same operational unit.

If it is not possible to carry out the two processes simultaneously, micrographic processing shall be performed first, since its conformity is essential and COLD production shall then be started either at the same time or subsequent to the COM process.

9.5 Similar visual results

Dual recording shall produce similar visual results when displaying the two types of recording. The graphic characteristics of the display of the images on the COLD medium and the display of the COM microimages shall be analogous.

In line mode, restoring upper and lower case letters, diacritical marks or symbols shall be identical at both outputs.

If there is a critical difference in the two types of outputs, the irreversibility and reliability of the COM microimage will take preference.

9.6 Management of data recorded on COLD media

9.6.1 Administration

The means of administration of the data recorded on COLD media shall include the elements of labelling and identification, the means of display (visualization) and retrieval (search), the management of the form overlays, the possible segmentation of the file and the time-stamp of the media.

9.6.2 Retrieval and display of the data on COLD media

The recording on COLD media shall be made by taking into account the means of search and retrieval and the display of the data. The software carrying out these functions shall either be recorded

— on every COLD media, or

— on the computer used for the consultation of the COLD media.

9.6.3 Indexing

Any index shall be recorded on the COLD media containing the corresponding data.

In the case of indexes using several criteria (multicriteria), it is recommended that every category of index be indicated clearly and a selective access to each list be authorized.

9.6.4 Segmentation of file on COLD media

When the size of the file to be recorded exceeds the capacity of the COLD media, it is recommended that the recording be segmented in a rational way (e.g. between two different folders).

9.6.5 Form overlays

When the COM production requires the use of a form overlay, a similar form overlay shall be used for the COLD production by applying to it the same requirements as the COM production (see 7.2.4).

9.6.6 Labelling COLD media

It is recommended that COLD media be identified with an eye-legible, indelible printed label. The label shall include at least a relevant element of identification and indexing, as well as the production date and shall specifically mention “DUAL RECORDING COM-COLD”.

When it is necessary to segment a file on several COLD media, the total number of media and the order of each one, e.g. in form 1/3, 2/3, 3/3, shall be included.

Sticky labels shall not be used on COLD media.

9.6.7 Time-stamp

When a COM production requires a time-stamp (see 7.2.5), the COLD recording counterpart shall use the same criteria.

9.7 Electronic databases

9.7.1 General

It is typically possible to apply the principles of the COLD to an electronic database, e.g. with the aim of authorizing on-line operations (LAN, WAN). It is recommended that this database be established by exporting the contents of the COLD media, in order that the database be a mirror of the COLD media.

The export of the data shall not cause any format conversion nor modify the visual aspect of the data. The database shall not be used as a substitute for COLD.

9.7.2 Retrieval and display of database

The retrieval and display software mentioned in 9.6.2 shall be recorded on the computer connected to the database.

10 Evidentiary aspects of COM-COLD dual recording

If COM-COLD dual recording is used, it is recommended that the evidentiary functions be reserved for first-generation silver COM microforms. However, the COLD medium can be used to print on paper, transmit electronically or copy the items concerned on a transition medium. If there is any dispute or doubt regarding the integrity of the recording, then reference shall be made to the COM microforms as best evidence due to their complete and permanent irreversibility.

Annex A
(informative)

Archiving electronic data subject to restrictions for privacy reasons on COM microforms

A.1 General considerations

The influence of information technology in everyday life continues to grow. As a result, some data processed by computers involve people's privacy. Maintaining this information in digital format, which facilitates processing and exchanging of data, can produce files considered to be potentially dangerous to individual liberties or freedoms. Many countries have introduced rulings restricting the conditions in which individual data are collected, processed and stored.

The due respect for people's privacy should create no obstacle, either to technological progress, the requirements linked to the presentation of evidence or the need for storage.

It therefore seems appropriate, where this type of restriction is applied, to use an archiving method that is able to ensure efficient durability and quantifiable longevity, while discouraging automated processing.

A.2 Technological independence of COM microforms

Recording a digital document on a COM microform turns it into a miniaturized analogue image. Its use requires an optical magnification device, so that it can be read with the naked eye. Although it is of digital origin, the document is now no longer a part of the data processing world.

This independence renders any computer processing of the recorded content, and any return/conversion of data in the form of a text file useable by a computer, extremely complex, random and costly. This technological independence allows one to consider that archiving on COM microforms presents little danger of mass processing of personal or sensitive data recorded on them.

A.3 Recording data subject to restrictions on COM microforms

A.3.1 Mandatory notes

Any microform containing data subject to restrictions should be time-stamped according to 7.2.5 and stamped according to 8.3.

A.3.2 Master index

Creating a master index listing personal data is not advised.

A.4 COM-COLD dual recording of data subject to restrictions

Recording data subject to restrictions, using COM-COLD dual recording, involves duplicating micrographic recording with recording on COLD media. The COLD recording, which stores the data in a digital format that can easily be exported and processed, presents a potential risk comparable to storage on hard disks. It should therefore be checked that this type of recording of data subject to restrictions is not prohibited by the legislation in force.

When the restriction is a limited storage time, it is recommended, at the legal expiry date, that the data concerned be eliminated, either by destroying the COLD medium, or by applying ISO/TR 12037, which gives recommendations on procedures for selectively overloading information contained on a WORM (overwriting) medium. The data can also be deleted by copying and deleting the index links with deleted or cancelled information.

Annex B
(informative)

The COM process and microforms

B.1 History

The COM process began in the United States in 1948, with the spread and development in the military and civil sectors of cathode ray tubes (CRT) capable of creating graphics.

The first COM was completed in 1952, by combining a CRT with optical elements, enabling the recording in real time of graphics displayed through the cathode ray tube on to silver 16 mm or 35 mm film. The first COMs, which at the time were capable of recording images and text, were developed for military use and were used notably in association with radars to follow up manoeuvres and for the recording of seismographic data linked to explosions.

In 1959, the first COM for civil use was released. This simplified version was limited to recording alphanumeric data on 16 mm and 35 mm films. At that time, the data had to be specially prepared for micrographics (formatting). The data were transmitted to the COM by magnetic tapes.

In 1969, the first COM using a 105 mm film was made and was able to create microfiches.

From then on, COM equipments have continued to evolve. Today, computer micrographic platforms have become powerful devices managed by micro-computers, accepting practically any known printing format. Chains that automate production exist from the on-line reception of data to the packing of microforms, including duplication and dispatching. The processing speeds have become very high (e.g. the final and irreversible archiving of 420 A4 pages can be recorded on one single microfiche and can be carried out in approximately 1 min).

B.2 The COM process

B.2.1 General

Computer micrographics or the “COM process” consists of producing miniaturized documents direct from the binary data from a computer.

There are four types of microform produced from these processes:

— COM microfiches;

— 16 mm COM microfilms;

— 35 mm COM microfilms;

— COM aperture cards.

The production equipment, known as “COMs”, is divided into two categories:

a) alphanumeric COMs, limited to transcribing phonetic writing signs and not including diagrams, sketches or photographs. This equipment can create and record characters at more than 60 000 signs per second;

b) graphic COMs, able to produce and record any type of graphics. The graphic COM category includes COMs specialized in producing aperture cards, often called “laser COM plotters”, mainly dedicated to archiving technical drawings.

B.2.2 Block diagram

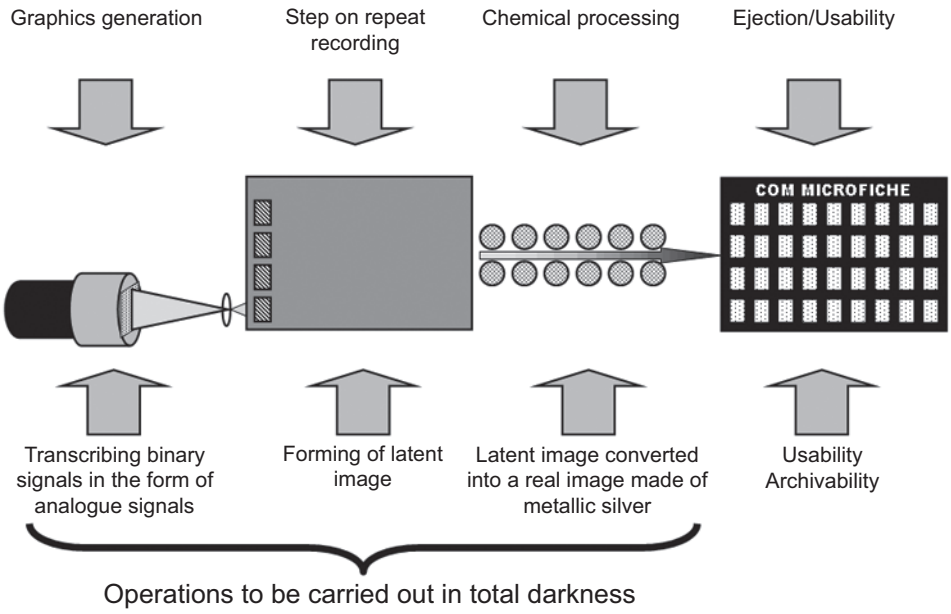

Figure B.1 — Block diagram of the production of COM microfiches

The computer data are transferred to the COM memory by a channel or network for on-line configuration and by way of optical or magnetic media in stand-alone mode.

The COM's control computer ensures, in its memory, the formatting of the data and the building of the virtual image, the configuration of the title elements and the storing of index keys. All these data are then recreated page by page by the graphic generator (CRT, LASER or LED), in the form of real images formed from a multitude of light spots. The light emitted by these images is directly recorded by the silver film, which forms the latent image. The chemical processing then converts the latent image into a real image made from metallic silver. The microform is directly useable and can be archived for more than a century once the chemical processing is complete.

B.2.3 Form overlays

B.2.3.1 General

The processing of certain files requires the use of form overlays. These can be optical or electronic, though the current trend is electronic.

B.2.3.2 Optical form overlays

These are made up of the physical image of the form concerned by the production, photo-engraved on to a glass plate, and placed in a subset designed to be inserted into the optical path of the COM. The image of the form is flashed simultaneously when each page in the file is created, with the two types of data being fused on to the same microimage using a prism.

B.2.3.3 Electronic form overlays

This is the image of the form concerned by the production, created as a file put into the memory of the COM system. The image corresponding to this file is recreated by the COM graphic generator at the same time as the data from the production file, with the two types of data being fused on to the same microimage. The electronic form overlay enables the recording of files requiring multiple form overlay formats.

B.3 Formats and codifications

The COMs can be configured for different alphabets. The versions generally utilized in Europe use the set of characters from the Latin alphabet.

The files created in various computer coding formats are produced on microforms in the same way as a paper print.

Among the coding formats, two large categories should be distinguished:

— files in line mode, and

— files in image mode for COM graphics only.

B.4 COM microforms

B.4.1 Types of COM microforms

There are four types of COM microforms, namely the A6 microfiche, the 16 mm roll microfilm, the 35 mm roll microfilm and the aperture card.

The microfilms and the microfiches use the reduction ratios 1/24, 1/42 and 1/48. The ratio 1/72 also exists, but it is rarely used in microfiche and never used in microfilm.

The reduction ratio conditions the maximum number of pages or frames that can be contained on a microform. See Table B.1 for examples.

Table B.1 — COM microform reduction ratios

Reduction	A4 Equivalent		Listing equivalent (11″ × 14″)	
	Microfiche A6	Microfilm 16 mm [a]	Microfiche A6	Microfilm 16 mm [a]
1/24	98 frames	3 000 frames	63 frames	1 800 frames
1/42	325 frames	5 200 frames	208 frames	3 100 frames
1/48	420 frames	6 000 frames	270 frames	3 600 frames
1/72	989 frames	Unused	644 frames	Unused

[a] Indicative values, for a microfilm of 30 m.

Naturally, the graphic quality of the microimages is dependent on their reduction ratios. The best quality is obtained by the smallest reductions.

B.4.2 The COM microfiche

A COM microfiche is made up of a sheet of film in A6 format (105 mm × 148 mm).

It authorizes variable partitions and facilitates the segmentation of the file (dispatching, for example) without limiting the size of the files (unlimited chaining of microfiches in one series).

For each partition, the recording can be carried out:

— in vertical mode, column by column, with the pages following one another from top to bottom in the form of a continuous list;

— in horizontal mode, row by row, with the pages following one another from left to right like pages in a book.

Each microfiche includes a title area (header) and an indexing area (last frame at the bottom-right). The microfiche may also include floating titles.

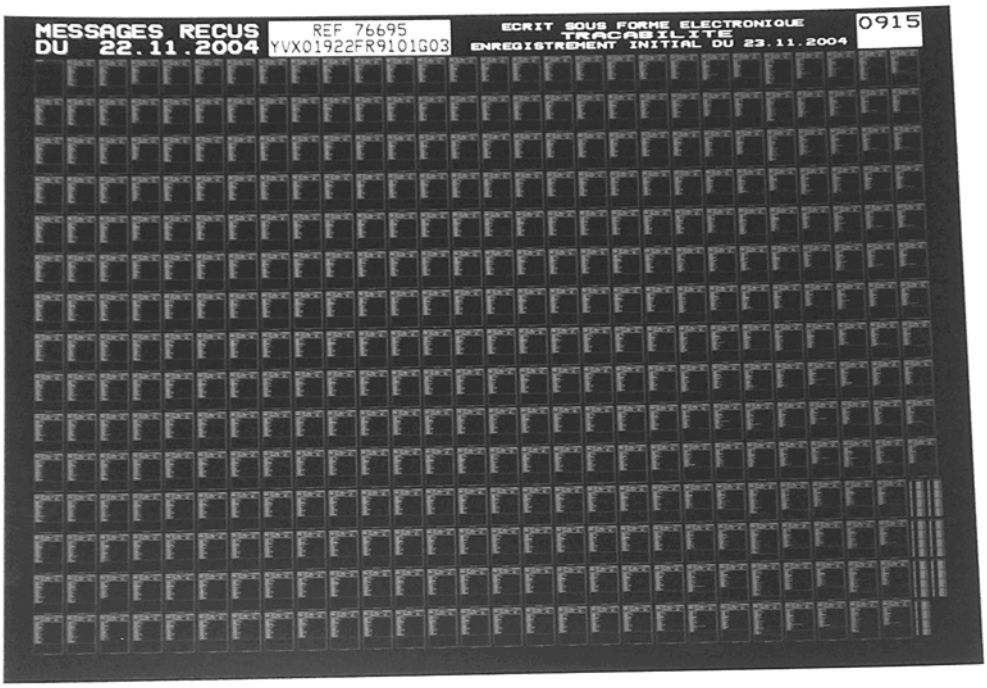

Figure B.2 — Example of a COM microfiche

B.4.3 The 16 mm COM microfilm

The 16 mm COM microfilm is produced with a roll of film of 16 mm in width. The images are recorded on it sequentially, with or without a blip, with variable reductions and/or formats.

A roll microfilm can be divided into logical segments, with each segment containing a specific number of frames and including title elements as well as index pages to facilitate data retrieval.

The microfilms are stored on reels or in cartridges to facilitate handling.

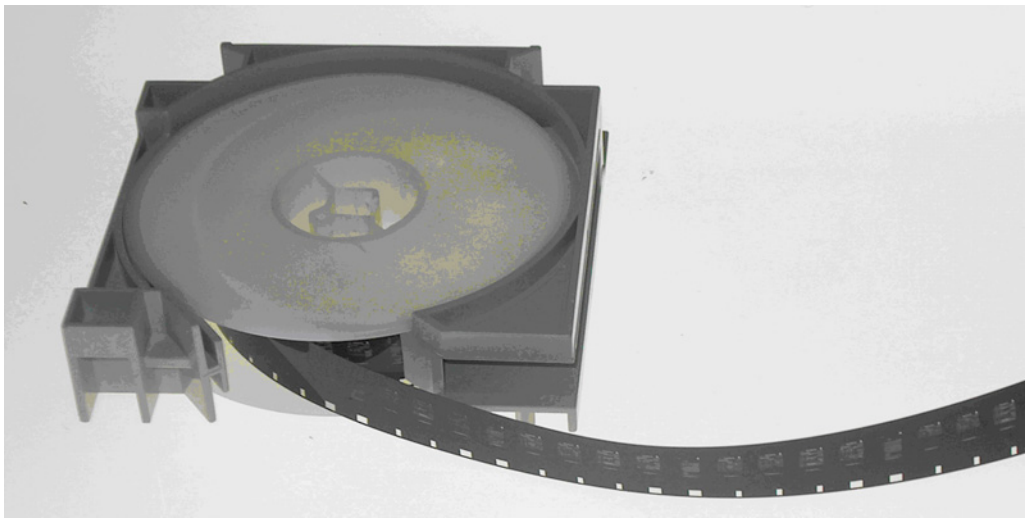

Figure B.3 — Example of a 16 mm COM microfilm

B.4.4 The 35 mm COM microfilm

The 35 mm COM microfilm is produced with a roll of film of 35 mm in width, on which the frames are sequentially recorded.

It should include title elements and index pages to facilitate data retrieval, if it is being stored on reels.

The 35 mm COM microfilms can also be segmented to be placed in aperture cards.

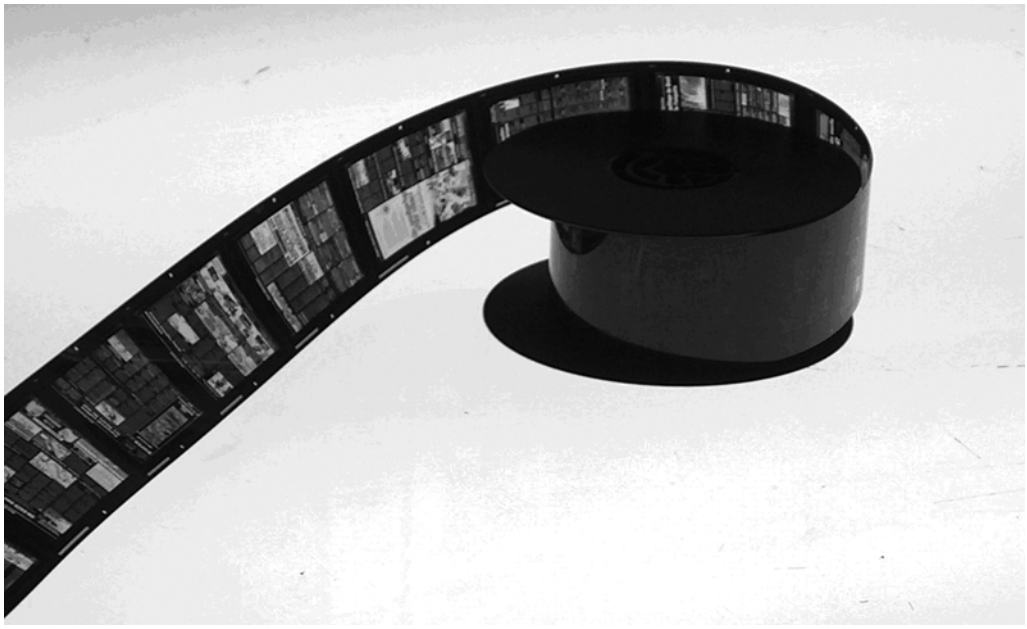

Figure B.4 — Example of a 35 mm COM microfilm

B.4.5 The COM aperture card

The COM aperture card is a product based on the 80-column punched card. It comprises a card of base weight around 200 g/m^2, with a cut-out window on the right-hand side, which includes a microimage mounted in the window.

The title and indexing elements are printed on the card, and are generally associated with punched data allowing automatic identification by specialized equipment.

The COM aperture card can be produced using two processes.

a) From a 35 mm COM microfilm:

   The roll of film created beforehand by a 35 mm graphic COM is cut into segments of 48 mm in length and generally contains a single microimage (representation of an A0 plan, for example), which is then inserted into the window of the card.

b) From an integrated COM aperture card:

   In this case, the aperture card is produced direct by this specialized COM, which integrates a chemical processing system, as well as a printing and card punching system.

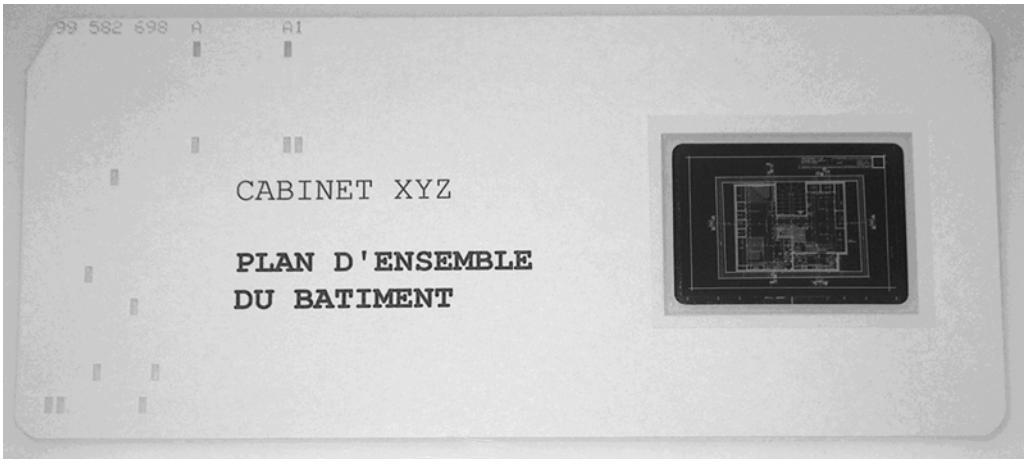

Figure B.5 — COM aperture card

Annex C
(informative)

Long-term preservation of silver microforms

C.1 General considerations

Where silver microforms are used for archival applications, their storage method conforms to the manufacturer's recommendations. Typically, for storage durations of up to 10 years, an “office” style environment might be satisfactory. For longer term preservation (typically for more than 100 years), a number of areas of risk are taken into account when defining storage conditions. See Table C.1 for the principal processing of the storage conditions for long-term preservation.

C.2 Harmful factors

C.2.1 General

There are four essential factors that might harm the long-term preservation of microforms:

— biological factors;

— chemical factors;

— physical factors;

— mechanical factors.

C.2.2 Biological factors

Biological factors include micro-organisms (mould, spores, fungus, etc.) which contribute to the contamination and decay of gelatin. Air quality and the surfaces of storage areas are factors of important risk of contamination.

C.2.3 Chemical factors

The following are the chemical factors that need to be taken into account:

a) poor quality in the manufacture of emulsions and bases;

b) non-compliant processing conditions;

c) polluted storage zone from the exterior (pollution in the atmosphere) or from the interior (chemical releases due to volatile organic products in unsuitable containers);

d) prolonged contact between silver and non-silver microforms.

C.2.4 Physical factors

The following are the physical factors that need to be taken into account:

a) prolonged exposure to sunlight or ultraviolet saturated light;

b) storing at excessive temperature or humidity;

c) storing in an environment subject to sudden or large variations in temperature or humidity;

d) deterioration caused by micro-organisms or insects;

e) abrasive particles likely to cause physical alterations.

C.2.5 Mechanical factors

The following are the mechanical factors that need to be taken into account:

a) risks linked to ill-timed handling;

b) damage resulting from poor usage or poor maintenance of reading material, copying or testing equipment.

C.3 Summary

Table C.1 — Principle of processing and storage conditions for long-term preservation

Essential factor	Recommendation or specification	Normative reference
Processing conditions	— fixer pH set between 4 and 5 — minimum washing temperature of 25 °C, with a maximum difference of $^{0}_{-3}$ °C from the developer temperature — HT (hydrometric title) of washing water between 15 and 20 French degrees (hardness) — maximum drying temperature of 60 °C — maximum residual thiosulfates of 0,007 g/m^2	ISO 18901 ISO 18917
Conditioning	— stabilized plastic sealed boxes of either polyethylene, polypropylene, polystyrene or polycarbonate	ISO 18901
	— no elastic or adhesive tape	ISO 18911
Storage accessories and furniture	— locked cabinets — shelves or drawers in stainless steel, in anodized aluminium or enamelled metal or coated with paint which has been correctly oven heated — no electric circuit inside the container — a container in solid wood, chipboard or plywood is not advised	ISO 18911
Storage room	— dust-free room, only to be used for preserving microforms — not to be used to store other archiving media, such as paper which creates dust over time — air filtering < class 100 000 — no smoking allowed — anti-dust flooring should be installed (no carpet) — anti-dust wall covering (no curtains) — recommended paint: acrylic or vinyl; avoid glycerophtalic paints — stable atmosphere, air renewal at 8 volumes per hour for a busy area and at 4 volumes per hour for a non-busy area	ISO 18911
Light conditions	— to be kept in darkness at all times — no prolonged exposure to daylight or UV light — lighting to a maximum of 150 lx if necessary	ISO 18911 ISO 10977 ISO 12040
Temperature conditions	— surrounding temperature of less than 21 °C — avoidance of thermal shocks — temperature gradient: 4 °C/H	ISO 18911
Relative humidity	— from 20 % to 40 %	ISO 18911
Protection against fire or flood	— any usual facility designed in such cases (adapted detectors, extinguisher equipment, fire doors and fire-resistant surfaces, etc.) — no underground storage (increased risk of water damage) — no storage on roofs (the most exposed zone in case of fire)	ISO 18911
Handling conditions	— exclusive use of the copy reserved for consultation if one exists — avoid fingerprints, scratches, dirt, stains (use of gloves recommended) — preventive maintenance of reading and copying or test equipment which may cause damage	ISO 18911
Monitoring conditions	— summary of densities and examination of visual appearance by periodical sampling — periodical checking of temperature and hygrometry	ISO 18911
Back-up methods	— storage of a silver back-up copy in a different location	ISO 18911

NOTE Reading Table C.1 does not replace the need to read and apply the International Standards indicated next to each factor.

Annex D
(normative)

Microforms created for use as evidence

D.1 General considerations

The presentation of evidence varies substantially according to the differences in the legal systems of countries, ranging from the strictest systems to more liberal ones. Moreover, the legal texts influencing the rules of evidence are progressive and the precepts specific to each country are often linked to cultural criteria. This frequently leads to the conclusion that it is impossible to standardize a universal method of proof.

It shall be noted, however, that, beyond differences in the rules, evidence has the same function in every country around the world: to serve as an expression of the truth. Regarding the media used, a de facto standardization can also be observed, since writing on paper is a form of evidence commonly accepted on a worldwide scale.

Today, the widespread use of digital documents and the common cross-border exchange of information require a description of an evidentiary recording method that goes beyond diversity of legislation thanks to evidentiary functions based on obvious reliability rather than on adherence to formalities.

D.2 Functional specifications

Recording and preservation of digital data intended to be used as evidence necessitate the following functional requirements:

a) being restricted to means that reveal any modification to the information after its initial recording;

b) ensuring the continuity of the evidentiary effects contained in a recording;

c) allowing knowledge of the recording's generation rank (original, copy, etc.);

d) having longevity that is at least equal to the stipulated time period;

e) ensuring access to information, its availability and mobility, at least for the duration of the stipulated term;

f) ensuring usability and legibility of the information for at least the stipulated time period.

D.3 Evidential properties of microforms

D.3.1 Mandatory shared indications

Any microform that might contain data that could be required as evidence shall be time-stamped in compliance with 7.2.5 and stamped in compliance with 8.3.

D.3.2 Establishing original documents on COM microform

D.3.2.1 General

When storing an original document on a COM microform, it is necessary to specify in the text of the document itself that the original document was saved on a COM microform after the decision made by the interested

parties. When the microform production is allocated to a specialized operation, it is also necessary to specify, in the terms of the document, the identity and the geographic location of the designated operation.

If only one copy of the document has been recorded, the first-generation silver microform will be considered as the original title. It is recommended that a duplicate be kept of the original COM microform in the same way that a copy of a letter is kept. A duplicate shall have the same irreversibility as an original microform.

When it is necessary to create several copies of a document (e.g. when each party involved in a contract shall keep their own copy) then the same file shall be processed as many times as necessary to produce the required number of copies. These processes shall be made on the same day, on the same COM recorder, using the same type of film and chemical. Where time-stamping of the microform is used, then the copies will necessarily indicate different times.

D.3.2.2 Applying signatures

Where signatures are used on original documents, there is a requirement for using a COM recorder with a graphics capability. A signature file (which can be created using a graphic tablet, for example) may either be an integral part of the document or included in a linked file. The signature may be included as part of the original document, or may be produced as a separate document, provided that it is stored on the same microform as the linked document.

When the document requires the signatures of several persons, the signatures shall be produced together and on the same microimage.

When the nature of the document requires adding handwritten information, this information shall be produced on the same microimage and in the same way as the signature(s).

Recording signatures of the document and handwritten information on the microform might be dependent on an integrity check of the terms of the document by way of adequate information security.

D.3.2.3 Useful information

The useful information that follows shall be included in the titles of the microforms, either in the header of each microfiche, or before the first pages of data of each microfilm. It is also possible to include them under each page of data, if required.

The title of a microform designed to be the original bears the heading “ORIGINAL – DIGITAL DOCUMENT”.

Where there are several copies of a document, it is necessary for it to carry the following title: “ORIGINAL – DIGITAL DOCUMENT IN *X* COPIES”.

The copy rank may also be indicated in its title (example: “COPY 1/2” for the first in the folder and “COPY 2/2” for the second).

D.3.3 Recording traceability elements

Microforms used to establish evidentiary traces (e.g. financial transactions, food chain and e-commerce) shall bear the title “TRACEABILITY”. The date of each microform indicates the exact time the traces which have been recorded become irreversible.

D.3.4 Evidentiary copies

D.3.4.1 Evidentiary copy on paper

When the microforms constitute the copies of documents that were initially on paper, it is necessary to include “EVIDENTIARY COPY – PAPER SOURCE” in the title.

Producing copies of this type requires the use of a COM recorder capable of reproducing both the semantic content and graphic appearance of the initial documents.

The reproduction of paper documents using a COM recorder requires the documents to be digitized beforehand. It is necessary to take into account the specification of the COM recorder to determine the digitization parameters. The “faithful” character of the copy shall always take precedence over aesthetics. It shall exclude any “cleaning up” during the digitization of the initial documents, which may disassociate any digital process from the image likely to affect the semantic content or the significant graphic aspect of the initial document, such as the overshadowing of the form overlay, logotypes or any other element whose absence would significantly distort the representation of the reproduced document.

Deleting the page borders is prohibited.

The deskewing of pages is authorized.

When the combination of the form overlay and data makes it difficult to read, it is recommended, where possible, to carry out the digitization by favouring legibility and by smoothing out the form overlay.

In any case, the settings for the digitizing of the original documents should be chosen according to the COM specification, with the aim of obtaining the best possible result on the microform. Priority should be given to appropriate settings able to enhance the quality of the microimages, rather than the settings for best on-screen viewing.

D.3.4.2 Evidentiary copy of a digital document

When the recording of a digital document on a microform is considered a copy, “EVIDENTIARY COPY – DIGITAL DOCUMENT” shall be included in the title.

The accuracy of the copy on microform involves the reforming by the COM recorder of the semantic identity and the graphic aspect of the original image from the file used to carry the document.

When the document is an electronic form (administrative form filled out on the Internet, for example), the accuracy of the copy requires the integral reproduction by the COM recorder of the graphic and semantic identity of the form and its completed contents. When the form includes several windows and one of them remains blank, it shall be reproduced at the same time as the other windows from the same form.

D.4 Transmitting documents

When information recorded on a COM microform is subject to a contrary debate or an exchange of documents (a legal debate, for example), it can be made available until dispute:

a) as reproductions on paper of the pages concerning the debate;

b) in digital format and on a widely accepted form of media, after the digitization of images concerning the debate;

c) in the form of a microform duplicate, provided micrographic processing methods are available.

When the dual-recording option exists and the COLD medium is in good condition, the pages taken from this medium can also be communicated on a digital medium, sent either over the network or printed on paper.

In case of dispute or doubt, it is necessary to produce and examine at the debate, the first-generation silver COM microform.

D.5 Checking methods

D.5.1 General

In addition to using one's intellectual checking skills, it shall be necessary to look closely at the following points, especially when forgery is suspected.

D.5.2 Comparative study

It is recommended, if possible, that comparisons be made between the physical characteristics of the inspected microform and microforms from the same processing or from the same workshop. The comparisons will cover, in particular, the general aspect, the polarity, the mattness of the film and/or the silver coating and the thickness of the film.

For the microfiches, possible differences in the levels of curling and length shall be checked.

D.5.3 Stamping check

It is recommended that the stamp on the microform be compared with other stamps from the same production unit. The legal existence of the production unit on the date of production of the microform can be checked. The production date of the microform should also be compared with the history of the types of COM recorder and film indicated.

Bibliography

[1] ISO 5466, *Photography— Processed safety photographic film — Storage practices*

[2] ISO 6586, *Data processing — Implementation of the ISO 7-bit and 8-bit coded character sets on punched cards*

[3] ISO 10977, *Photography — Processed photographic colour films and paper prints — Methods for measuring image stability*

[4] ISO/TR 12037, *Electronic imaging — Recommendations for the expungement of information recorded on write-once optical media*

[5] ISO 12040, *Graphic technology — Prints and printing inks — Assessment of light fastness using filtered xenon arc light*

[6] ISO 15489-1, *Information and documentation — Records management — Part 1: General*

[7] ISO/TR 15489-2, *Information and documentation — Records management — Part 2: Guidelines*

ICS 37.080

Price based on 33 pages