INTERNATIONAL STANDARD

ISO/IEC 11694-3

Second edition
2001-01-15

Identification cards — Optical memory cards — Linear recording method —

Part 3: Optical properties and characteristics

Cartes d'identification — Cartes à mémoire optique — Méthode d'enregistrement linéaire —

Partie 3: Propriétés et caractéristiques optiques

Reference number
ISO/IEC 11694-3:2001(E)

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Foreword

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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.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 11694 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 11694-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Identification cards and related devices*.

This second edition cancels and replaces the first edition which has been technically revised.

ISO/IEC 11694 consists of the following parts, under the general title *Identification cards — Optical memory cards — Linear recording method*:

— *Part 1: Physical characteristics*

— *Part 2: Dimensions and location of the accessible optical area*

— *Part 3: Optical properties and characteristics*

— *Part 4: Logical data structures*

Introduction

This part of ISO/IEC 11694 is one of a series of standards describing the parameters for optical memory cards and the use of such cards for the storage and interchange of digital data.

The standards recognize the existence of different methods for recording and reading information on optical memory cards, the characteristics of which are specific to the recording method employed. In general, these different recording methods will not be compatible with each other. Therefore, the standards are structured to accommodate the inclusion of existing and future recording methods in a consistent manner.

This part of ISO/IEC 11694 is specific to optical memory cards using the linear recording method. Characteristics which apply to other specific recording methods shall be found in separate standards documents.

This part of ISO/IEC 11694 defines the optical properties and characteristics and the extent of compliance with, addition to, and/or deviation from the relevant base document, ISO/IEC 11693.

Identification cards — Optical memory cards — Linear recording method —

Part 3: Optical properties and characteristics

1 Scope

This part of ISO/IEC 11694 specifies the optical properties and characteristics of optical memory cards using the linear recording method.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 11694. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 11694 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 11693:1994, *Identification cards — Optical memory cards — General characteristics.*

NOTE A new edition is in preparation.

ISO/IEC 11694-4:1996, *Identification cards — Optical memory cards — Linear recording method — Part 4: Logical data structures*.

3 Reading/writing test conditions

NOTE These test conditions apply to all tests unless otherwise specified.

3.1 Illumination source

The illumination source shall be a semiconductor laser diode having a wavelength between 760 nm and 850 nm.

3.2 Illumination beam diameter

The focused beam at the surface of the optical layer shall be measured at the $1/e^2$ point. A specific beam diameter shall be defined for each test.

3.3 Read power

The read power at the surface of the optical layer shall be less than 0,50 mW.

3.4 Default test environment and conditioning

The default test environment and conditioning parameters specified in ISO/IEC 11693 apply.

4 Optical characteristics

These characteristics are expected to be achieved under the test conditions defined herein. If test conditions change then the optical characteristics specified herein will change. See Figure 1 for the parameters to be measured.

4.1 Minimum performance characteristics

The values contained in this subclause represent the minimum acceptable levels for interchange purposes. Therefore, they represent characteristics that optical cards shall meet or surpass during their *useful life*, exclusive of physical damage to the card.

NOTE Useful life may be defined differently from application to application and therefore is left to the card manufacturer and the card issuer to properly define for their particular implementation.

4.1.1 Background reflectivity

The reflectivity of the area measured midway between adjacent track guides shall be between 12 % and 18 %, or between 27 % and 48 %. The reflectivity within one card shall not vary more than 10 % relative to the mean value.

NOTE This intends that card drives will accept both media reflectivity ranges.

4.1.2 Track guide contrast

The contrast of preformatted track guides, measured when scanning perpendicular to the guides, shall have a minimum of 0,3 contrast when compared to the measured background signal level.

NOTE Track guide contrast is the background signal level minus the track guide signal level divided by the background signal level.

4.1.3 Written data contrast

Written data bits shall have a minimum of 0,3 contrast when compared to the measured background signal level.

NOTE Written data contrast is the background signal level minus the written data signal level divided by the background signal level.

4.1.4 Card surface reflectivity

The reflectivity at the entry face of the data side of the card shall be less than or equal to 7 %.

4.2 Preformatted data characteristics

To ensure compatibility, the values for low frequency recovery, amplitude comparison, and signal overlap (S_O) divided by high frequency amplitude (A_{HF}), shall all be verifiable when scanning a portion of the accessible optical area containing preformatted data.

To achieve the expected results, a portion of the accessible optical area, containing a specific preformatted data pattern, shall be scanned using a specified beam diameter at a set media linear velocity. See ISO/IEC 11694-4:1996, annex A or annex B, for actual test conditions and values.

4.3 Written data characteristics

To ensure compatibility, the values for low frequency recovery, amplitude comparison, and signal overlap (S_O) divided by high frequency amplitude (A_{HF}), shall all be verifiable when scanning a portion of the accessible optical area containing written data.

To achieve the expected results, a high frequency and low frequency data pattern shall be written and scanned using a specified beam diameter, at a set media linear velocity, write power, and pulse width. See ISO/IEC 11694-4:1996, annex A or annex B, for actual test conditions and values.

4.4 Optical path length

The optical path length shall be in the range of 1,036 mm to 1,431 mm and the variation shall not exceed ± 15 % in any single card, or in cards of different lots.

4.5 Optical retardation

The variation in optical retardation through the transparent layer from card to card and within a card is not specified in this part of ISO/IEC 11694.

5 Reading characteristics

The card shall be subjected to 10 000 successive read passes in the same region within the accessible optical area. The orientation of the card shall then be changed by 90° and the reflectivity of that region examined. The relative change in reflectivity shall not exceed ± 10%.

6 Defects

These defect criteria apply unless other specific defect criteria are specified in ISO/IEC 11694-4:1996, annex A or annex B

6.1 Definition

A defect is any anomaly located within the accessible optical area whose cross-section exceeds 2,5 μm. It is assumed that defects are nominally circular in their cross-section.

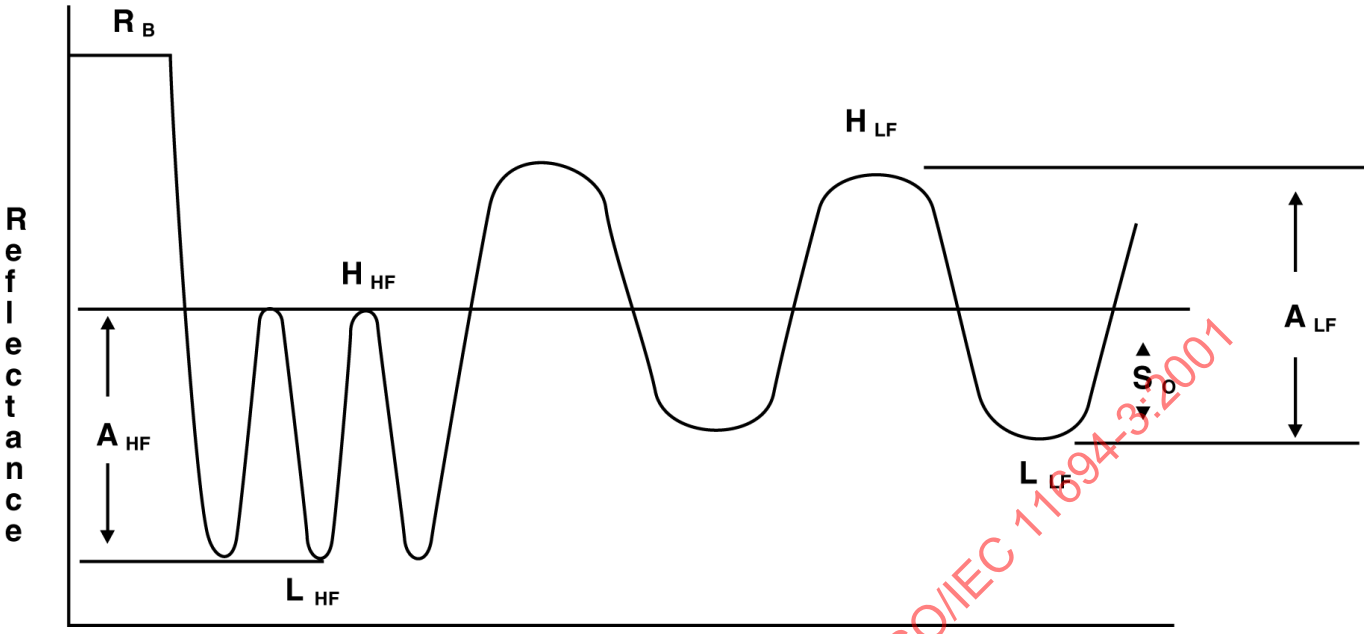
NOTE Both drop-ins and drop-outs are considered defects.

6.2 Density

The raw uncorrected defect ratio within the entire accessible optical area shall be less than $5{,}0 \times 10^{-4}$.

6.3 Transparent layer

The transparent layer shall have no defects whose cross-section exceeds 100 μm.



Low frequency recovery – the high reflectance value of the low frequency data pattern (H_{LF}) divided by the background reflectance (R_B).

Amplitude comparison – the high frequency amplitude (A_{HF}) divided by the low frequency amplitude (A_{LF}).

High frequency amplitude (A_{HF}) – the high reflectance value of the high frequency data pattern (H_{HF}) minus the low reflectance value of the high frequency data pattern (L_{HF}).

Low frequency amplitude (A_{LF}) – the high reflectance value of the low frequency data pattern (H_{LF}) minus the low reflectance value of the low frequency data pattern (L_{LF}).

Signal overlap (S_O) – the high reflectance value of the high frequency data pattern (H_{HF}) minus the low reflectance value of the low frequency data pattern (L_{LF}).

Figure 1 — Contrast parameters