

Identification card systems — Intersector thin flexible cards

Part 2. Magnetic recording technique

The European Standard EN 753-2 : 1997 has the status of a
British Standard

ICS 35.240.15

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents



Document Sharing Hub

National foreword

This British Standard is the English language version of EN 753-2 : 1997.
The UK participation in its preparation was entrusted to Technical Committee IST/17, Identification cards and related devices, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

This British Standard, having been prepared under the direction of the Information Systems Technology Assembly, was published under the authority of the Standards Board and comes into effect on 15 October 1997

© BSI 1997

ISBN 0 580 28393 3

Amendments issued since publication

Amd. No.	Date	Text affected

ICS 35.240.15

Descriptors: Identification cards, magnetic cards, specifications, physical properties, magnetic properties, magnetic records, magnetic tapes, codification

English version

Identification card systems — Intersector thin flexible cards — Part 2: Magnetic recording technique

Systèmes de cartes d'identification — Cartes
souples minces intersectorielles —
Partie 2: Technique d'enregistrement magnétique

Identifikationskartensysteme —
Branchenübergreifende dünne biegsame Karten —
Teil 2: Magnetische Aufzeichnungstechnik

This European Standard was approved by CEN on 1997-05-23. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

© 1997 CEN - All rights of exploitation in any form and by any means reserved worldwide for CEN national members.

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 224, Machine-readable cards, related device interfaces and operations, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1997, and conflicting national standards shall be withdrawn at the latest by December 1997.

This European Standard is one of a series of standards, under the general title *Identification card systems — Intersector thin flexible cards* and the different parts are the following:

- Part 1: *General technical specifications*;
- Part 2: *Magnetic recording technique*;
- Part 3: *Test methods*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

	Page
Foreword	2
Introduction	4
1 Scope	4
2 Normative references	4
3 Definitions	4
4 Symbols and abbreviations	6
5 General characteristics	6
5.1 Introduction	6
5.2 Requirements common to all formats	6
5.2.1 General requirements	6
5.2.2 Reference edges	6
5.2.3 Presentation	7
5.3 Environmental conditions	7
5.3.1 Testing environment	7
5.3.2 Storage environment and packaging	7
5.3.3 Usage environment	7
5.4 Classification of card characteristics	7
6 Magnetic materials	8
6.1 Magnetic stripe characteristics	8
6.1.1 Stripe surface	8
6.1.2 Stripe adherence	8
6.1.3 Stripe life	8
6.2 Magnetic characteristics	8
6.2.1 Classification of magnetic characteristics	8
6.2.2 Reference cards	8
6.3 Magnetic stripe zone reservation	9
7 TFC.0 data recording	10
7.1 Magnetic track characteristics	10
7.1.1 Number of tracks	10
7.1.2 Position of track	10
7.1.3 Track height	10
7.2 Specific stripe requirements	10
7.3 Encoding characteristics	10
7.3.1 Encoded data	10
7.3.2 Encoding method and recording density	10
7.3.3 Encoding zone	10
8 TFC.1 data recording	10
8.1 Magnetic track characteristics	10
8.1.1 Number of tracks	10
8.1.2 Position of single track	10
8.1.3 Position of multiple tracks	10

8.1.4	Track height	12	Annexes	
8.2	Specific stripe requirements	12	A	(normative) Magnetics classes 15
8.3	Encoding characteristics	13	A.1	Static characteristics 15
8.3.1	Encoded data	13	A.2	Dynamic characteristics 15
8.3.2	Encoding method and recording density	13	B	(normative) Encoding classes 16
8.3.3	Encoding zone	13	B.1	Encoding methods 16
9	TFC.5 data recording	13	B.1.1	Biphase F/2F 16
9.1	Magnetic track characteristics	13	B.1.2	Split phase (Manchester code) 16
9.1.1	Number of tracks	13	B.2	Class w encoding 16
9.1.2	Position of tracks	13	B.2.1	Encoding binary density 16
9.1.3	Track height	13	B.2.2	Transition angle and spacing 17
9.2	Specific stripe requirements	13	B.3	Class p encoding 17
9.3	Encoding characteristics	13	B.3.1	Encoding binary density 17
9.3.1	Encoded data	13	B.3.2	Transition angle and spacing 17
9.3.2	Encoding method and recording density	13		
9.3.3	Encoding zones	14		

Introduction

Thin flexible cards (TFCs), the subject of this European Standard, are used to automate the controls for access to goods or services such as mass transit, highway toll systems, car parks, vouchers, stored value, etc.

The cards are made from various materials, on which can be deposited a regular and continuous coating of magnetic material to form a stripe. The recording technique permits the storage of data on a single or multiple tracks located within the magnetic stripe specified herein.

1 Scope

This Part of EN 753 specifies the magnetic stripe and encoding characteristics of thin flexible cards. Other cards, for example ID-1 cards, do not come within its scope.

Guidance concerning the storage and usage of finished cards (including magnetic stripe cards) under various environmental conditions is given in EN 753-1.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 753-1 : 1997	<i>Identification card systems — Intersector thin flexible cards — Part 1: General technical specifications</i>
prEN 753-3	<i>Identification card systems — Intersector thin flexible cards — Part 3: Test methods</i>
ISO 4287-1	<i>Surface roughness — Terminology — Part 1: Surface and its parameters</i>
ISO 4287-2	<i>Surface roughness — Terminology — Part 2: Measurement of surface roughness parameters</i>
IEC 50(221)	<i>International Electrotechnical Vocabulary — Chapter 221: Magnetic materials and components</i>

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 average signal amplitude (U_A)

The arithmetic mean of the absolute values of the individual signal amplitudes found in a readback waveform.

$$U_A = \frac{\sum_{k=1}^n U_{ik}}{n} \quad (\text{where } n \text{ is the number of individual signal amplitudes}).$$

Five such values are specified in EN 753-2:

- U_{A1} : average value after recording at $D_{\min}$ and $I_{\min}$;
- U_{A2} : average value after recording at $D_{\min}$ and $I_{\max}$;
- U_{A3} : average value after recording at $D_{\max}$ and $I_{\max}$;
- U_{A4} : average value after recording at $D_{\min}$ and $I_{\max}$ then erasing at $I_{\min}$;
- U_{A5} : average value after recording at $D_{\max}$ and $I_{\min}$ then erasing at $d \cdot I_R$.

3.2 back

The face of the card opposite the front.

3.3 central stripe

A stripe centred on the widthwise axis of the card.

3.4 coercive field strength

The magnetic field strength for which the magnetization is zero [IEC 50 (221)].

3.5 coercivity (H_{CM})

The value of coercive field strength obtained when the material is brought from saturation by a monotonically changing field [IEC 50 (221)].

3.6 erase noise level

The level of the noise signal which is read from an erased magnetic stripe. EN 753-2 controls erase noise level via the quantities U_{A4} and U_{i4} .

3.7 erasure

The attenuation of a magnetic encoding signal by re-magnetizing the track area in a single direction, parallel to the width of the stripe.

3.8 finished card

A card at the point of issue to the public.

3.9 front

The reference face of the card (which normally bears printed information relating to its origin and ownership).