



SLOVENSKI STANDARD SIST-TS CEN/TS 15291:2006

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Identification card system - Guidance on design for accessible card-activated devices

Identifikationskartensysteme - Leitfaden zur Gestaltung erreichbarer kartenaktivierter Geräte

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Systeme d'identification des cartes - Guide sur les motifs pour l'accessibilité aux terminaux a cartes

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TECHNICAL SPECIFICATION
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CEN/TS 15291

January 2006

ICS 35.240.15

English Version

**Identification card system - Guidance on design for accessible
card-activated devices**

Système d'identification des cartes - Guide sur les motifs
pour l'accessibilité aux terminaux à cartes

Identifikationskartensysteme - Leitfaden zur Gestaltung
erreichbarer kartenaktivierter Geräte

This Technical Specification (CEN/TS) was approved by CEN on 4 December 2005 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This Technical Specification (CEN/TS 15291:2006) 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 Technical Specification is based on the results of a CEN TC 224 WG 6 Project team commissioned to perform the necessary research.

It is intended that this Technical Specification will complement, but not be a part of, the series EN 1332, "*Identification card systems – Man-machine interface*". The EN 1332 series includes the following parts:

- Part 1: Design principles for the user interface;
- Part 2: Dimensions and location of a tactile identifier for ID-1 cards;
- Part 3: Key pads;
- Part 4: Coding of user requirements for people with special needs;
- Part 5: Raised tactile symbols for differentiation of application on ID-1 cards.

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

Introduction

Machine-readable cards facilitate the provision of a growing variety of services across Europe. The purpose of this document is to increase the accessibility of these services for the benefit of consumers. This will be achieved by facilitating the inter-sector and cross-border interoperability of machine-readable cards and to do so with the maximum possible degree of user-friendliness.

This document complements the EN 1332 series. EN 1332 addresses the needs of all users, including people with special needs, not overlooking first time users, minors, those not conversant with the local language.

EN 1332 specifies:

- a) the design principles for the user interface (including functions to be represented by symbols) to be incorporated into the design of card operated equipment, but not the machine operations associated with the selection and delivery of goods or services;
- b) a tactile identifier to be incorporated into the design of machine readable cards;
- c) a standard layout for the keypads of card operated equipment;
- d) coding of user requirements for people with special needs.

The contents of the EN 1332 series are generically based, not sector specific, and cover card-operated equipment. It is recognised that the equipment may also be operated by other means, such as the insertion of notes and coins, but the scope of this document has been, as indicated, narrowly defined.

Issues relating to such consumer concerns at the man-machine interface as PIN presentation is dealt with in a separate standard, see ISO 9564.

The information society is moving from a "service" society to a "self service" society and the key to accessing many of these services will be via the use of a machine readable card. It is essential that all users are able to achieve access in order to avoid a two-tier society.

The purpose of this document is to increase the accessibility of these services for the benefit of all stakeholders and to explain the design requirements for equipment, services and the environment in which they are used.

According to CEN Guide 6:2002, 3.2, accessible design is focused on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service which may be achieved by:

- e) designing products, services and environments that are readily usable by most users without any modification,
- f) making products or services adaptable to different users (adapting user interfaces) and
- g) having standardized interfaces to be compatible with special products for persons with disabilities.

NOTE 1 Terms such as design for all, barrier-free design, inclusive design and trans-generational design are used similarly but in different contexts.

NOTE 2 Accessible design is a subset of universal design where products and environments are usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

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There are a wide range of application areas where card readers might be employed (public, e.g. ATMs and personal, e.g. mobile phone). This is likely to expand enormously in the future.

This document is written in the form of a set of informative clauses covering various aspects of location, access, user space, lighting, interface layout and interface design etc., to which compliance is necessary in order for a device to be regarded as “accessible”, i.e. enables inserting or swiping the card. It should be noted that all components of the total design are equally important. If one part is missing or inadequate it may not be possible to use the card-activated device at all.

This document is based on a review of published literature, supplemented by limited research, practice and expert judgment.

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1 Scope

This document provides guidance for the design and location of card-activated devices and the immediate environment, to facilitate access for the widest possible range of users (all / most members of the community), subject to conditions of adequate privacy and security.

The contents of this document are generically based, not sector specific, and cover “card-activated device”, the generic term used in this document to encompass:

- a) terminals (device with card reader and other components such as keyboard and displays);
- b) standalone card readers (access control for building, public transport);
- c) hand held devices (e.g. mobile phone when used to access other card-activated devices).

Card-activated devices may be used either by pedestrians or car drivers.

This document may also be applied to devices that are not card-activated, e.g. they may be activated by notes, coins, tickets, tokens, touch or other interaction with the user.

(Context of use includes: unattended, public and home use, handheld).

This document addresses the card-activated device and its immediate vicinity. It does not address the entire building / locality in which the card-activated device is located. (The reader is referred to appropriate ISO, CEN and national standards for guidance on designing accessible built environments. It should be noted that national legislation, standards and guidance have different requirements).

The term “wheelchair” in this document refers to manually propelled wheelchairs, not power driven ones, which are often of different dimensions in relation to manually propelled wheelchairs.

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2 Normative references

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

EN 1332-1, *Identification card systems – Man-machine interface – Part 1: Design principles for the user interface*

ISO 7010, *Graphical symbols - Safety colours and safety signs – Safety signs used in workplaces and public areas*

ISO/IEC 7810, *Identification cards –Physical characteristics*

ISO 14443, *Identification cards - Contactless integrated circuit(s) cards – Proximity cards*

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

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3.1 Definitions

3.1.1

area around

area around a terminal that is used for access (under control of the building owners) and other areas immediately adjacent to the card reader (under the control of local authority)

3.1.2

accessible

describes all or part of a site, building or facility that complies with this document and that can be approached, entered and used by people with disabilities

3.1.3

assistive technology

as defined in CEN / CENELEC Guide 6 /ISO Guide 71

3.1.4

card-activated device

any device or machine capable of reading and or writing information on a card.

The term “card-activated device” is the term used to refer to any piece of equipment forming a part of a functional system which is capable of reading (and possibly writing) information encoded (either in a magnetic strip or in a microprocessor) on an ID-1 or TFC card. It may be used for a transaction or interaction with a system (e.g. purchase payment, gaining cash, gaining credit, identification, ticket payment, information download / upload, validation codes and so on)

3.1.5

design for all

mainstream products designed according to good Human Factors practice, incorporating considerations for people with impairments that can be used by a broad range of users

3.1.6

drive-up only readers

card reading devices accessed only from a vehicle

3.1.7

hazard

any area or object within the environment that may place people at risk

3.1.8

impairment

as defined in CEN/ CENELEC Guide 6

3.1.9

ID-1 card

as defined in ISO 7810

3.1.10

luminance factor

ratio of luminance of a surface to that of a perfect reflector identically illuminated

3.1.11

older persons

people who may have a variety of age related impairments and who may have an additional time requirement for task performance and who may find learning more difficult

3.1.12**path of travel**

passageway, walkway, ramp, landing or other space used for circulation

3.1.13**parallax**

design characteristic of a machine which determines the visual alignment of screen text and adjoining function keys on the terminal's surface

3.1.14**people with disabilities**

persons who have an impairment (e.g. physical, cognitive sensory or other), that limits their capability in some way (for guidance refer to Annex A)

3.1.15**privacy area**

area (by the card reading devices) that ensures that the privacy rights of the individual are granted

3.1.16**proximity card**

as defined in ISO 14443

3.1.17**sensory impairment**

any significant loss of hearing, sight or tactile sensory capability (see also Annex A)

3.1.18**tactile feedback**

the increase of resistant pressure on the key followed by a rapid decrease in pressure on the key to indicate activation

3.1.19**terminal**

mounted card reading device including interactive controls and displays or requiring user dialogue (e.g. ATM, ticket dispenser, public telephone)

3.1.20**user**

person who interacts with the product, service or environment (see CEN/CENELEC Guide 6). This includes maintenance and service persons (including people with disabilities, older persons, children, etc.)

3.1.21**user operating space**

floor area immediately in front of and around a card reading device where the user stands or sits while interacting with the card reader

3.1.22**vestibule**

room surrounding terminal(s)

3.2 Abbreviations

ATM Automatic Teller Machine

DSN Drivers with Special Needs

GSM Global System for Mobile Communications

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| | |
|------|--------------------------------|
| GPRS | General Packet Radio Service |
| GPS | Global Positioning System |
| HHD | Hand held device |
| HMI | Human Machine Interaction |
| PIN | Personal Identification Number |
| TFC | Thin Flexible Card |

4 General principles for ease of access and use**4.1 Approaches to ease of access and use**

There are two fundamental approaches to making solutions accessible and easy to use: one is to design for the widest possible range of users (universal design); - the other (Assistive Technology) approach is to design for direct interaction by a limited range of users, supplemented by indirect interaction (e.g. via wireless communications between card-activated devices and assistive technology) for those unable to manage direct interaction with card-activated devices.

The underlying principle for ensuring ease of access and use is that systems have to be seen within their *context of use*. Requirements for the design of any specific solution are dependent upon the *interaction* of people, tasks, systems and the environment in which they will be operating. There is no one single solution that can cover all eventualities. The reader of this document should bear this in mind when applying the guidance in this document.

4.2 General principles

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The following principles should be observed:

- a) The user population and their related anthropometric requirements must be determined before planning the location of a terminal.
- b) Users should be able to approach, enter, find their way around and move in the premises where the card-activated device is located, and use it with ease.
- c) The terminal should be located and designed to provide for privacy and security of the user and their possessions.
- d) Improvements that benefit users with particular impairments should be implemented, even where it is not possible to make it usable by everyone.
- e) The concept of accessible design should be considered at the start of the planning and before the building process to avoid expensive and complicated conversions.
- f) For those who cannot access a card-activated device suitable alternative provisions should be given (e.g. provide personal service).
- g) The card-activated device should have a consistent user interface, especially with regards to the method of entering, navigating in and exiting the card-activated device (EN 1332-1).
- h) The card-activated device should be adaptable to meet a user's specific requirements, for example, to provide output (on screen or sound) in a preferred language (EN 1332-4).

- i) Installers and designers should consult with target user groups, e.g. national/local support groups, local users and relevant local associations during the design process and before installation. Consider if target group might expand or change.
- j) The design and location of card-activated devices should take into account the potential consequences of vandalism.

5 Access and location

5.1 Location site

The choice of a site for the installation of public card-activated devices should take into account factors such as the layout, structure and location of an existing building, passing trade, security aspects, environmental noise, and building regulations. These factors may potentially be in conflict with the requirements for accessible design. A poorly sited device placed in direct sunlight can become unusable because of reflected glare. In addition, defective or damaged local lighting can mean that users cannot see the interface clearly or with any sense of security.

If the card-reading device is located inside, entrances and lobbies should be easy to negotiate and well lit.

In addition, the following factors should be considered:

- a) The existence of a clear circulation space fronting the area of the proposed installation.
- b) The area should be free from obstructions, such as building stanchions, street utilities, etc. in the vicinity of the card reading device. This will assist wheelchair access and facilitate the queuing of users so that more privacy can be obtained.
- c) The location of card reading devices also affects their security of use. There are various factors to consider. These may be in conflict with regard to ease of use and accessibility for different user groups.
- d) Adequate parking spaces for mobility-impaired people should be available on the shortest possible accessible route to each card-activated device.
- e) The access route to the card-activated device should be free of obstructions, i.e. free from stairs, thresholds, narrow passages and heavy doors. The surface of the floor space should be level, stable, firm and non-slip. Snow, ice, standing water, leaves or litter can make the access route difficult or dangerous for all users and impossible for a wheel chair user.
- f) Terminals offering similar services should have a unitary visual/auditory/tactile profile, be placed according to these guidelines, and be clearly identifiable from both a long and short distance. The purpose of the terminal should be clear to the user through visual/auditory/tactile means.

5.2 Location signs and visual indications

Signs may be for public information or, if environmental features have impacted on the design of the facility, for safety. Safety signage should use the appropriate symbol, colour and shape in accordance with current International Standards to warn users of the potential hazard. Public information signs should conform to the current International Standard ISO 7010.

The following factors should be considered:

- a) Graphical symbols are an essential aid for people with learning difficulties and for people unfamiliar with the surroundings.
- b) Persons with disabilities may have limitations in the movement of their head, or a reduction in peripheral vision. Signs positioned perpendicular to the path of travel, are the easiest for them to notice. Persons

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can generally distinguish signs within an angle of 30° to either side of the center-line of their faces without moving their heads.

- c) Card-activated devices should be clearly signed by means of text and or graphics, using the appropriate standard symbol where available. Signs should be placed above the card-activated devices.
- d) There should be clear and visible markings of the location of the terminal and they should be easily identifiable at night and on overcast days.
- e) Colour and contrast should be used to enable visually impaired persons to locate the terminal.
- f) Colour markings should be at least 40 cm wide on the walls and floor surrounding the terminal.
- g) Symbols, icons and pictograms should conform to EN 1332-1.
- h) Signs should be visible from front and side, or all round if free standing signs shall be clearly visible to people in both seated and standing positions.
- i) In order to help people find their way to accessible card reading devices, signage should be located at decision-making locations (exterior and/or interior) and, where applicable, should include the appropriate standardised symbols.
- j) All signs should be consistently placed and of uniform design so as to be readily seen.

Detailed information is given in Annex D for the following:

- basic design features for text based signs;
- lighting for signs;
- placement of signs located parallel with front of terminal;
- height of characters in signs including symbols;
- international symbols of access;
- sign maintenance.

5.3 Alternative methods for locating terminals

It is important that terminals can be located by persons with impaired vision. This can be achieved by:

- a) The provision of tactile markings on the floor (specially patterned pavements or floor surfacing which can be easily perceived by blind or partially sighted people) leading the user towards the terminal. Such surfaces should comply with Annex D.
- b) The use of technology such as voice messages or audible direction instructions transmitted to a hand-held device such that selected audible route guidance could be provided to lead users to the terminal from their current location.

Access routes can be graphically displayed (in a similar manner to current in-car route navigation systems) on hand-held device screens within the terminal vicinity, upon request. Ideally, the user's location on the route should be indicated as well as the nearest "accessible" route to the terminal from the user's current location (see also Clause 14).

Annex D contains more detailed design information on the following:

- tactile signs and symbols;

— detectable tactile floor surfaces for warning and way guidance.

5.4 Lighting

5.4.1 General

Lighting should be designed to provide safe mobility through the provision of good visibility in all ambient lighting conditions. There should be a consistent pattern and level of light in the absence of natural light. Lighting should avoid misleading shadows and highlight obstacles such as stairs, curbs, and ramps in the locale and close to the access route. Care should be taken to ensure that a terminal does not face into direct sunlight as this can cause direct reflected screen glare or strong shadows which can make the device unusable.

Maintenance programmes should be in accordance with Clause 17.

5.4.2 Design

Good lighting means:

- a) no glare;
- b) flicker free light;
- c) sufficient intensity of light (see Annex D);
- d) sufficient contrast;
- e) appropriate direction and distribution of the light;
- f) appropriate colour of the light; [SIST-TS CEN/TS 15291:2006](https://standards.iteh.ai/catalog/standards/sist/586f71e3-1529-45fc-847e-ca1a23761dd3/sist-ts-cen-ts-15291-2006)
- g) no emission of heat or UV radiation.

These factors are particularly important for visually impaired, including older people. They often need to read very close to the text.

5.5 Accessible route

There are a number of factors to take into account when ensuring that the route to the card-activated device is accessible, such as path gradient, width and height of access route, avoidance of protrusions into path, avoidance of barriers / hazards. Detailed information is provided in Annex D.

5.6 Space in front of card-activated devices

When designing the area immediately in front of a card reading device, called the “User Operating Space”, the following factors should be considered:

- a) Sufficient space to allow users (especially those in wheelchairs) to choose between making a forward, parallel (side) or angled approach.
- b) Sufficient space in which users can perform any interactive tasks at the reader terminal without being cramped or forced to adopt stressful postures.
- c) Provision of an area at the terminal where the user has control of valuables (e.g. wallet, card) in order to provide a reasonable level of security.
- d) Privacy of information on the screen.