

JUfbcghlfcYj`E; bUbUcdfYa UnUdUf_jfUbY'a clcfb]`j cn]`E JUfbcghbYnU hYj Y
]b`nU hYj YYY_fca U[bYfbYnXfi y`qj cgh]`nUbU flcj UbYzdfc]nj cXb`cža cbfUyc`]b
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Safety of machinery - Equipment for power driven parking of motor vehicles - Safety and
EMC requirements for design, manufacturing, erection and commissioning stages

Sicherheit von Maschinen - Kraftbetriebene Parkeinrichtungen für Kraftfahrzeuge -
Sicherheits- und EMV-Anforderungen an Gestaltung, Herstellung, Aufstellung und
Inbetriebnahme

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Sécurité des machines - Dispositif de stationnement motorisé des véhicules automobiles
- Exigences concernant la sécurité et la CEM pour les phases de conception,
construction, montage et mise en service

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English version

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This European Standard was approved by CEN on 1 October 2003.

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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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 14010:2003) has been prepared by Technical Committee CEN /TC 98, "Lifting platforms", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are an integral part of this document.

Annexes A, Ca and Cb are normative. Annex B is informative.

This document includes a Bibliography.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This European Standard is a "Type C" Standard as in EN 1070.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

When producing this standard it was assumed that

- negotiation will take place between the manufacturer and the purchaser of the parking equipment/systems, concerning particular conditions for the use and places of use for the equipment/system, related to health, safety and environmental conditions;
- erection, commissioning and testing will be carried out by suitably trained persons;
- only legal drivers of vehicles will use the equipment/system;
- no vehicles in excess of the rated load or otherwise unsuitable (see clause 1), will use the equipment/system;
- persons will not be lifted or transported by the machinery;
- the machinery and its components will be kept in good repair and working order in accordance with the manufacturers instructions, to retain specified safety characteristics throughout the intended working life of the machinery;
- by design of the load bearing elements, safe operation of the machinery will be assured for loading ranging from zero to 100% of the rated capacities and during the loaded tests (see 6.1f);
- harmful materials, such as asbestos are not used as part of the machine;
- all parts of the equipment/system without specific requirements will be:
 - 1) designed in accordance with the usual engineering practice and design codes, using appropriate safety factors, taking account of all relevant forces, loads and failure modes;
 - 2) of sound mechanical and electrical construction;
 - 3) made from materials of adequate strength and durability and of suitable quality for their intended purpose.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

1.1 This European Standard **deals with** the technical requirements to minimise the risks due to the hazards listed in clause 4, which can arise during installation¹, operation and maintenance of permanently installed equipment and systems for the power driven parking of motor vehicles, as defined in 3.1 to 3.4 below. Requirements are also given on the provision of information for use, which includes requirements for the drafting of the instructions. Electromagnetic compatibility requirements are also covered.

¹ When carried out by or on behalf of the purchaser

1.2 This European Standard **applies to** equipment and systems for the power driven parking of motor vehicles which have four wheels, are within a maximum size envelope of 5,30 m long, by 2,30 m wide, by 2,20 m high and have a mass less than 2500 kg. The equipment can be manually or automatically controlled.

1.3 This standard does **not** cover:

- a) vehicle lifts (see EN 1493);
- b) peripheral devices, which do not handle motor vehicles, e.g. parking meters, ticket machines;
- c) requirements related to the building even if they support directly stored vehicles;
- d) goods only lifts in accordance with EN 81-31;
- e) power driven parking equipment intended for lifting and/or transporting any person;
- f) transmission and interface of remote controls;
- g) automatic parking equipment with transfer areas which move;
- h) the use of power driven parking equipment by wheelchair users and deaf persons;
- i) the workplace of any attendant.

1.4 This standard **does** not deal with the following:

- a) hazards arising if loads, or other items fall from vehicles;
- b) hazards arising if fuel or oil leaks from vehicles;
- c) hazards caused by operating the equipment/system in electromagnetic fields outside the range of EN 61000-6-2;
- d) hazards caused by operating the equipment/system in areas subject to special regulations (e.g. explosive atmospheres, fire risks);
- e) hazards caused by the use of dangerous/toxic materials, e.g. special hydraulic oil;
- f) hazards caused by noise;
- g) hazards arising from inadequate lighting of the surrounding of automatic parking systems and/or the place of installation of non-automatic parking equipment;
- h) hazards caused by earthquakes;
- i) hazards caused by vandalism;
- j) hazards due to the use of programmable electronic systems related to safety functions;
- k) hazards due to the use of cableless control devices;
- l) hazards arising due to collision caused by the driver of the vehicle.

This document is not applicable to power driven parking equipment and systems manufactured before the date of publication of this document by CEN.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the 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 (including amendments).

EN 292-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design - Part 2: Technical principles and specifications.*

EN 292-2:1991+A1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

EN 294:1992, *Safety of machinery — Safety distance to prevent danger zones being reached by the upper limbs.*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body.*

EN 418:1992, *Safety of machinery — Emergency stop equipment, functional aspects; principles for design.*

EN 457, *Safety of machinery — Auditory danger signals — General requirements, design and testing (ISO 7731:1986, modified).*

EN 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs.*

EN 842, *Safety of machinery — Visual danger signals — General requirements, design and testing.*

EN 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays.*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards.*

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EN 954-1:1996, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design.*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics.*

EN 1005-2, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery.*

EN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation.*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up.*

EN 1050:1996, *Safety of machinery - Principles for risk assessment.*

EN 1070, *Safety of machinery — Terminology.*

EN 1088, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection.*

EN 1760-2, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars.*

EN 1837, *Safety of machinery — Integral lighting of machines.*

EN 12150-1, *Glass in building — Thermally toughened soda lime silicate safety glass — Part 1: Definition and description.*

- EN 12385-4, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications.*
- EN 12385-5, *Steel wire ropes — Safety — Part 5: Stranded ropes for lifts.*
- EN 12433-1, *Industrial, commercial and garage doors and gates — Terminology - Part 1: Types of doors.*
- EN 12453, *Industrial commercial and garage doors and gates — Safety in use of power operated doors — Requirements.*
- EN 12604, *Industrial, commercial and garage doors and gates — Mechanical aspects — Requirements.*
- prEN 12624, *Industrial, commercial and garage doors and gates — Operational noise — Requirements and test methods.*
- EN 12635, *Industrial, commercial and garage doors and gates — Installation and use.*
- EN 12978, *Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods.*
- prEN 13241, *Industrial, commercial and garage doors and gates — Product standard.*
- EN 13411-2, *Terminations for steel wire ropes — Safety — Part 2: Splicing of eyes for wire rope slings.*
- prEN 13411-3, *Terminations for steel wire ropes — Safety — Part 3: Ferrules and ferrule-securing*
- prEN 13411-6, *Terminations for steel wire ropes — Safety — Part 6: Asymmetric wedge socket.*
- EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:1997).*
- EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989).*
- EN 60947-5-1:1997, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:1997).*
- EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:1999, modified).*
- EN 61000-6-3, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:1996, modified).*
- EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995).*
- EN 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2:1995).*
- EN 61496-1, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496:1997).*
- EN ISO 12543-2, *Glass in building — Laminated glass and laminated safety glass — Part 2: Laminated safety glass (ISO 12543-2:1998).*
- EN ISO 14122-1, *Safety of machinery - Permanent means of access to machinery - Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001).*
- EN ISO 14122-2, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2001).*
- EN ISO 14122-3, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001) .*

prEN ISO 14122-4, *Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders (ISO/FDIS 14122-4:2002)*.

ISO 3864, *Graphical symbols - Safety colours and safety signs*.

ISO 7000, *Graphical symbols for use on equipment - Index and synopsis*.

ISO 13050:1999, *Curvilinear toothed synchronous belt drive systems*.

IEC 61496-2, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1070 and the following apply.

3.1

automatic parking system

automatic parking equipment together with its linked ancillary equipment, e.g. main door, working area door, side door, emergency door

3.2

automatic parking equipment

power driven parking equipment for motor vehicles, which stores and retrieves motor vehicles in an automatically sequenced mode (see 5.11 and annex B). The equipment, which may include structural elements, is permanently installed

3.3

non-automatic horizontally moving parking equipment

power driven parking equipment for motor vehicles, which has a load carrier which is moved in a non-automatically sequenced mode only in the horizontal plane. The horizontal movement is either under permanent control of the user or partially automatic. The equipment is permanently installed

3.4

non-automatic vertical parking equipment

power driven parking equipment for motor vehicles, which is moved vertically exclusively or with separate horizontal movement in a non-automatically sequenced mode and has only one defined fixed access point for the load carrier. Each movement is under permanent control of the user or partially automatic. The equipment is permanently installed

3.5

ancillary equipment

3.5.1

main door

door between the access area outside an automatic parking equipment and the parking equipment itself, which is used by motor vehicles and users and passengers, to enter and exit the transfer area (see annex B)

3.5.2

working area door

door between the transfer area and the working area (see annex B)

3.5.3

side door

pedestrian door which is intended to be used by users and passengers to give access to the transfer area (see annex B)

3.5.4**service door**

pedestrian door which is intended to be used by trained personnel to give access to the working area (see annex B)

3.5.5**emergency door**

pedestrian door which is intended to be used solely for persons leaving the respective area in emergencies, e.g. fire (see annex B)

3.5.6**pass door**

part of a door leaf for pedestrians only (see EN 12433-1 and annex B)

3.6**other definitions****3.6.1****safety switch**

control switch having one or more break-contact elements coupled to the switch actuator via non-resilient members so that full contact opening of the break contact element(s) is obtained when the actuator is moved through the positive opening travel by applying the force stated by the switch manufacturer

NOTE See annex K of EN 60947-5-1:1997.

3.6.2**rated load (carrying capacity)**

maximum load per parking space that power driven parking equipment has been designed to carry

3.6.3**transfer area**

area within automatic parking equipment in which vehicles are transferred to, or taken from, to reach the working area. The transfer area is intended to allow for at least the driver to leave or to enter the vehicle (see annex B)

3.6.4**working area**

area in which the vehicle is handled. Within automatic parking equipment this area is not intended to be accessed by the user(s) (see annex B)

3.6.5**user**

person who parks and/or retrieves a vehicle, using power driven parking equipment

3.6.6**type test**

testing of a representative sample of a new design or of one which incorporates deviations from an existing design, which is conducted by or on behalf of the manufacturer or his authorised representative

3.6.7**load carrier**

part of power driven parking equipment on which a single motor vehicle is located

3.6.8**transmission element**

component through which force is transmitted from the power source to the load carrier. Transmission elements include e.g. gear boxes, hydraulic cylinders, lead screws and nuts, steel wire ropes, toothed belts and chains

3.6.9**lifting element**

transmission element through which force is transmitted to raise or lower the load carrier

3.6.10

suspension element

vertical transmission elements consisting of ropes, toothed belts and chains

3.6.11

wheel track width

distance between the centre lines of the wheels on one axle

3.6.12

wheel base

distance between the centres of wheels on the front and rear axle

3.6.13

locking device

device which prevents the load carrier from leaving a defined position

3.6.14

safety gear

mechanical device which is designed to stop and to hold the load carrier if the load carrier is overspeeding

3.6.15

parking unit

one or several load carriers connected together mechanically and move at a whole

3.6.16

parking equipment attendant

person(s) given the task of operating and/or cleaning and/or supervising power driven parking equipment

3.6.17

public use

where the power driven parking equipment is intended to be used by untrained users

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4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of equipment and which require action to eliminate or reduce the risk.

The list of significant hazards is based on EN 1050 and is using the numbering of annex A of EN 1050:1996. Also shown are the sub-clause references to the safety requirements and/or protective measures in the present standard.

Before using this standard it is important to carry out a risk assessment of the equipment to check that its significant hazards are identified in this clause.

Table 1 - List of hazards

No	Hazards	Relevant clauses of this standard
1	Mechanical hazards	
	Mechanical hazards due to machine parts or work pieces caused, for example, by:	
	— Relative location	5.8.4, 5.8.5
	— Mass and stability (potential energy of elements which may move under the effect of gravity)	5.6, 5.7.5
	— Mass and velocity (kinetic energy of elements in controlled or uncontrolled motion)	5.5.2, 5.7.5, 5.8.1, 5.8.8, 5.9.1, 5.9.2, 5.9.4, 5.11.1, 5.11.10
	— Inadequacy of mechanical strength	5.1.1, 5.5.3, 5.6, 5.11.10.2, annex 'A'
	Mechanical hazards due to accumulation of energy inside the machinery, caused for example, by:	
	— Liquids under pressure	5.4
1.1	Crushing hazard	5.2.3.1.1, 5.2.3.1.2, 5.2.3.1.4, 5.8.4, 5.8.5, 5.9.1, 5.9.3, 5.10.1, 5.11.3, 5.11.4, 5.11.5, 5.11.8, 5.11.10, 5.11.11, 5.11.12
1.2	Shearing hazard	5.7.6, 5.8.2, 5.11.3, 5.11.4, 5.11.5, 5.11.8, 5.11.10, 5.11.11, 5.11.12
1.3	Cutting or severing hazard	5.8.2, 5.11.3, 5.11.4, 5.11.5, 5.11.8, 5.11.10, 5.11.11, 5.11.12
1.4	Entanglement hazard	5.7.6, 5.11.3, 5.11.4, 5.11.5, 5.11.8, 5.11.10, 5.11.11, 5.11.12
1.5	Drawing-in or trapping hazard	5.2.3.6, 5.5.4, 5.7.6, 5.8.2, 5.8.3, 5.10.4, 5.10.6, 5.10.7, 5.11.3, 5.11.4, 5.11.5, 5.11.8, 5.11.10, 5.11.11, 5.11.12
1.6	Impact hazard	5.2.3.1.2, 5.8.1, 5.9.1, 5.11.3, 5.11.4, 5.11.5, 5.11.10, 5.11.11, 5.11.12
1.7	Stabbing or puncture hazard	5.11.10.1

continued

Table 1 (continued)

No	Hazards	Relevant clauses of this standard
1.9	High pressure fluid injection or ejection hazard	5.4
2	Electrical hazards due to:	
2.1	Contact of persons with live parts (direct contact)	5.3.1, 5.3.2, 5.3.3, 5.3.4
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	5.3.1, 5.3.3, 5.3.4
2.3	Access to live parts under high voltage	5.3.1, 5.3.2, 5.3.3, 5.3.4
2.4	Electrostatic phenomena	5.3.1, 5.3.5
3	Thermal hazards, resulting in:	
3.1	Burns and scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	Not Dealt With See 1.4d)
4	Hazards generated by noise, resulting in:	
4.1	Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness)	Not Dealt With See 1.3f) & 1.4f)
4.2	Interference with speech communication, acoustic signals, etc.	Not Dealt With See 1.3f) & 1.4f)

continued

Table 1 (continued)

No	Hazards	Relevant clauses of this standard
7	Hazards generated by materials and substances (and their constituent elements) processed or used by the machinery	
7.2	Fire or explosion hazard	Not Dealt With See 1.4d)
8	Hazards generated by neglecting ergonomic principles in machinery design as, e.g. hazards from:	
8.1	Unhealthy postures or excessive effort	Not Dealt With See Clause '1.3i)' & See Clause 'Introduction' - Negotiations
8.4	Inadequate local lighting	5.11.2, 7.1.2.2 & See Clause '1.4g)'
8.6	Human error, human behaviour	5.2.2, 5.2.3, 5.4.4, 5.8.8, 5.10.2, 5.10.5, 5.11.3, 5.11.4, 5.11.5, 5.11.7, 5.11.10, 5.11.11, 5.11.12, 5.11.13, 7.1.1, 7.1.3, 7.1.5, 7.2
8.7	Inadequate design, location or identification of manual controls	5.2.3, 5.11.13
8.8	Inadequate design or location of visual display units	5.2.3.1.2
9	Combinations of hazards	5.1.2

continued