SLOVENSKI STANDARD
SIST EN 13367:2005+A1:2008

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Stroji za keramiko - Varnost - Prenosne mize in vozila

Ceramic machines - Safety - Transfer platforms and cars

Keramikmaschinen - Sicherheit - Schiebebühnen und Wagen

Machines de la céramique - Sécurité - Chariots et wagons de transfert

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Ceramic machines - Safety - Transfer platforms and cars

Machines de la céramique - Sécurité - Chariots et wagons de transfert

Keramikmaschinen - Sicherheit - Schiebebühnen und Wagen

This European Standard was approved by CEN on 14 February 2005 and includes Amendment 1 approved by CEN on 25 August 2008.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 13367:2005+A1:2008) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines — Safety”, 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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-08-25.

This document supersedes EN 13367:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1〉 〈A1].

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).

[A1〉 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. 〈A1]

This European Standard 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, Bulgaria, 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

This European Standard is a type C standard as stated in EN ISO 12100-1:2003.

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

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 the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

When compiling this European Standard it was assumed that:

— negotiations occur between the manufacturer and the user concerning especially the building components in relation to:

  — static;

  — sufficient free space (minimum gap) between vehicles and fixed parts of the building and between cars on adjoining rails;

  — laying of tracks;

  — local separation of the area of process related transport on rails and the machinery and equipment connected with it, e.g. for setting, dehacking, drying, burning, from other work stations and intended traffic routes;

— hazards of crushing between moving cars and fixed parts of machines for setting and loading or dehacking or unloading are covered by the preventive measures at these machines;

— the place of use is adequately lit;

— the existing ad hoc standards for components are applied;

— components without specific requirements are designed in accordance with usual engineering practice and calculation codes;

— components are kept in good repair and working order, so that the required characteristic remain despite wear;

— specifications have been met about interface with machinery and equipment connected with the process related transport with transfer platforms and cars such as kilns, dryers, machinery for setting, loading, dehacking, unloading;

— the design and working mode exclude an overload of cars.

1 Scope

1.1 This European Standard applies for the design, installation and commissioning of transfer platforms and cars and ancillary devices for the process related transport of ceramic material on rails. The rails, which are considered to be horizontal and the movement of vehicles in equipment and machinery connected with the process related transport such as kilns, dryers, collector scaffolds, machinery for loading and unloading are also covered.

1.2 This European Standard deals with all significant hazards, hazardous situations and events relevant to transfer platforms and cars, when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4). Noise is not a significant hazard. This document deals with the preventive measures to minimise these hazards which can arise during commissioning, the operation and maintenance.

1.3 This European Standard is not applicable to:

1.3.1 Kilns and dryers (see EN 746-1:1997), machinery for setting and dehacking of heavy clay and refractory, products and machinery for loading and unloading of fine clay tiles;

1.3.2 Retrial, packaging and storage of finished products;

1.3.3 Transport of cars with not rail mounted equipment e.g. with driverless trucks (see EN 1525:1997);

1.3.4 Transfer platforms and cars which are driven by human power.

1.4 This European Standard is not applicable to transfer platforms and cars and ancillary devices which are manufactured before the date of publication of this European Standard by CEN.

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 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 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 999:1998, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*

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

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1760-2:2001, *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 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:1997)*

EN 61496-1:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

prEN 61496-2:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:1997)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

3.1
cars
rail mounted vehicles e.g. drying cars, kiln cars, finger cars, container cars, frame cars for accumulating (see Annex A (informative))

3.2
transfer platform
rail mounted vehicle for the movement of cars transverse to direction of their tracks (see Annex A (informative))

NOTE The term vehicle comprises cars and transfer platforms.

3.3
ancillary devices
equipment which is an essential part of a system of transfer platforms and cars such as pushing or pulling devices for cars, turntables, limit switches and their supports, brakes for cars without own drive

3.4
pushing or pulling devices
means for power driven movement of cars without own drive by applying the moving force from outside e.g. by guided trolleys with catches. The drive is realised e.g. by ropes of motor driven winches, hydraulic cylinders, motor driven frictional wheels

3.5
turntables
means to rotate cars around a vertical axis

3.6
process related transport
movement of transfer platforms and cars in the course of different process operations of ceramic material such as drying, firing; accumulating is included

3.7
fixed parts
objects able to produce high reaction force such as supporting pillars, cars on adjacent tracks

3.8
fixed low parts
fixed parts, e.g. ancillary devices, not higher than 250 mm above floor level

3.9
mechanical stop
structural or special component generally at the end of tracks for a rigid halt of vehicles

3.10
shock absorbers
mechanical equipment at the end of tracks, which allows damped stops by turning kinetic energy into heat

3.11
working area
zone as intended by the manufacturer with machines and equipment within the scope of this document where persons are for normal operation also of machinery and equipment connected with the process related transport on rails; inspection, maintenance, sampling and cleaning are excluded

3.12
traffic area
zone with machinery and equipment within the scope of this document accessible by everyone without opening a guard, activating a trip device or without using additional auxiliary means, such as movable ladders. Traffic area includes the working area

3.13
operating control station
place where manual controls (actuators) are installed to enable persons to perform the movements necessary for the usual working process

3.14
maintenance control station
place where manual controls (actuators) are installed for automatically controlled machinery and plants to enable persons to perform necessary single movements for servicing, adjustment and dejamming

3.15
plant
transport system with rail mounted transfer platforms and cars for a distinct ceramic process such as drying on cars in tunnel dryers, drying in chamber dryers and charging with finger cars, firing on kiln cars in tunnel kilns

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 machinery and which require action to eliminate or reduce the risk.

Table 1 — List of significant hazards

Clause	Hazards	Danger zone/Dangerous item	Preventive measures see clause
4.1	**mechanical**		
4.1.1	crushing of the body	between moving cars (and their loads) and fixed adjacent parts; fixed parts: cars on adjacent tracks, building components, parts of equipment and machinery connected with the process related transport e.g. inlets of kilns and dryers between moving transfer platforms with or without (loaded) cars and fixed adjacent parts such as structures, kilns, cars on their respective tracks	5.3.1; 5.4.2; 5.5.3; 5.5.6; 7.2.5; 7.2.6; 7.2.8
4.1.2	crushing and impact	between the front of cars (and their loads), the front of transfer platforms with or without cars (and their loads) and (low) fixed parts; fixed parts: e.g. walls, stationary or slower travelling cars on the same track; low fixed parts e.g.: brakes, centring devices, the floor with rail itself; (impact) by the front of cars or of transfer platforms (with their loads)	5.3.8.2 to 5.3.8.4; 5.4.1.3; 5.4.1.4; 5.4.1.7; 5.4.2; 5.5.3; 7.2.6; 7.2.11; 7.2.12
4.1.3	crushing of the body	between finger cars rotating by turntables on transfer platforms and fixed parts of the platform, e.g. consoles (cabins)	5.3.1.3; 5.3.8.2 to 5.3.8.5; 5.4.2; 5.5.3; 5.5.6; 7.2.9

Table 1 (*concluded*)

Clause	Hazards	Danger zone/Dangerous item	Preventive measures see clause
4.1.4	crushing of the lower limbs	between moving cars, transfer platforms, pushing or pulling devices and adjacent low fixed parts, e.g. position detectors, rail ends in front of transfer platform driving ways	5.3.3; 5.3.6; 5.4.2; 5.5.3; 5.5.6
4.1.5	crushing of the lower limbs	between the fronts of pushing or pulling devices, the construction of transfer platforms and the floor with rails	5.3.4; 5.4.1.5; 5.4.2; 5.5.3; 5.5.6; 7.1.12
4.1.6	crushing, roll over of feet	rails/wheels of cars, transfer platforms, pushing or pulling devices	5.2.10; 5.3.5
4.1.7	drawing - in	loose coils of ropes; rope take-up on winch drums, deflection and return pulleys	5.2.7; 5.2.8
4.1.8	trapping	finger cars with ride on drivers in chamber dryers; automatically moved cars in confined space	5.3.8.8; 5.4.1.6; 5.4.2; 5.5.3; 5.5.6; 7.2.1.3
4.2	**electrical**	direct contact of conductor wires or of cables with damaged insulation	5.2.5; 5.2.6; 7.2.16
4.3	**by neglecting ergonomic principles**		
4.3.1	inadequate local lighting	chamber dryers	5.2.4
4.3.2	inadequate design and location of manual controls (actuators)	missing view over danger zones; dangerous position	5.3.8.3; 5.5.4.1; 5.5.4.2
4.4	**unexpected start-up, overrun – malfunction by:**		
4.4.1	failure, disorder of the control system	overrun by: hold-to run device, which fails to deliver a stop command when released by failure of limiting devices; non release of contactors; start-up: all machinery or parts of it	5.5.1; 5.3.9; 5.5.2; 5.5.7; 7.2.4; 7.2.15; 7.2.16
4.4.2	external influences	local changes in rail gradient, kinetic energy of the car or induced by other cars	5.2.2; 5.3.9; 7.2.4
4.4.3	errors made by the operator due to human behaviour	misuse by untrained persons; erroneous start of machinery; manipulation	5.2.5; 5.3.8.5; 5.3.8.6; 5.3.9, 5.5.1; 5.5.3.6; 5.5.6; 7.2.4; 7.2.10; 7.2.15; 7.2.16
4.5	**impossibility of stopping the machine in the best possible conditions**	braking, emergency stop, failure of operational stop	5.2.1; 5.5.2; 5.5.5, 7.2.9
4.6	**break-up during operation**	ropes, transfer platforms and cars	5.2.7; 5.2.9; 7.2.7
4.7	**falling objects**	load of finger cars, unstable load on cars	5.3.8.7; 5.3.10; 7.2.3
4.8	**overturning of machinery**	finger cars	5.2.3
4.9	**slip, trip, fall of persons**		
4.9.1	trip of persons	parts protruding the floor such as tracks, pushing or pulling devices, limit switches	5.3.2; 5.3.7
4.9.2	fall of persons	operating stations on transfer platforms	5.3.8.9

5 Safety requirements and/or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of Clause 5.

In addition, transfer platforms, cars and ancillary devices shall be designed according to the principles of both parts of EN ISO 12100 for hazards relevant but not significant which are not dealt with by this document (e.g. sharp edges).

For applications of EN 418:1992, EN 954-1:1996, EN 982:1996, EN 999:1998, EN 1037:1995, EN 1088:1995, EN 60204-1:1997 and due to complexity and variety of machinery covered, the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary.

NOTE This specific risk assessment is part of the general risk assessment relating to the hazards not covered by this type C standard.

5.2 General requirements

5.2.1 Mechanical brakes

Transfer platforms and cars with own drive, e.g. finger cars, shall be equipped with mechanical brakes to be able to be stopped and hold (immobilised) at any time even if there is a failure of the power supply. When transfer platforms and cars with own drive are controlled in the automatic mode, devices to brake and hold shall be self-acting, when the power supply fails.

5.2.2 Devices against unintended movement

Devices shall be installed, which brake or stop unintended movement of cars without own drive caused by kinetic energy or by local falling gradient of the track:

— at rail ends in front of transfer platforms driving ways;

— where trip devices (see e.g. 5.3.1.2) or hold-to-run control devices (see 5.3.1.3) are provided to interrupt dangerous movements of cars at crushing points;

— in the working area of permanent setting and/or unloading stations, at which persons stand on the floor;

— on transfer platforms.

Suitable devices are for example:

— brakes acting permanently from outside on the cars;

— back run mechanisms on tracks where cars are moved only in one direction.

Devices operating in the positive mode shall be (additionally) installed:

— for immobilising finger cars with ride on drivers on transfer platforms (see 5.2.9.3), e.g. by self acting bolts;

— to prevent cars, which move in elevated position from running off from rail ends in front of transfer platform driving ways in multi level buffers, e.g. by self acting mechanical stops, which are only retracted by positive operation by means of the transfer platform, when the latter is correctly positioned to the respective track.

NOTE For immobilising cars in variable areas, where people stand on the floor for setting/unloading see 5.3.9.