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Machines for the manufacture of constructional products from concrete and calcium-silicate - Safety - Part 3: Slide and turntable machines

Maschinen für die Herstellung von Bauprodukten aus Beton und Kalksandsteinmassen - Sicherheit - Teil 3: Drehtischmaschinen

Machines pour la fabrication de produits de construction en béton et silico-calcaire - Sécurité - Partie 3: Machines à table coulissante et tournante

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English version

Machines for the manufacture of constructional products from
concrete and calcium-silicate - Safety - Part 3: Slide and
turntable machines

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table coulissante et tournante

Maschinen für die Herstellung von Bauprodukten aus Beton
und Kalksandsteinmassen - Sicherheit - Teil 3:
Drehtischmaschinen

This European Standard was approved by CEN on 1 November 2002.

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 Management Centre 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 12629-3:2002) 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of an identical text or by endorsement, at the latest by June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

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 EC Directive(s).

For relationship with EC Directive(s), see informative annex ZA, which is an integral part of this document.

The series "Machines for the manufacture of constructional products from concrete and calcium-silicate - Safety" consists of following Parts :

- Part 1 : Common requirements
- Part 2 : Block making machines
- Part 3 : Slide and turntable machines
- Part 4 : Concrete roof tile making machines
- Part 5.1 : Concrete pipe machines manufacturing in the vertical axis.
- Part 5.2 : Concrete pipe machines manufacturing in the horizontal axis
- Part 5.3 : Pipe prestressing machines
- Part 5.4 : Concrete pipe coating machines
- Part 6 : Stationary and mobile equipment for the manufacture of precast reinforced products
- Part 7 : Stationary and mobile equipment for the benched manufacture of prestressed products
- Part 8 : Machines and equipment for the manufacture of constructional products from calcium silicate (and concrete)

Annexes A to H are informative.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is a Type C-standard in the structure as stated 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 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.

Reference to pertinent standards mentioned above is made where requirements of such standards are relevant.

1 Scope

1.1 This European Standard applies to machines for the manufacture of constructional products of calcium silicate or concrete, where the mould(s) is (are) mounted on a turning or slide moving table. The motive power for compressing the mixture is effected either mechanically (annexes A, B), or hydraulically (annexes C and D).

1.2 This European Standard deals with the hazards listed in clause 4 of machines for the manufacture of constructional products from concrete and calcium silicate, when used as intended under the conditions foreseen by the manufacturer. This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

1.3 This European Standard applies to the machines from the point at which the mixture enters the machine (see point 1 of annexes A, B, C, D) and the point where the pallets for concrete products are brought to the assembly (see point 8 at annexes C and D) until the point where the green products are removed from the machine to the curing system (see point 2 of annexes A, B, C, D).

1.4 This European standard does not cover those requirements for reducing hazards from mechanical, electrical, pneumatic, hydraulic or other equipment or machinery that are dealt with in standards for their common use (Type A, B1 and B2 standards).

1.5 This European Standard deals with the hazards listed in clause 4 which can arise during the operation and maintenance, including the interfaces, of the slide and turntable machines, when carried out in accordance with the specifications given by the manufacturer or his authorised representative, except noise hazards. ¹⁾

NOTE Amendment is under preparation to deal with noise, in particular for measures to reduce noise at source and a noise test code including noise declaration.

This standard establishes safety requirements and/or methods of protection which apply to these machines.

1.6 The provisions stated in this standard assume that all operators have been adequately informed and trained.

1) Until a noise test code (dealing with the measurement and declaration of noise emission values) specific to the machines covered by this part is available to complement the requirements of 5.7.2 and 7.4.2 of EN 12629-1:2000, it cannot be considered that noise hazards are covered.

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 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

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

EN 1070:1998, *Safety of machinery — Terminology.*

EN 12629-1:2000, *Machines for the manufacture of constructional products from concrete and calcium-silicate — Safety — Part 1: Common requirements.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1070:1998 apply.

Additional definitions found in EN 12629-1:2000 and those given below also apply to this standard.

For additional information, see also annexes A, B, C and D.

3.1 table

movable part of the machine in which the mould is fixed, recirculating mould machines (turntable) or forwards-backwards (slide table)

3.2 ram

movable part of the machine which brings the compression force to the mixture in the mould

3.3 transmission levers

those parts of the machine that convert rotary motive power into reciprocal movement through gears and cams

3.4 take off device

integral part of the machine, that takes off the formed products (green) and puts them on a green product collection system or arranges them into formation for removal from the machine

3.5 green product collection system

integral transport system which is part of the machine that carries the green product from the take off device to the stacking equipment, or to the point where the green product is removed from the machine

3.6 stacking equipment

transport system which is an integral part of the machine that takes the green products from either the green product collection system or the take off device and arranges them into formation for removal from the machine

3.7 drawing box

container having the shape of a box with an open or movable bottom. The drawing box fills the mould with the mixture

**3.8
feed hopper**

device, only used with concrete product machines, that contains the mixture which is transported to the drawbox or mould by a discharge gate

**3.9
front mix dosing installation**

device that doses the plastic or fluid face into the mould before the drawbox fills the back mix. It is only required when producing two layer concrete slabs

**3.10
brick wagon pusher**

transport system which is an integral part of the machine which pushes the brick wagons from one position to the other within the area of the stacking equipment. It is only used at machines producing calcium-silicate products

**3.11
pallet pusher**

transport system which is an integral part of the assembly of the machine which pushes the pallets from one position to another or direct to the area where the take off device arranges the formed products into formation on the pallets. It is only used at machines producing concrete products

**3.12
pallet feeding unit**

device only used with concrete product producing machines, which automatically supplies pallets or plates to the pallet pusher or to the take off device from a store in the immediate proximity of the machine

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4 List of significant hazards

This clause contains all hazards, as far as they are dealt with in this European Standard, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce risk.

Before using this standard, it is important for the manufacturer to carry out a risk assessment of the machine to check that it has the hazards identified in this clause.

4.1 Mechanical hazards (see informative annexes E, F, G, H)

Annexes E, F, G and H (informative) illustrate examples of common machine types.

In accordance with clause 5 of EN 12629-1:2000 the hazard zones, marked 1-12 at annexes A to D of this standard, are described in the following table (see also 4.1.1 to 4.1.8 for detailed mechanical hazards).

Table 1 — Mechanical hazards and hazard zones

Hazard zones	Hazard	See subclause 4
1	Crushing	4.1.1
2	Shearing Cutting-severing	4.1.2 4.1.3
3	Shearing Cutting-severing Drawing-in or trapping	4.1.2 4.1.3 4.1.5
4	Crushing Shearing Cutting-severing Drawing-in or trapping	4.1.1 4.1.2 4.1.3 4.1.5
5	Entanglement hazards	4.1.4
6	Crushing Drawing-in or trapping Impact	4.1.1 4.1.5 4.1.6
7	Shearing Cutting or severing Entanglement Drawing-in or trapping	4.1.2 4.1.3 4.1.4 4.1.5
8	Cutting or severing Drawing-in or trapping	4.1.3 4.1.5
9	Cutting or severing	4.1.3
10	Cutting or severing	4.1.3
11	Crushing Shearing Cutting or severing	4.1.1 4.1.2 4.1.3
12	Shearing Entanglement Drawing in or trapping	4.1.2 4.1.4 4.1.5
Equipment	High pressure	4.1.7
Floor	Slip, trip or fall	4.1.8
Around the machine	Vibration	4.3

4.1.1 Crushing hazards

Between the ram and the innermould (see hazard zone 1, annexes E, F, G, H).

Beneath descending stacking equipment (see hazard zone 4, annexes E, F).

Between moving pallets and fixed structure (see hazard zone 11, annexes G, H).

Between transmission levers and fixed parts. (see hazard zone 6, annexes E, F, G, H).

4.1.2 Shearing hazards

Between the inner mould and the outside mould (see hazard zone 2, annexes E, F, G, H).

Between the take off device and other machine parts (see hazard zone 3, annexes E, F, G, H).

The whole area where the stacking equipment is moving (see hazard zone 4, annexes E, F).

Between fixed and movable parts of the pallet feeding unit or fixed and movable parts of the pallet pusher. (see hazard zone 11, annexes G, H).

All moving parts of power transmission (see hazard zone 7, annexes E, F, G, H).

Between fixed parts of the front mix dosing installation and the moving table (see hazard zone 12, annex G).

4.1.3 Cutting or severing hazards

See 4.1.2 and, for example, hazard zones 2, 3, 4 and 8, annexes E, F, G, and H.

The part of the machine where the table moves (see hazard zone 8, annexes E, F, G, and H).

Between the moving drawing box and edge of the mould (see hazard zone 9, annexes G and H).

Between fixed and movable parts of the pallet feeding unit or the pallet pusher and descending pallets (see hazard zone 11, annexes G, H).

Between fixed parts of the feed hopper with dosing installation and the moving discharge gate (see hazards zone 9, annexes G, H).

In the area where the brick wagons are moving between the brick wagon pusher and fixed parts of the assembly. (see hazard zone 10, annexes E, F).

All moving parts of power transmission (see hazard zone 7, annexes E, F, G, H).

4.1.4 Entanglement hazards

The area around the stirrer, near the front mix dosing installation (see hazard zone 12, annex G).

The area where the mixture is forced into the mould(s) (see hazard zone 5, annexes E, F).

All moving parts of power transmission (see hazard zone 7, annexes E, F, G, H).

4.1.5 Drawing-in or trapping hazards

The area where the stirrers of the front mix dosing installation are turning (see hazard zone 12, annex G).

The area where the table moves (see hazard zone 8, annexes E, F, G, H).

The area where the drawing box and/or feed hopper moves (see hazard zone 6, annexes G, H).

The area where the take off device reciprocates (see hazard zone 3, annexes E, F, G, H).

The area where the stacking equipment moves (see hazard zone 4, annexes E, F).

4.1.6 Impact hazards

The area where the transmission levers driving the machine parts are moving (see hazard zone 6, annexes E, F, G, H).

4.1.7 High pressure injection hazard

Hydraulic and pneumatic equipment of the machine.

4.1.8 Slip, trip or fall hazard

The floor in or surrounding the assembly manufacturing concrete products.

4.2 Electrical hazards

Installation and equipment of the machine.

4.3 Hazards generated by vibration

The whole area on or around the machine.

4.4 Hazards generated by materials and products

By contact with wet concrete that can cause skin injury or allergic including dermatitis.

By inhalation of oil spray and contact with oil from product mould release agent.

4.5 Hazards generated by neglecting ergonomic principles

From the lack of the integration of automatic handling which leads to manual handling injury. See EN 12629-1.

4.6 Hazards caused by the failure of energy supply

Failure of energy supply could lead to machine parts moving to settled position.

Failure of energy supply may lead to dropping of products from the take off device or stacking equipment.

5 Safety requirements and/or measures

Machinery conforming to this standard shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN 292 for hazards relevant but not significant, which are not dealt with by this document (e.g. sharp edges).

NOTE For hazards which are to be reduced by the application of an A or B-level standard such as EN 294, EN 418, EN 60204-1, and for hydraulic, pneumatic or other machinery dealt with in standards for common uses, the manufacturer should carry out a risk assessment to establish the requirements of the A or B-level or other standard which are to be applied. This specific risk assessment should be part of the general risk assessment of the machine.

For the safety requirements, see clause 5 EN 12629-1:2000.

Where it is known that the installation site already contains elements that can be considered as risk reduction means, the design of the machine may take these elements into consideration (see also clause 7).

5.1 The hazard zones marked 1 to 12 in annexes E, F, G, and H shall be equipped with measures specified in clauses of EN 12629-1:2000 as shown in Table 2 of this standard.