SLOVENSKI STANDARD
SIST EN 1374:2001

01-december-2001

Kmetijski stroji - Vgrajeni odjemalniki za okrogle silose - Varnost

Agricultural machinery - Silos stationary unloaders for round silos - Safety

Landmaschinen - Stationäre Entnahmegeräte für Rundsilos - Sicherheit

Matériel agricole - Désileuses stationnaires pour silos cylindriques - Sécurité

Ta slovenski standard je istoveten z: EN 1374:2000

ICS:

65.040.20	Poslopja in naprave za predelavo in skladiščenje kmetijskih pridelkov	Buildings and installations for processing and storage of agricultural produce

SIST EN 1374:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1374

June 2000

ICS 65.040.20

English version

Agricultural machinery - Silos stationary unloaders for round silos - Safety

Matériel agricole - Désileuses stationnaires pour silos cylindriques - Sécurité

Landmaschinen - Stationäre Entnahmegeräte für Rundsilos - Sicherheit

This European Standard was approved by CEN on 9 April 2000.

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.

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

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

Ref. No. EN 1374:2000 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry", 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of an identical text or by endorsement, at the latest by December 2000, and conflicting national standards shall be withdrawn at the latest by December 2000.

This European Standard 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 Annex ZA, which is an integral part of this standard.

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.

Annex A is normative and contains the "List of hazards". Annex B is informative.

Introduction

The extent to which hazards are covered is indicated in the scope of this standard. Silo unloaders shall comply as appropriate with EN 292 for hazards which are not covered by this standard.

1 Scope

This European Standard specifies safety requirements for the design and construction of unloaders mounted in stationary round silos for the removal of the silage and similar materials. It applies to electrically powered, slowly rotating unloaders which operate on top surface of the stored silage surface.

It describes methods for the elimination or reduction of hazards for which specific requirements on unloaders, as defined in 3 and shown in Annex B, are necessary. In addition, it specifies the type of information to be provided by the manufacturer on safe working practices.

The standard only deals with the hazards generated by the silo unloader and not with those of the silo system itself (e.g. hazards arising from generated gases).

The standard does not deal with technical requirements for installation or removal of the unloader from one silo to another.

The list of significant hazards dealt with in this standard is given in annex A. Annex A also indicates the hazards which have not been dealt with.

The environmental aspects have not been considered in this standard.

This standard applies primarily to machines which are manufactured after the date of issue of this standard.

NOTE Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres can be applicable to the type of machine or equipment covered by this European Standard. The present standard is not intended to provide means of complying with the essential health and safety requirements of Directive 94/9/EC.

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.

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

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 distances to prevent danger zones being reached by the upper limbs.*

EN 418, *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 1088:1995, *Safety of machinery-Interlocking devices associated with guards - Principles for design and selection.*

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989).*

EN 60947-4-1:1992, *Low-voltage switchgear and controlgear - Part 4 : Contactors and motor-starters - Section 1 : Electromechanical contactors and motor-starters (IEC 60947-4-1 : 1990).*

EN 60947-5-1:1997, *Low-voltage switchgear and controlgear - Part 5-1 : Control circuit devices and switching elements - Section 1 : Electromechanical control circuit devices (IEC 60947-5-1 : 1997).*

EN 1553:1999, *Agricultural machinery - Agricultural self-propelled, mounted, semi-mounted and trailed machines – Common safety requirements.*

HD 22.4 S 3:1995, *Rubber insulated cables of rated voltages up to and including 450/750 V - Part 4 : Cords and flexible cables (IEC 60245-4:1994).*

IEC 60364-7-705:1984, *Electrical installations of buildings - Part 7 : Requirements for special installations or locations - Section 705: Electrical installations of agricultural and horticultural premises.*

3 Terms and definitions

For the purposes of this standard the terms and definitions given in EN 292-1:1991 and EN 292-2:1991 apply together with the following:

3.1
silo unloader
machine for unloading silage from inside of a stationary silo of essentially circular cross-section. It is set upon the surface of the silage, whereby the silage cutting tools rotate around a vertical axis during extraction of the silage e.g. by chain or screw conveyors. The cut silage is removed from the silo by a blower. The rotational rate is max. 5°/ s (See Annex B for examples of such machines).

NOTE The cut silage is handled simultaneously out of the silo. Silo unloaders can also be used to distribute the silage during filling the silo.

3.2
cutting arm
part of the unloader carrying the silage cutting tools

3.3
drive roller
powered roller which drives on the silage top surface making the cutting arm rotate around the vertical axis of the silo

3.4
silage cutting tool
cutting tool attached to a chain or a screw conveyor for cutting and extracting the silage

3.5
slipring connection
device for continuously maintaining electrical connections between the moving cutting arm and the non-rotating part of the silo unloader

4 Mechanical safety requirements

4.1 General

The machinery shall comply as appropriate with EN 292 for hazards which are not dealt with and especially with Annex A of EN 292-2:1991/A.1:1995 when EN 292 does not give precise requirements.

Unless otherwise specified in this standard, the unloader shall comply with the requirements of tables 1, 3, 4 and 6 of EN 294 : 1992.

4.2 Protection against hazards generated by silage cutting tools and drive roller*s*

The total overall length of the silage cutting tools forming the cutting arm shall be guarded at the front, at the back and from above (see Figure 1a). The vertical distance between the lower edge of the front and back guards and the lower edge of the silage cutting tools shall be a maximum of 125 mm, and the horizontal distance between the periphery of the silage cutting tools and the front and back guards shall be a minimum of 200 mm.

The guard shall be radially adjustable so that a gap of no more than 60 mm is left between the end of the guard and to the surface of the inner wall of the silo (see Figure B.1).

In addition, at the rear of the cutting arm a deterring/impeding device (see 3.24 in EN 292-1 : 1991) shall be located at a maximum height of 400 mm above the silage top surface, and a horizontal distance of not less than 300 mm from the periphery of the silage cutting tools.

The guard at the rear of the unloader may be modified to include a hinged flap that rests on the cut surface of the silage (see Figure 1 b).

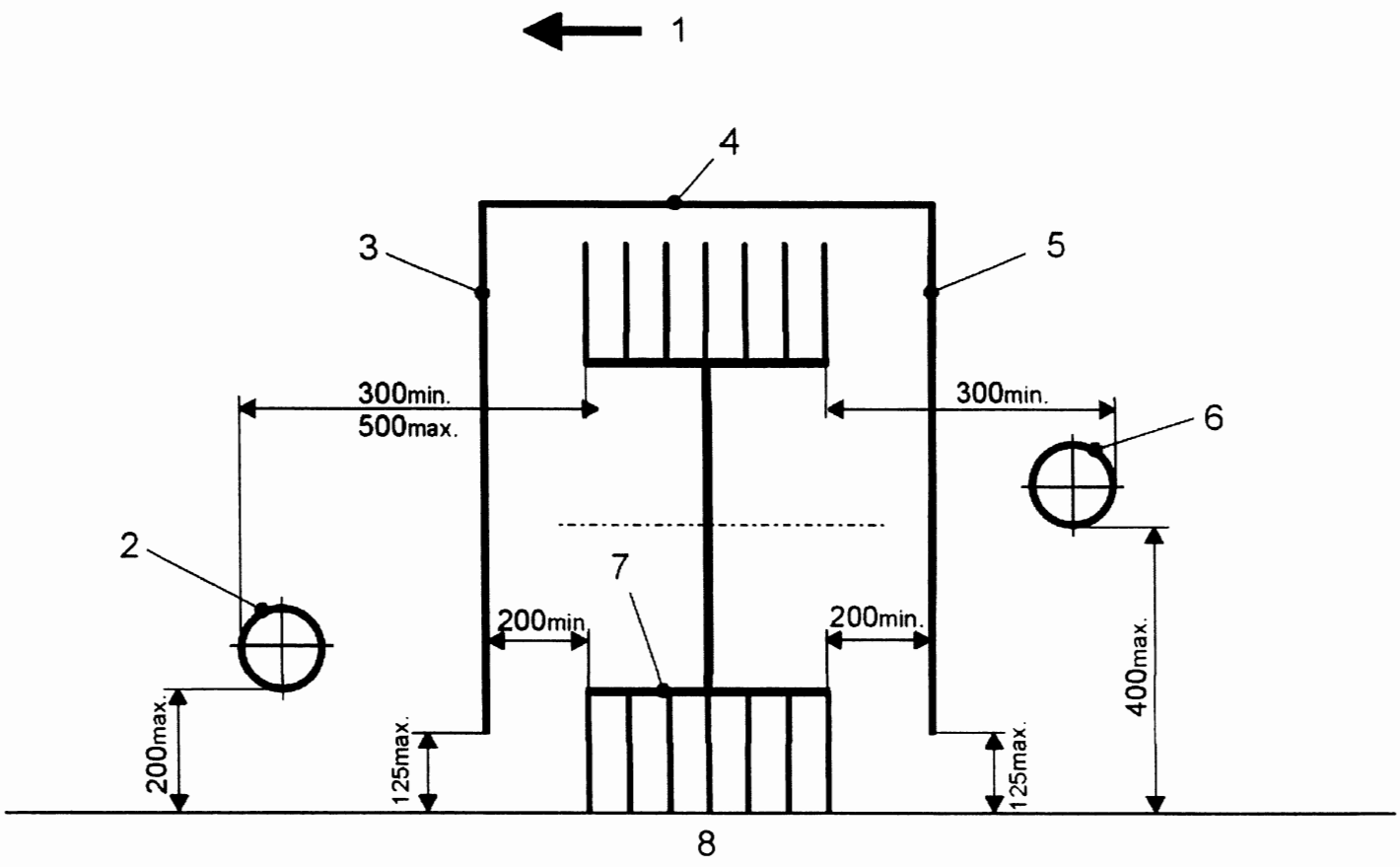
A trip device (see 3.23.5 of EN 292-1 : 1991), extending the full width of the cutting arm shall be located in front (relative to the normal direction of working) of each cutting arm and drive roller to prevent overrunning of persons. Rotation shall stop within 1° /s after activation of the trip device.

This device shall be mounted at a maximum height of 200 mm above the lower edge of the silage cutting tools and at a horizontal distance of between 300 mm and 500 mm in front of the leading edge of the silage cutting tools and drive roller.

The trip device on the drive roller shall be located in accordance with Figure 2.

Guards and trip devices shall withstand horizontal forces of 600 N and vertical forces of 900 N. The test method should be in accordance with Annex B of EN 1553:1999.

Dimensions in millimetres

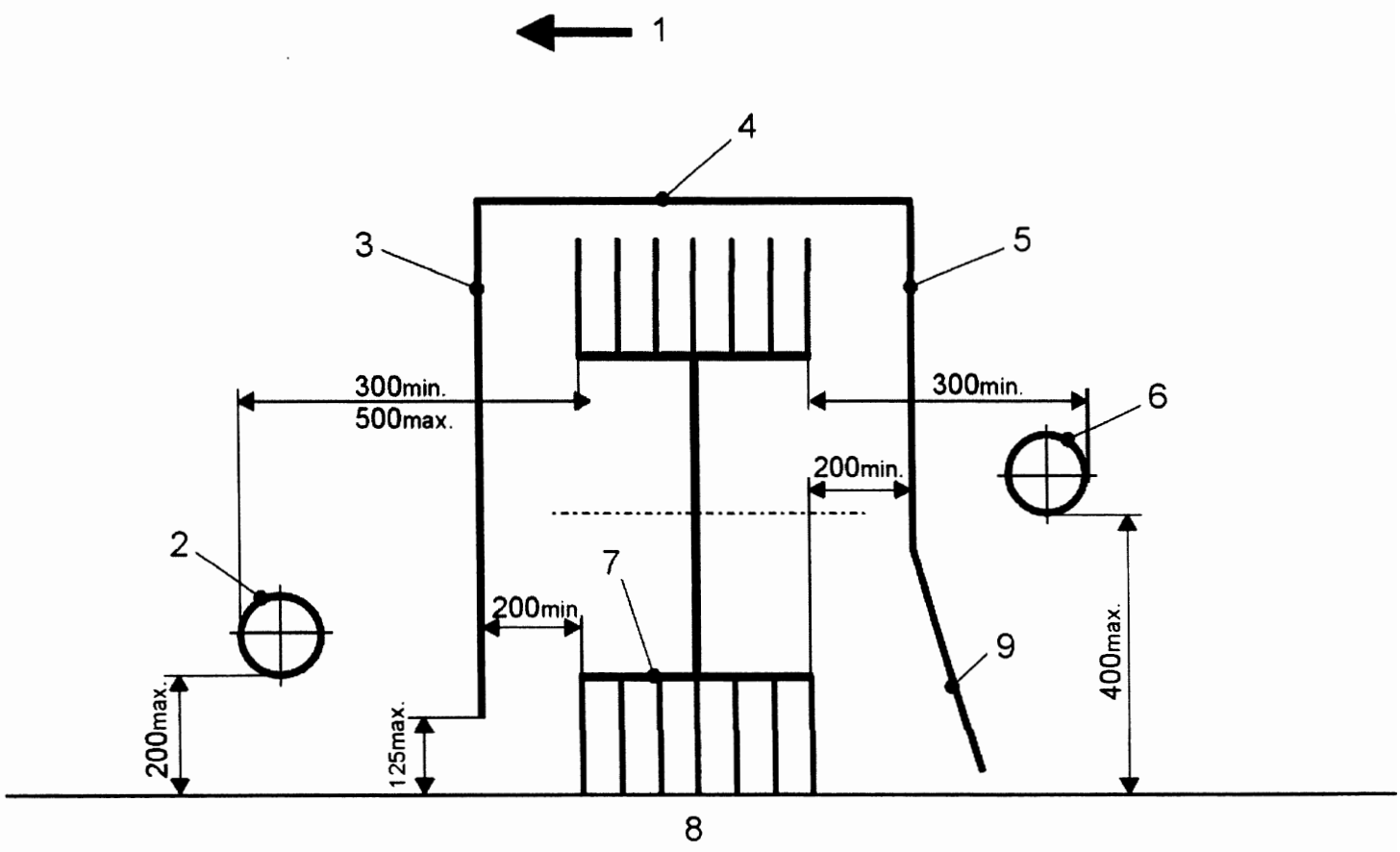


Key

1	Working direction	5	Back guard
2	Trip device	6	Deterring/Impeding device
3	Front guard	7	Cutting tool
4	Guard, topside	8	Silage

Figure 1 a — Protection of silage cutting tools with deterring device

Dimensions in millimetres



Key

1	Working direction	6	Deterring/Impeding device
2	Trip device	7	Cutting tool
3	Front guard	8	Silage
4	Guard, topside	9	Flap
5	Back guard		

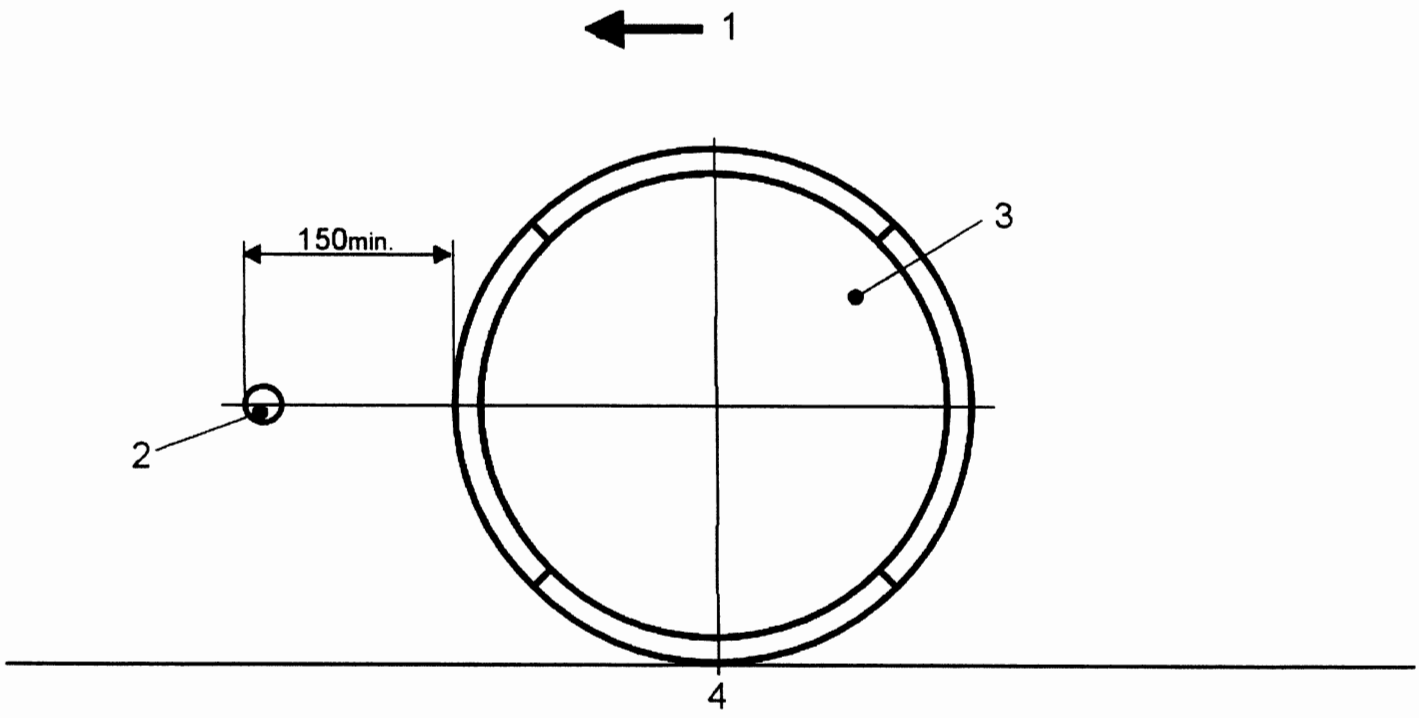
Figure 1 b — Protection of silage cutting tools with hinged flap

If the non-rotating part of the unloader is supported by fixed arms at the inner wall of the silo the following provisions shall be made to prevent of crushing (see Figure 3) :

— a distance between the fixed arms and the top of the rotating cutting arm of at least 500 mm; and

— a free passage height of the fixed arms above the lower edge of the tools of at least 1 250 mm.

Dimensions in millimetres



Key

1 Working direction
2 Trip device
3 Drive roller
4 Silage

Figure 2 — Protection of drive roller