SLOVENSKI STANDARD
SIST EN 703:2004

01-september-2004

Nadomeġ a:
SIST EN 703:1996

Kmetijski stroji - Stroji za nalaganje, mešanje oziroma rezanje ter raztros silaže - Varnost

Agricultural machinery - Silage loading, mixing and/or chopping and distributing machines - Safety

Landmaschinen - Maschinen zum Laden, Mischen und/oder Zerkleinern und Verteilen von Silage - Sicherheit

Matériel agricole - Désileuses chargeuses, mélangeuses et/ou hacheuses et distributrices - Sécurité

Ta slovenski standard je istoveten z: **EN 703:2004**

ICS:

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

SIST EN 703:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 703

May 2004

ICS 65.060.99

Supersedes EN 703:1995

English version

Agricultural machinery - Silage loading, mixing and/or chopping and distributing machines - Safety

Matériel agricole - Désileuses chargeuses, mélangeuses et/ou hacheuses et distributrices - Sécurité

Landmaschinen - Maschinen zum Laden, Mischen und/oder Zerkleinern und Verteilen von Silage - Sicherheit

This European Standard was approved by CEN on 2 February 2004.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

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

Ref. No. EN 703:2004: E

Contents

page

Foreword

This document (EN 703:2004) 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 November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

This document supersedes EN 703:1995.

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 Directives, see informative annex ZA, which is an integral part of this document.

Annex A is informative and gives examples of machines and components.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

This document is a type C standard 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 document. These hazards are specific to machines for loading (including silage cutting), mixing and/or chopping and distributing silage.

Significant hazards that are common to all the agricultural machines (self-propelled, mounted, semi-mounted and trailed) are dealt with in EN 1553.

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.

1 Scope

This document, used together with EN 1553, specifies the safety requirements and their verification for the design and construction of mounted, semi-mounted, trailed or self-propelled machines that have a combination of two or more of the following functions: loading, mixing, chopping and distributing silage and/or other feedstuffs, to be used by one operator only. It includes those fitted with a built-in loading crane. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

This document applies only to machines that have the following functional combinations:

— mixing and distributing functions; or

— mixing, chopping and distributing functions; or

— loading, mixing and distributing functions; or

— loading, mixing, chopping and distributing functions; or

— chopping and distributing functions; or

— loading, chopping and distributing functions.

Silage block cutters, even if they carry out a single function, are covered by this document.

It does not apply:

— to machines which pick up green fodder directly from the field;

— to loading cranes;

— to silage buckets.

NOTE 1 Loading cranes are dealt with in EN 12999.

NOTE 2 Silage buckets will be dealt through an amendment or during next revision.

This document deals with all the significant hazards, hazardous situations and events relevant to machines for loading, mixing and/or chopping and distributing silage and/or other feedstuffs, when they are used as intended and under the conditions foreseen by the manufacturer as listed in clause 4, except for the hazards arising from:

— failure of the control circuit;

— inadequate seating;

— inadequate lighting;

— impossibility of stopping the machine in the best possible conditions;

— travelling of machinery;

— break-up of parts rotating at high speed.

It is not applicable to environmental hazards (except noise).

This document is not applicable to machines for loading, mixing and/or chopping and distributing silage and/or other feedstuffs which are 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 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).*

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

EN 1070, *Safety of machinery – Terminology.*

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

EN ISO 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry – Seat index point (ISO 5353:1995).*

EN ISO 11688-1, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning (ISO/TR 11688-1:1995).*

3 Terms and definitions

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

NOTE Examples of machines and components, illustrating the following definitions are given in annex A.

3.1 machines

3.1.1
silage block cutter
machine mounted on the rear 3-point linkage of a tractor that consists of a main guiding frame, equipped with a set of horizontal tines, carrying the cutting frame equipped with one or more cutting knives, intended to cut out a silage block, to take it from the silo and to discharge or distribute it (this machine can be equipped with a distribution device)

3.1.2
silage bucket
bucket intended to be fitted as an attachment on a front loader or a self-propelled variable reach truck and which carries out at least loading and distributing functions

3.2 functions

3.2.1
mixing
operation for blending two or more different materials without reducing the size of their components

3.2.2
chopping
operation to reduce the size of the constituent elements of a material or to break up an agglomerated or an entangled material

3.3 loading device

3.3.1
cutting and loading tools
set of elements, consisting of the loading arm and of tools for taking the materials such as rotary cutters, knives, blades, teeth, etc., needed for picking-up (i.e. cutting) the material and for loading the machine

3.3.2
loading crane
powered crane comprising a column, which slews about a base, and a boom system which is attached onto the top of the column. The crane is fitted on the machine and is designed for loading product into the machine by means of a grab, a hook or any other device

NOTE Adapted from EN 12999:2002, definition 3.1.1.

3.3.3
loading door
mobile part fitted generally at the rear of the machine, which is used for handling and/or for containing the material and/or loading the products inside the machine. It is used as a door for closing the mixing and/or chopping compartment

3.4
mixing and/or chopping device
set of elements such as one or more rotating auger(s), rotating paddle auger, conveyor, separator, turbine

3.5
distribution device
set of elements (such as conveyor belt, auger, distributor cylinder, turbine) operated to unload the materials from the machine and to deposit them where required (on the ground, in troughs, on feeding belts, etc.)

3.6
work station
position of the operator, standing on the ground or on a platform or sitting, to actuate controls or carry out any other task

3.7
driver's station
position of the operator from where the driving of the machine is controlled

3.8
flap
hinged guard which is closed when the machine is operating and which can be opened for service and maintenance operations

4 List of significant hazards

For the purposes of this document Table 1 gives, for defined danger zones, the significant hazards, the hazardous situations, the significant hazardous events, covered by this document, that have been identified by risk assessment as being significant for this type of machine, and which require specific action by the designer or manufacturer to eliminate or to reduce the risk.

Table 1 — List of significant hazards associated with machines for loading, mixing and/or chopping and distributing silage and/or other feedstuffs

N°	Hazard	Location or event	Clause/sub-clause of EN 1553:1999	Clause/sub-clause of this document
1.1	Crushing hazard	Contact with unguarded working tools, unexpected opening of the loading door	4.1.7.1, 4.2.2.2, 4.2.6.1, 4.3.2.3, 4.3.4.1	5.2, 5.4.1, 5.4.2
1.2	Shearing hazard	Contact with unguarded working tools, unexpected opening of the loading door	4.1.7.3, 4.2.2.2	5.2, 5.4.2, 5.6.1, 5.7
1.3	Cutting or severing hazard	Contact with unguarded working tools	4.1.1, 4.1.7.1, 4.2.6.1, 4.3.2.3, 4.3.4.1	5.2, 5.4.1, 5.5, 5.6.1, 5.7.1
1.4	Entanglement hazard	Contact with unguarded working tools, checking of the mixing, contact with the PTO drive shaft	4.1.1, 4.1.7.1, 4.2.6.1, 4.3.2.3, 4.3.4.1	5.1, 5.2, 5.4.1, 5.5, 5.6.1, 5.6.2, 5.7.1, 5.7.2, 5.8
1.5	Drawing-in or trapping hazard	Contact with unguarded working tools, contact with the PTO drive shaft, checking of the mixing	-	5.2, 5.4.1, 5.6.1, 5.6.2, 5.7, 5.8
1.6	Impact hazard	Contact with unguarded working tools, unexpected opening of the loading door, lifting of the drawbar	4.1.1, 4.1.7.1, 4.1.7.3, 4.2.6.1, 4.3.2.3, 4.3.4.1	5.2, 5.4.1, 5.4.2
1.7	Stabbing or puncture hazard	Contact of fingers with unguarded working tools, unexpected opening of the loading door	-	5.7.1
1.9	High pressure fluid injection or ejection hazard	Hazardous location of pressurised hoses	4.1.8.2	7.1.o), 7.2
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	Contact of the loading device with overhead power lines	-	7.1.f), 7.2
2.3	Approach to live parts under high voltage	Contact of the loading device with overhead power lines	5.1	7.1.f), 7.2
2.5	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads, etc.	Hazardous location of cables	4.1.8.1, 4.2.5.1	-
4.1	Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness)	Hearing damage due to the working machine	4.1.2, annex D	5.9, 7.1
5.2	Whole body vibration, particularly when combines with poor postures	Seat insufficiently dampened	4.1.3	-

(continued)

Table 1 — List of significant hazards associated with machines for loading, mixing and/or chopping and distributing silage and/or other feedstuffs (concluded)

N°	Hazard	Location or event	Clause/sub-clause of EN 1553:1999	Clause/sub-clause of this document
7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes, and dusts	Leakage from the fuel tank or from the engine	4.2.5.2, 4.2.6.2, 4.3.4.2, 5.1	-
7.2	Fire or explosion hazard	Leakage from the engine	4.2.6.2, 4.3.4.2, 5.1	-
7.3	Biological or microbiological (viral or bacterial) hazards	Leakage from the fuel tank	4.2.5.2	-
8.1	Unhealthy postures or excessive efforts	Unergonomic design of operator's station	4.1.4, 4.1.5.1, 4.1.6, 4.2.6.1, 4.3.4.1	-
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	Inability to check of the mixing	4.1.5.1, 4.1.5.2, 4.1.6, 4.2.2.2, 4.2.2.3.1, 4.2.3	5.6, 5.7
8.6	Human error, human behaviour	Misunderstanding of the meaning of controls	4.2.1, 4.3.1, 5.1	7.1.c), g), h), i), p), 7.2
8.7	Inadequate design, location or identification of manual controls	Manual controls located in an unusual way	4.2.1, 4.2.3, 4.3.1	7.1.c), g), h), i), p), 7.2
10.2	Restoration of energy supply after an interruption	Activation of the cutting and loading tools while the operator is standing around	4.3.1	-
13	Failure of power supply	Unexpected opening of the loading door, inadvertent lowering of the cutting and loading tools	-	5.4.2, 5.5
15	Errors of fitting	Confusion in the connection of hoses or electrical cables	4.3.3, 5.1	7.1.k), 7.2
17	Falling or ejected objects or fluids	Rupture of pressurised hoses	4.1.8.2	7.1, 7.2
18	Loss of stability/overturning of machinery	Incorrect location of attachments for towing, tie-down points or application points for jacks	4.2.4.1, 4.3.2.1	7.1.m)
19	Slip, trip and fall of persons (relating to machinery)	Inability to check of the mixing, accumulation of material on the top of the machine	4.1.5.1, 4.1.5.2, 4.1.5.3, 4.1.6, 4.2.5.2, 4.2.6.2, 4.3.4.2	5.6.2, 5.6.3, 7.1
20.1	Movement when starting the engine	Unexpected opening of the loading door	4.2.2.5	5.4.2, 7.1.m)
21.5	Insufficient visibility from the work positions	Incorrect location of the manual controls, obstruction around the working area	-	5.2, 5.3, 6.1, 7.1.b), t)
21.10	Insufficient means for evacuation/emergency exit	Checking of the mixing	4.2.2.3.1	5.6.2
22.1	Inadequate location of manual controls	Manual controls located in an unusual way	4.3.1	7.1.c), g), h), i), p), 7.2
22.2	Inadequate design of manual controls and their mode of operation	Manual controls located in an unusual way	4.2.1, 4.3.1	7.1.c), g), h), i), p), 7.2
24.3	Hazards from coupling and towing	Incorrect location of attachments for towing	4.2.4.1.1, 4.3.2.2	7.1.s), 7.2

5 Safety requirements and/or protective measures

5.1 General

Machinery 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 relevant parts of EN ISO 12100 for hazards relevant but not significant, which are not dealt with by this document (e.g. burns and scalds).

5.2 Location of the manual controls

It shall not be possible for the operator, when inside the mixing and/or chopping compartment(s), to reach the manual controls.

The control system shall be such that it is not possible for the operator to reach the unguarded mobile working tools while actuating the control. This requirement is considered met for mounted machines when the distance between the manual controls and any unguarded mobile working tools in operation is more than 850 mm.

The location of the manual control(s) of cutting and loading tools or loading door shall be such that when the operator actuates these from the work station or the driver's station, there is adequate direct visibility on the work area of cutting and loading tools or the loading door as characterised in 5.3.

When the machine is travelling, it shall be possible to actuate controls for mixing and/or chopping and distribution only from the driver's station.

For mounted, semi-mounted or trailed machines, when controls require actuation from the driver's station, these controls shall be designed so that the operator can reach them, for example by means of an adjustable position of the controls or controls that can be situated inside the tractor.

These requirements shall be verified by measurement and inspection.

5.3 Visibility

The visibility is considered to be adequate when the operator, from his driver's or work station, can see the work area of the cutting and loading tools over their whole width. This work area extends from their highest position to a minimum height of 1,5 m from the ground when the machine is in its loading position and:

— for self-propelled machines, at 200 mm measured from the edge of the cutting and loading tools (see Figure 1);

— for trailed machines, at 200 mm measured from the outer edge of the machine (see Figure 2).

The position of the operator's eye is determined as shown in Figures 1 and 3. This requirement shall be checked according to 6.1.

When adequate direct visibility is not achieved, machines with cutting and loading tools or a loading door shall be fitted with devices such as mirrors or closed circuit television (CCTV) which ensure indirect visibility. Additionally, a sound and/or light signal shall be emitted at actuation of the cutting and loading tools. This requirement shall be verified by functional test.