SLOVENSKI STANDARD
SIST EN 690:2014

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Nadomešča:
SIST EN 690:1995+A1:2009

Kmetijski stroji - Trosilniki hlevskega gnoja - Varnost

Agricultural machinery - Manure spreaders - Safety

Landmaschinen - Stalldungstreuer - Sicherheit

Matériel agricole - Epandeurs de fumier - Sécurité

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ICS:

65.060.25	Oprema za skladiščenje, pripravo in razdeljevanje gnojiv	Equipment for storage, preparation and distribution of fertilizers

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Agricultural machinery - Manure spreaders - Safety

Matériel agricole - Epandeurs de fumier - Sécurité

Landmaschinen - Stalldungstreuer - Sicherheit

This European Standard was approved by CEN on 14 September 2013.

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Foreword

This document (EN 690:2013) 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of an identical text or by endorsement, at the latest by April 2014, and conflicting national standards shall be withdrawn at the latest by April 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 690:1994+A1:2009.

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 Annex ZA, which is an integral part of this document.

The following main changes have been introduced during the revision of EN 690:1994+A1:2009:

— Scope: inclusion of self-propelled, mounted, semi-mounted and trailed manure spreaders, except spreaders with lateral spreading;

— update of Normative References;

— new requirements on prevention of unintentional contacts with moving spreading device;

— new requirements regarding design for cleaning and maintenance operations;

— new requirements regarding design and guarding of conveyor;

— means of access;

— noise.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is a type-C standard as specified in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the Scope of this document. These hazards are specific to manure spreaders.

Significant hazards that are common to all the agricultural machines (self-propelled, mounted, semi-mounted and trailed) are dealt with in EN ISO 4254-1. 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 European Standard, to be used together with EN ISO 4254-1, specifies the safety requirements and their verification for the design and construction of self-propelled, mounted, semi-mounted and trailed manure spreaders, provided with vertical or horizontal axes rotors rear spreader device or with vertical axes disc rear spreader device. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

When requirements of this document are different from those which are stated in EN ISO 4254-1, the requirements of this document take precedence over the requirements of EN ISO 4254-1 for machines that have been designed and built according the provisions of this document.

This European Standard, taken together with EN ISO 4254-1, deals with all the significant hazards, hazardous situations and events relevant to manure spreaders, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Table 1), excepting the hazards arising from:

— vibrations of self-propelled machinery;

— travelling function of self-propelled machinery;

— overturning in regard to the protection of the operator at the driving station of a self-propelled machine;

— hazards related to conveying devices other than those defined in 3.3.1 and 3.3.2, for example load push/push-off device.

NOTE 1 Regarding roll-over protection for self-propelled agricultural machinery, see EN ISO 16231-1.

NOTE 2 This European Standard is neither applicable to environmental hazards nor to road safety. Environmental aspects are dealt with in EN 13080.

This European Standard does not apply to manure spreaders with laterally mounted spreading device as defined in 3.6.

This European Standard is not applicable to manure spreaders which are manufactured before the date of publication of this document by CEN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15811, *Agricultural machinery — Guards for moving parts of power transmission — Guard opening with tool (ISO/TS 28923)*

EN ISO 4254-1:2009, *Agricultural machinery — Safety — Part 1: General requirements (ISO 4254-1:2008)*

EN ISO 5353:1998, *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)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14982, *Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria (ISO 14982)*

ISO 3600, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and presentation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1
manure spreader
machine for transporting and spreading manure and/or other mainly non-liquid organic products or soil improvers (e.g. lime) on the field

Note 1 to entry: See examples in Annex A, Figures A.1, A.2 and A.3.

3.2
load body
volume consisting of a platform with three walls and a spreading device at the rear able to contain the product for its transport and spreading

3.3
conveyor device
device able to convey/move/carry the material in the load body to the spreading device, that are of three types: scraper floor, conveyor belt or load push/push-off device

3.3.1
scraper floor
conveyor device made by two or more dragging chains and by a number of slats

3.3.2
conveyor belt(s)
conveyor device made by belt(s)

3.3.3
load push
push-off device
conveyor device formed by a moveable wall for pushing the material in the load body to the spreading device

3.4
rear spreading device
device made by rotary elements (e.g. rotors or discs) intended for spreading the product contained inside the load body

Note 1 to entry: See examples in Annex A, Figure A.4 and A.5.

3.4.1
rear spreading device with rotor(s)
device formed by rotor(s) with vertical or horizontal rotation axe

3.4.2
rear spreading device with discs
device formed by two or more discs with vertical rotation axes

3.5
working tools of the spreading device
components (as teeth, saw-blades, etc.) fixed on spreading device for catching the product inside the load body, and spreading it

3.6
manure spreader with lateral spreading
manure spreader (3.1) that spreads laterally

Note 1 to entry: See examples in Annex A, Figure A.6.

3.7
entry point
point at which the conveyor chains enter the (chain) sprocket(s)

3.8
reverse movement of conveyor
movement of the conveyor opposite to the working direction for removal of disorders, such as blockages

4 List of significant hazards

Table 1 gives the significant hazard(s), the significant hazardous situation(s) and hazardous event(s) 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 reduce the risk.

Attention is drawn to the necessity to verify that the safety requirements specified in this document apply to each significant hazard presented by a given machine and to validate that the risk assessment is complete.

Table 1 — List of significant hazards associated with manure spreaders

No.[a]	Hazard, hazardous situation or hazardous event	Origin	Clause/subclause of EN ISO 4254-1:2009	Clause/subclause of this document
A.1	**Mechanical hazards**			
A.1.1	Crushing hazard	Controls	4.4.3; 5.1.3.2; 5.1.8; 6.1	5.2
		Access means	4.5.1.1.2; 4.5.1.2.5; 4.5.2.3; 4.6	—
		Working elements /conveyor/spreading devices	4.7	5.3; 5.5.1; 5.9; 7.1
		Service points, service and maintenance operations	4.8; 4.14.1; 4.14.3; 4.14.5; 4.14.6	5.5.2; 5.9; 7.1
		Roll-over	5.1.2.3	—
		Shearing and pinching points at the operator's work station	5.1.4	—
		Moving the machine	5.2	—
		Lack of stability	6.2	7.1
		Mounting of machines/coupling area	6.2.2; 6.2.3; 6.3	—

Table 1 (*continued*)

No.[a]	Hazard, hazardous situation or hazardous event	Origin	Clause/subclause of EN ISO 4254-1:2009	Clause/subclause of this document
A.1.2	Shearing hazard	Controls	4.4.3; 5.1.3.1; 5.1.3.3; 5.1.8; 6.1	5.2
		Access means	4.5.1.1.2; 4.5.1.2.5; 4.5.2.3; 4.6	—
		Power transmission parts Working elements /conveyor/spreading devices	4.7	5.3; 5.5.1; 5.9; 7.1
		Service points, service and maintenance operations	4.8; 4.14.1; 4.14.3; 4.14.5; 4.14.6	5.5.2; 5.9; 7.1
		Shearing and pinching points at the operator's work station	5.1.4	—
		Moving the machine	5.2	—
		Lack of stability	6.2	7.1
		Mounting of machines	6.2.2; 6.2.3; 6.3	—
A.1.3	Cutting or severing hazard	Working elements /conveyor/spreading devices	4.7	5.2;; 5.3; 5.5.1; 5.5.2; 5.9; 7.1
A.1.4	Entanglement hazard	Power transmission parts Driving gear of spreading device	6.4 4.7	5.6; 5.8 5.7 5.2; 5.3; 5.5.1; 5.5.2; 5.9; 7.1
		Working elements /conveyor/spreading devices		
		Starting/stopping the engine with engaged drive(s)	5.1.8	7.1; 7.2
A.1.5	Drawing-in or trapping hazard	Power transmission parts Driving gear	6.4 4.7 5.1.8	5.6; 5.8 5.7 5.2; 5.3; 5.5.1; 5.5.2; 5.9; 7.1 7.1; 7.2
		Working Elements/conveyor/ spreading devices		
		Starting/stopping the engine with engaged drive(s)		
A.1.6	Impact hazard	Access means	4.5.1.2.5	—
		Steering system	5.1.3.1	—
A.1.7	Stabbing or puncture hazard	Spreading devices Projectiles	4.7	5.9 5.4
A.1.8	Friction or abrasion hazard	Controls	4.4.3; 5.1.3.2	
		Electrical equipment,	4.9.1	—
		Access means	4.5.1.1.2	—
A.1.9	High-pressure fluid injection or ejection hazard	Hydraulic components and fittings (e.g. rupture)	4.10; 6.5	—
A.2	**Electrical hazards**			
A.2.1	Contact of persons with live parts (direct contact)	Electrical equipment	4.9; 5.3, 6.5	—

Table 1 (*continued*)

No.[a]	Hazard, hazardous situation or hazardous event	Origin	Clause/subclause of EN ISO 4254-1:2009	Clause/subclause of this document
A.2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	Electrical equipment	4.9.1	—
A.2.4	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads, etc.	Electrical equipment	4.9.2; 5.3.1	— —
A.3	**Thermal hazards**			
	Burns, scalds and other injuries by possible contact between persons and objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	Hydraulic system, operating fluids (e.g. fuel, hydraulic oil, engine coolant)	4.12	—
		Cab material	5.1.6	—
		Hot surfaces	5.5	—
A.4	**Hazards generated by noise**			
	Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness), accidents due to speech communication and acoustic warning signals	Noise	4.2	5.11
A.5	**Hazards generated by materials and substances**			
A.5.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Operating fluids (fuel tank, hydraulic systems, engine cooling system)	4.10; 5.4	—
		Cab material	5.1.6	—
		Battery	5.3.1	—
		Exhaust system	5.6	—
A.5.2	Fire or explosion hazard	Cab material	5.1.6	—
A.6	**Hazards generated by neglecting ergonomic principles in machinery design**			
A.6.1	Unhealthy postures or excessive effort	Controls	4.4	—
		Access means	4.5; 4.6	5.6
		Service and maintenance operations	4.14.2; 4.14.4	5.5.2; 5.9; 7.1
		operator's station	5.1.1; 5.1.2.1; 5.1.3;	—
A.6.2	Non- or inadequate consideration of hand–arm or foot–leg anatomy	Controls	4.4	5.2
		Access means	4.5; 4.6	5.6
		Operator's station	5.1	—
A.6.3	Neglected use of personal protective equipment	Operator's manual	8.1.3	7.1
A.6.4	Inadequate local lighting	Visibility	5.1.7.3	—
A.6.5	Mental overload and under load, stress	Controls	4.4	
A.6.6	Human error, human behaviour	Controls	4.4	—
		Operator's manual	8.1	7.1
		Location and design of signs	8.2	7.2

Table 1 (*continued*)

No.[a]	Hazard, hazardous situation or hazardous event	Origin	Clause/subclause of EN ISO 4254-1:2009	Clause/subclause of this document
A.6.7	Design, location or identification of manual controls	Design, location and identification of controls	4.4; 5.1.3; 6.1, 8.1.3.c)	—
A.7	**Combination of hazards**	Individual assemblies	4.13	5.7
		Operator's manual	8.1	7.1
A.8	**Unexpected start-up, unexpected overrun/overspeed**			
A.8.1	Failure/disorder of the control system	Service and maintenance	4.8	—
		Electrical equipment	4.9	—
		Connections	6.5	
A.8.2	Restoration of energy supply after an interruption	Control	4.4; 6.1	—
A.8.3	External influences on electrical equipment	Cables	4.9.1	5.1.4
		Electrical/Electronic components	—	
A.8.4	Other external influences (gravity, wind, etc.)	Stability	6.2.1.1; 6.2.1.2	7.1
A.8.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)	Design and location of controls	4.4; 6.1.2	—
		Access means	4.5 , 4.6	—
		Operator's work station	5.1	—
		Moving the machine	5.2	—
		Service and maintenance systems	4.14	7.1
		Mounting system of machines	6.2; 6.3	7.1
		Missing or insufficient instructions in the operator's manual	8.1.3	7.1
A.9	**Impossibility of stopping the machine in the best possible conditions**	Control	4.4; 6.1	—
A.11	**Failure of energy supply**	Supports	4.8	7.1
		Electrical equipment	4.9	—
		Connections	6.5	
A.12	**Failure of the control circuit**	Electrical equipment	4.9	—
A.13	**Errors of fitting**	Mounting of machines	6.2; 6.3	7.1
		Missing or insufficient instructions in the operator's manual	8.1.3	7.1
A.14	**Break-up (of parts) during operation**	Guards and barriers (strength)	4.7	—
		Supports	4.8	—
		Hydraulic components	4.10	—
		Pneumatic components	4.11	
A.15	**Falling or ejected objects or fluids**	Supports	4.8	—
		Hydraulic components	4.10	—
		Projectiles		5.4