SLOVENSKI STANDARD

SIST EN 12999:2003/A2:2006

01-oktober-2006

Dvigala (žerjavi) – Nakladalna dvigala

Cranes - Loader cranes

Krane - Ladekrane

Appareils de levage a charge suspendue - Grues de chargement

Ta slovenski standard je istoveten z: EN 12999:2002/A2:2006

ICS:

53.020.20 Dvigala Cranes

SIST EN 12999:2003/A2:2006 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12999:2002/A2

April 2006

ICS 53.020.20

English Version

Cranes - Loader cranes

Appareils de levage à charge suspendue - Grues de chargement

Krane - Ladekrane

This amendment A2 modifies the European Standard EN 12999:2002; it was approved by CEN on 16 March 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant 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 amendment 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This document (EN 12999:2002/A2:2006) has been prepared by Technical Committee CEN/TC 147 “Cranes - Safety”, the secretariat of which is held by BSI.

This Amendment to the European Standard EN 12999:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

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).

The provisions of this amendment shall not be mandatory to cranes manufactured the first 12 months after the date of availability of the amendment. The provisions concerning stress calculations shall not apply to cranes designed before the date of availability of the amendment.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

2 Normative references

The following text is used:

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.

The following references are added:

EN 13001-1:2004, *Cranes — General design — Part 1: General principles and requirements*

EN 13001-2:2004, *Cranes — General design — Part 2: Load actions*

CEN/TS 13001-3-1:2004, *Cranes — General design — Part 3-1: Limit states and proof of competence of steel structures*

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

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

The following references are deleted:

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

EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications*

ISO 4302:1981, *Cranes — Wind load assessment*

The following two references are replaced in Clause 2 and in the text:

EN 50081-2:1993, *Electromagnetic compatibility — Generic emission standard — Part 2: Industrial environment*

by

EN 61000-6-4:2001, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:1997, modified)*

and

EN 50082-2:1995, *Electromagnetic compatibility — Generic immunity standard — Part 2: Industrial environment*

by

EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:1999, modified)*

5.2 Structural calculations

5.2.1 Information to be given in the calculation

The text of indent e) is replaced by:

e) the governing hoisting class, hoist drive class and stress history classes

5.2.2 Dynamic factors

5.2.2.1 Hoisting and gravity effects of the mass of the crane

The text of this subclause is replaced by:

The dynamic effects due to vibrations of the structure when raising or lowering a load shall be taken into account by applying the factor ϕ_1 on the gravitational forces due to the masses of the crane. It shall be used for the design of the crane structure itself and its supports. The value of ϕ_1 shall be the lowest of the two values 1,1 and ϕ_2, or expressed as an equation:

$$\phi_1 = \min(1{,}1 \; ; \; \phi_2)$$

5.2.2.2 Hoisting and gravity effects of the gross load

The text of this subclause is replaced by:

In the case of hoisting or grounding a load as well as starting or stopping a vertical motion, the hereby included vibrational effects shall be taken into account by multiplying the gravitational force due to the mass of the hoist load by a factor ϕ_2.

The factor ϕ_2 shall be taken as follows:

$$\phi_2 = \phi_{2,min} + \beta_2 \times v_h$$

$\phi_{2,min}$ and β_2 are given in Table 2a for the appropriate hoisting class. Loader cranes are assigned to hoisting classes HC1 and HC2 according to their dynamic and elastic characteristics:

— HC1 for crane mounted on a vehicle or foundation of equivalent flexibility;

— HC2 for crane mounted on a static foundation.

v_h is the steady vertical hook speed, in meters per second, related to the lifting attachment. Values of v_h are given in Table 2b.

Table 2a — Value of β_2 and $\phi_{2,min}$

Hoisting class of appliance	β_2	$\phi_{2,min}$
HC 1	0,17	1,05
HC 2	0,34	1,10

Table 2b — Values of v_h

Load combination	Type of hoist drive and its operation method		
	HD1	HD4	HD5
A1, B1	$v_{h,max}$	$0,5 \times v_{h,max}$	$v_h = 0$
C1	-	$v_{h,max}$	$0,5 \times v_{h,max}$

where

HD1: hoist drive can only be operated at a fixed speed;

HD4: a step-less variable speed control can be operated by the crane driver;

HD5: after pre-stressing the hoist medium, the hoist drive control provides the reaching of a selected speed with an acceleration independent of the crane driver;

$v_{h,max}$ is the maximum vertical hook speed.

In load combinations A1 and B1, $v_{h,max}$ is the maximum vertical hook speed that is given by any single hydraulic drive action.

In load combination C1, $v_{h,max}$ is the maximum vertical hook speed from all articulation hydraulic drives acting simultaneously.

The heading and the text of subclause 5.2.2.4 is changed to:

5.2.2.4 Effects caused by acceleration/deceleration of the slewing drive

The dynamic factor Φ_{5h} shall have the value 1,05 for hook duty and 1,3 for bucket or grapple duty.

5.2.3 Loads and forces

5.2.3.1 General

Under clause c) Exceptional loads, a new indent 4) is added:

4) forces due to simultaneous dynamic peaks caused by raising or lowering a load at the maximum sum of the vertical speeds from all articulation drives.

5.2.3.2.3 Forces due to acceleration/deceleration of the slewing drive

The text of this subclause is replaced by:

The horizontal load of the mass of the gross load shall be taken into account according to the following:

$$F_h = \frac{M}{R}$$

where

F_h is the horizontal load;

M is the gross slewing moment - (theoretical slewing moment with 100 % efficiency);

R is the outreach at calculated position. If $R < R_{max} / 2$, the value $R = R_{max} / 2$ is used in the equation for calculating F_h;

R_{max} is the maximum hydraulic outreach.

5.2.3.3.1 Wind loads

The text of this subclause is replaced by:

Wind loads shall be calculated to EN 13001-2. Only in-service wind needs to be applied.

5.2.4 Load combinations

5.2.4.2 Load combinations to be covered (see table 3)

The text of this subclause is replaced by:

A1 and B1	Normal service conditions, raising/lowering loads with dynamic peak from any single hydraulic function while slewing: A1 without wind effects, B1 with wind effects.
A2 and B2	Normal service conditions, with grapple, magnet or similar accessory allowing sudden release of a part of the gross load while slewing: A2 without wind effects, B2 with wind effects.
C1	Simultaneous dynamic peaks caused by raising or lowering a load at the maximum sum of the vertical speeds from all articulation drives, taking into account the available oil flow.
C3	Crane under test condition.

5.2.4.3 Application of Table 3

The text of this subclause is replaced by:

Basic load combinations for the calculation to prove that mechanical hazards from yielding and elastic instability from extreme values are prevented are given in Table 3.

For the proof of fatigue strength, load combinations A1 and A2, with all partial safety factors γ_p set to 1,00, shall be applied.