



**SLOVENSKI STANDARD**  
**SIST EN 12325-2:2000**

**01-oktober-2000**

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Irrigation techniques - Centre pivot and moving lateral systems - Part 2: Minimum performances and technical characteristics

Bewässerungsverfahren - Kreis- und Linearberegnungsverfahren - Teil 2: Mindestanforderungen und technische Kennwerte

Techniques d'irrigation - Installations avec pivots et rampes frontales - Partie 2: Performances et caractéristiques techniques minimales

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**Ta slovenski standard je istoveten z: EN 12325-2:1999**

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**ICS:**

65.060.35	Namakalna in drenažna oprema	Irrigation and drainage equipment
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 12325-2

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English version

## Irrigation techniques - Centre pivot and moving lateral systems - Part 2: Minimum performances and technical characteristics

Techniques d'irrigation - Installations avec pivots et rampes  
frontales - Partie 2: Performances et caractéristiques  
techniques minimales

Bewässerungsverfahren - Kreis- und  
Linearberegnungsverfahren - Teil 2: Mindestanforderungen  
und technische Kennwerte

This European Standard was approved by CEN on 8 July 1999.

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.

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

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 334 "Irrigation techniques", 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 February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

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.

Within its programme of work, Technical Committee CEN/TC 334 "Irrigation techniques" charged working group CEN/TC 334/WG 2 "Centre pivot and moving laterals" to prepare the following standard :

- EN 12325-2, *Irrigation techniques - Centre pivot and moving lateral systems - Part 2 : Minimum performances and technical characteristics*

The other standards concerning the irrigation techniques are :

- EN 12325-1, *Irrigation techniques - Centre pivot and moving lateral systems - Part 1 : Presentation of the technical characteristics*
- EN 12325-3, *Irrigation techniques - Centre pivot and moving lateral systems - Part 3 : Terminology and classification*
- prEN ISO 11545, *Agricultural irrigation equipment – Centre-pivot and moving lateral irrigation machines with sprayer or sprinkler nozzles – Determination of uniformity of water distribution (ISO/DIS 11545:1999)*

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## 1 Scope

This European Standard defines and specifies the minimum performances of the machines. It gives a minimum quality level to which the manufacturers shall refer to.

It takes in account the mechanical, electrical, hydraulic and agronomic aspects.

This standard is to be applied to fixed and movable centre pivots as well as to the different categories of moving laterals.

This standard doesn't deal with safety problems; those aspects are treated in EN 909.

This standard doesn't deal with specific problems for impact on environment.

## 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 the European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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

ENV 1991-2-4, *Eurocode 1 : Basis of design and actions on structures - Part 2-4 : Actions on structures - Wind actions.*

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

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EN 909, *Agricultural and forestry machinery - Centre pivot and moving lateral types irrigation machines - Safety.*

ENV 1993-1-1/A2, *Eurocode 3 : Design of steel structures - Part 1-1/A2 : General rules and rules for buildings - Annexes G, H, J revised, N and Z.*

EN 12324-2:1999, *Irrigation techniques - Reel machine systems - Part 2 : Specifications of polyethylene tube for reel machines.*

EN 12325-1:1998, *Irrigation techniques - Centre pivot and moving lateral systems - Part 1 : Presentation of the technical characteristics.*

EN 12325-3, *Irrigation techniques - Centre pivot and moving lateral systems - Part 3 : Terminology and classification.*

prEN ISO 11545:1999, *Agricultural irrigation equipment - Centre-pivot and moving lateral irrigation machines with sprayer or sprinkler nozzles - Determination of uniformity of water distribution (ISO/DIS 11545:1999).*

ISO 7749-1:1995, *Agricultural irrigation equipment - Rotating sprinklers - Part 1 : Design and operational requirements.*

ISO 8026:1995, *Agricultural irrigation equipment - Sprayers - General requirements and test methods.*

ISO 8224-2, *Traveller irrigation machines - Part 2 : Softwall hose and couplings - Test methods.*

ISO 8779:1992, *Polyethylene (PE) pipes for irrigation laterals - Specifications.*

ISO 12374, *Agricultural irrigation - Wiring and equipment for electrically driven or controlled irrigation machines.*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.*

ISO 14713, *Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings - Guidelines.*

### 3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions of EN 12325-3 apply together with the relevant units.

In this standard, the term "treated against corrosion" signifies that the protection provided is equivalent to galvanisation one.

### 4 Performances and mechanical characteristics

#### 4.1 Structure

##### 4.1.1 Pivot point (see annex C)

**Flagstone characteristics (9)** : Drawing, position and characteristics of iron reinforcements including concrete dosage shall be given. The flagstone shall top natural soil level of 0,2 m. Possible leaks shall be able to be evacuated out of the flagstone.

**Water supply (12)** : It shall be ensured by a tight, accessible and easily removable device.

##### Vertical pipe :

- the pipe diameter of the mobile part (11) shall be greater than or equal to the pipe diameter of the first span and have a wall thickness superior or equal to the machine pipe one ;
- the fixed (13) or mobile (11) part shall be easily removable in order to change water tightness joint(s) (3) ;
- when the vertical pipe is equipped with lubricators their shall be minimum two diametrically opposed ;
- in case of internal wire supply the bearing surface of joint (8) performing water tightness of collector ring supply (1) shall be in stainless material or treated against corrosion.

##### Elbows :

- bending radius of elbows (2 and 7) shall be at least equal to 3 times the pipe diameter ;
- in the case where the elbows is made up of several sections of straight pipe, adjacent pipe axes shall have an angle greater than or equal to 135°.

**Height from the ground of first span connection** : It shall comply with the minimum height under structure announced in the description (See "a" on Figure 1 of EN 12325-1:1998).

**Pressure switch** : It shall be easily removable and shall be positioned in an accessible place .

**Pressure gauge** : It shall be mounted on a 3 ways valve in order to perform draining and disconnection, at the height between 1 m and 2 m from the flagstone.

**End gun control** : If the control is performed by wedges or thrusts, the wedges and thrusts shall be rigid and rigidly fixed on pivot point at a minimum height of 2 m.

##### 4.1.2 Towers and spans

###### 4.1.2.1 Structure and pipe stability

The stability of a span shall be verified using the calculation note given in annex A.

The loading cases shall be considered for a machine with and without water as specified in EN 909.

#### 4.1.2.2 Towers

**Resistance to lateral efforts :** The tower shall withstand lateral efforts of 1 000 daN, as specified in the annex A.

On each tower at the lowest point of the pipe a valve or other equivalent device shall be placed.

On the last tower at the lowest point of the pipe a sand trap or other equivalent device, minimum diameter 100 mm shall be mounted to catch impurities.

#### 4.1.2.3 Pipe sprinkling outlets

The minimum diameter of pipe perforations shall be 15 mm.

The perforation of the span's pipe shall have a minimum surface of 150 mm<sup>2</sup> and to be exempt of wire edges in order to limit corrosion attacks.

#### 4.1.2.4 Hydraulic linkage between spans

The device performing water tightness between the pipes of adjacent spans shall comply with EN 909.

Bolts and nuts used shall be made of anti-corrosion treated steel.

### 4.2 Motorization

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#### 4.2.1 Electric gear motors

When it is external to the motor the electrical connecting box and its closing device shall be made of stainless or treated against corrosion materials.

A device allowing the fixation of a protection gear case will be provided.

The fixation plate shall be conform to the scheme given in Figure D.1.

In the case of a single motor on each tower, it shall be centred on the tower frame (cardan shafts of same length).

The outlets of the reducer shall have a diameter of 25,4 mm  $_{-0,4}^0$  mm and a pin hole of diameter more than 9,6 mm at (15 to 20) mm from the extremity.

The gear motor carter shall be made of stainless or treated against corrosion materials.

#### 4.2.2 Wheels gear reducers

It shall be in accordance with the motor power rating and the wheels diameter. The oil or grease types, periodicity of maintenance shall be indicated.

The gear reducers shall have reduction ratios between 1:30 and 1:60.

Fixation plate of gear reducers shall be conform to the scheme given in Figure D.2.

The inside diameters of draining and emptying holes shall be at least 20 mm, and their threads shall be standard.

The oil expansion chamber shall be made of anti-corrosion treated material.

The inlet (s) of the reducer shall have a diameter of 25,4 mm  $_{-0,4}^0$  mm and a pin hole of diameter more than 9,6 mm at (15 to 20) mm from the extremity.



### 4.2.3 Transmission

The misalignment between the outlet of the gear motor and wheels gear reducers inlet shall be as a minimum of 7° for a cardan shaft and as a maximum 2° for a dry joint (U-joints or flexors).

### 4.3 Wheels

The wheels type (rim and tire), the allowable charge in the different loading cases (see 4.1.2.2), the efforts applied and the machine speed shall be compatible.

The tire ply rating shall be 6 as a minimum inflation pressure required shall be indicated on the rim in kPa.

The tire valve shall be protected against pulling out by a device locked with the rim.

### 4.4 Structure and bolt-and-nut protection

The different metallic elements shall be galvanised in accordance with ISO 14713, and the galvanisation shall comply with ISO 1461 standard specifications.

If other protection methods are chosen they shall provide performances equivalent to galvanisation one.

## 5 Electrical performances

### 5.1 General

The basic standards will be ISO 12374, EN 60204-1 and EN 909.

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### 5.2 Electrical cables

The pipe shall be equipped with cable fixation devices protected against corrosion and UV radiations.

Cables used to supply power from the tower boxes to the gear motors shall be protected against : Friction, impacts, UV radiation and shall be fixed on tower structures elements.

### 5.3 Plugs and connectors

The plugs and connectors shall meet the minimum requirements of EN 292-2.

### 5.4 Boxes and panels

- a) Main control panel box : It shall be conform to the description given in EN 909. The panel shall include a device allowing water supplying stopping in case of safety problem ;
- b) tower boxes : They shall be conform to the description given in EN 909. They shall be built in a material chosen for its resistance to ageing. The fixation plate shall be made of stainless or treated against corrosion materials. They will be placed such that the maximum horizontal distance from tower vertical axis is less than 0,3 m.

### 5.5 Alignment devices

The parts outside the box and the fixation plate shall be constructed with a stainless or protected against corrosion material, protected against unintentional damage risks.

### 5.6 Collector ring

All the extern pieces of the collector ring shall be protected against corrosion.