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Irrigation techniques - Quick coupling pipes for movable irrigation supply - Technical characteristics and testing

Bewässerungsverfahren - Schnellkupplungsrohre für ortsbewegliche
 Bewässerungseinrichtungen - Technische Eigenschaften und Prüfung

Techniques d'irrigation - Tubes a raccords rapides pour aménées mobiles en irrigation -
 Caractéristiques techniques et essai

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ICS:

23.040.60	Prirobnice, oglavki in spojni elementi	Flanges, couplings and joints
65.060.35	Namakalna in drenažna oprema	Irrigation and drainage equipment

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12734

May 2000

ICS 23.040.60; 65.060.35

English version

**Irrigation techniques - Quick coupling pipes for movable
irrigation supply - Technical characteristics and testing**

Techniques d'irrigation - Tubes à raccords rapides pour
amenées mobiles en irrigation - Caractéristiques
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ortsbewegliche Bewässerungseinrichtungen - Technische
Eigenschaften und Prüfung

This European Standard was approved by CEN on 28 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.

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

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


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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 November 2000 and conflicting national standards shall be withdrawn at the latest by November 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 program of work the CEN/TC 334 "Irrigation Techniques" charged CEN/TC 334/WG 6 "Water supply – Buried and surface pipes" to elaborate the following Standard:

EN 12734 "Irrigation techniques – Quick coupling pipes for movable irrigation supply – Technical characteristics and testing".

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1 Scope

This standard specifies the conditions of suitability for application of quick coupling pipes for movable irrigation supply made of steel, aluminium, PE or rigid PVC used in irrigation systems.

Standards for PE or PVC are not applicable for quick coupling pipes.

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 last edition of the publication referred to applies.

EN 10240

Internal and/or external protective coatings for steel tubes – Specification for hot dip galvanized coatings applied in automatic plants;

EN 45001

General criteria for the operation of testing laboratories

ISO 4065

Thermoplastic pipes – Universal wall thickness table

ISO 11678

Agricultural irrigation equipment – Aluminium irrigation tubes

3 Terms and Definitions

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For the purposes of the present Standard, the following term and definition apply.

3.1 Quick coupling pipe

Portable pipe with coupling parts which give a safe connection with the pipe of the same kind in a few seconds mostly without a tool.

NOTE: The loosening is possible in the same easy way.

4 Technical characteristics

4.1 Material

Methods for the production of tubes depending upon the materials are indicated in table 1.

Table 1: Material and production methods

Material	Method of production
Steel	welded
Aluminium alloy	welded or extruded
PE	extruded
PVC	extruded

4.2 Corrosional resistance and protection against corrosion

4.2.1 General

Quick coupling pipes have to be corrosional resistant against the application.

4.2.2 Pipes and couplings made of steel

All parts of quick coupling pipes made of steel shall conform to EN 10240.

4.2.3 Pipes and couplings made of Aluminium alloy

Pipes and couplings made of Aluminium alloy shall meet the requirements for tubes given in ISO 11678.

4.2.4 Pipes made of PE or PVC

No specific requirements (pipes made of such material are resistant against the chemical influence of soil and water).

4.3 Length

4.3.1 General

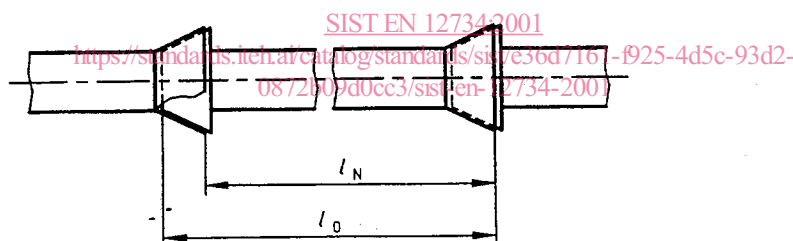
It is to distinguish between nominal length (l_N) and overall length (l_O).

4.3.2 Nominal length

The nominal length of a quick coupling pipe shall be declared by the manufacturer. It is measured after coupling of two identic pipes as the distance between two similar points on both pipes. The measurement should be carried out under nominal pressure at $(20 \pm 5)^\circ\text{C}$. Deviation of (0 to 0,4) % from the declared value is allowable (see figure 1).

4.3.3 Overall length

The overall length of a quick coupling pipe is the total length of a pipe incl. coupling parts (see figure 1).



l_N nominal length
 l_O overall length

Figure 1: Nominal length and overall length of quick coupling pipes

4.4 Average outside diameter and wall thickness of tubes (measured in mm)

4.4.1 Pipes made of steel

Table 2: Minimum wall thickness of pipes made of steel tube depending on outside diameter

Average outside diameter ¹⁾ in mm measured at PN 10 = 1,0 MPa	50	60	70	80	89	100	108	120	133	150	159	200	216	250	300
Min. wall thickness without zinc in mm	0,7	0,7	0,7	0,7	0,8	0,8	0,9	0,9	1,0	1,0	1,2	1,2	1,5	1,8	1,8

¹⁾ Tolerances of diameter are not necessary because the producer himself completes the tubes with coupling parts.

4.4.2 Pipes made of Aluminium alloy**Table 3: Minimum wall thickness of welded pipes made of aluminium**

Average outside diameter ¹⁾ in mm measured at PN 10 = 1,0 MPa	50	60	70	76	80	89	100	108	120	127	133	150	152	159	200
Tolerances + / - (in mm)	0,60	0,75	0,75	0,75	0,75	0,75	0,80	0,90	0,90	0,90	0,90	1,00	1,00	1,00	1,00
Minimum wall thickness in mm	0,90	0,90	0,90	0,90	0,90	1,15	1,10	1,18	1,10	1,25	1,30	1,30	1,40	1,42	1,80
Tolerances + / - (in mm)	0,08	0,10	0,10	0,10	0,10	0,10	0,10	0,12	0,12	0,12	0,12	0,14	0,14	0,14	0,15
¹⁾ Instead of pipes specified in table 3 also pipes of light metal in the normal inch dimension with corresponding wall thickness can be used.															

Table 4: Minimum wall thickness of extruded pipes made of aluminium

Average outside diameter ¹⁾ in mm measured at PN 10 = 1,0 MPa	60	80	100	120	150
Minimum wall thickness in mm	0,9	0,9	1,0	1,0	1,1
¹⁾ Tolerances of the pipe diameters: 1 %. Tolerances of the wall thickness: 10 %					

4.4.3 Pipes made of PE

For use in movable irrigation supply, quick coupling pipes made of PE under MRS PE 63, PE 80 or PE 100 shall be used.

The tubes shall have a minimum wall thickness as given in table 5 taking into account that these wall thicknesses are calculated on the minimal basis of PE63 and that the nominal operating pressure of quick coupling pipes is derived from the nominal pressures of pipes in ISO 4065 with a derating factor of 1 series because of non permanent pressurisation and shorter intended lifespan in movable irrigation systems.

For example PN10 (EN 12734) corresponds to PN 6 (ISO 4065).

Table 5: Minimum wall thickness of PE-pipes

Average outside diameter in mm	50	63	75	90	110	125	140	160	180	200
Minimum wall thickness in mm at PN 6 = 0,6 MPa (PE 63)	2,0	2,4	2,9	3,5	4,2	4,8	5,4	6,2	6,9	7,7
Minimum wall thickness in mm at PN 10 = 1,0 MPa (PE 63)	3,0	3,8	4,5	5,4	6,6	7,4	8,3	9,5	10,7	11,9
Minimum wall thickness in mm at PN 12,5 = 1,25 MPa (PE 63)	3,5	4,5	5,5	7,0	8,0	9,0	10,0	11,5	13,2	14,5
Minimum wall thickness in mm at PN 16 = 1,6 MPa (PE 63)	4,6	5,8	6,8	8,2	10,0	11,4	12,7	14,6	16,4	18,2
NOTE: Reference temperature for the wall thickness is 20 °C.										

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4.4.4 Pipes made of PVC

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Table 6: Minimum wall thickness of PVC-pipes

Average outside diameter in mm	50	63	75	90	110	125	140	160	200
Minimum wall thickness in mm at PN 6 = 0,6 MPa	1,2	1,6	1,8	2,2	2,6	3,0	3,3	3,8	4,7
Minimum wall thickness in mm at PN 10 = 1,0 MPa	2,4	3,0	3,0	3,5	4,3	4,4	4,9	5,6	6,9
Minimum wall thickness in mm at PN 16 = 1,6 MPa	2,8	3,5	4,2	4,9	6,0	6,8	7,8	8,7	10,9

4.5 Smoothness of the surface

The inner side of the pipe wall shall be smooth; welding residue and flashes are allowed to protrude not more than 2 mm. The protective coating on steel pipes must have such a strong adhesion so that hits caused during transportation or general use do not allow peeling off. The adhesion of the coating should also avoid hairline cracks caused by the test pressure.

4.6 Coupling

Three kinds of couplings are used:

- Spherical coupling with an O - ring - seal, mechanically closed
- Coupling with a lip type seal, mechanically closed
- Coupling with a lip type seal. Closed by water-pressure. The coupling that is closed by water pressure could be not tight at water pressures below 50 kPa.

NOTE: For special application lip type couplings may be required to be untight at pressures below 50 kPa by agreement.

The maximum bending angle shall be declared by the manufacturer in his documentation.

The coupling shall be water-tight if filled with water under nominal pressure. If quick coupling pipes are used as suction line the coupling shall be tight for water and air. The coupling shall withstand opening and closing for 2000 times. Examples for different kinds of connection for quick coupling pipes see in figure 2.

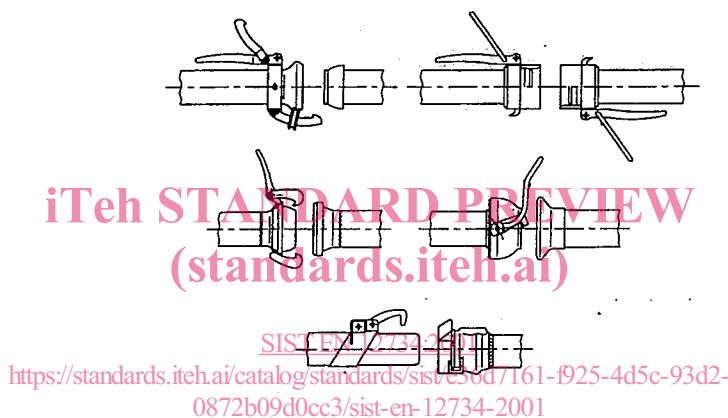


Figure 2: Examples for different connection kinds of quick coupling pipes

4.7 Replacement of pipes with spherical couplings

The replacement of one pipe in the middle of a pipeline with 100 m length shall be possible without moving the whole pipeline in longitudinal direction.

4.8 Fittings and accessories

The construction of piping systems may require the use of accessories such as elbows or T-pieces. In this case they shall show the same technical characteristics as the corresponding pipes and couplings. In some cases the installation of stabilisers may be recommended. They should be specified by the manufacturer in order to match the specified use and the risks undergone. The parts pertaining to the seal are considered as integral parts of the coupling and not as accessories.

4.9 Operating pressure

The operating pressure in quick coupling pipelines shall not exceed the nominal pressure of the pipes. The selection of pipes shall be made taking into account the possible pressure shocks

5 Marking

Quick coupling pipes according to this standard may be marked with the name or the sign of the producer in connection with length, diameter and nominal pressure.

6 Construction and operating tests

6.1 Sampling and test forms

For tests of quick coupling pipes the forms 1 and 2 are to be used (see annexes A and B). These forms have to be filled in double. For the test pipes, moulded parts and documents according to the following table are necessary.

Table 7: Parts required for testing quick coupling piping systems

No	Pipes - moulded parts - accessories - documents	Quantity
1	Complete quick coupling pipes with sealing elements	minimum 100 m
2	Stabilizer ¹⁾	–
3	Bend 90°	2
4	T-Piece	2
5	Threaded piece with female coupling or flange piece with female coupling	2
6	End plug with male-piece with female-piece	1 1
7	Optionally other accessories: Reduced cross, online hydrant, opening elbow	1 each
8	Pipe: length = 1 m without corrosion protection and without coupling	1
9	Sectional drawing of the coupling located on the pipe ends with main dimensions as well as details about the material, fabrication and corrosion protection.	2
10	Operating instructions	1
11	Inline gate valve (does not belong to the tested equipment)	2
¹⁾ by agreement		

6.2 Test procedure

The test shall be carried out according to test methods in clause 7 for the dimensions and properties listed from section 6.2.1 to 6.2.14.

6.2.1 Outside diameter (without corrosion protection)

6.2.2 Wall thickness