



SLOVENSKI STANDARD

SIST EN 639:1996

01-marec-1996

Splošne zahteve za betonske tlačne cevi, skupaj s spoji in fazonskimi kosi

Common requirements for concrete pressure pipes including joints and fittings

Allgemeine Anforderungen für Druckrohre aus Beton einschließlich Rohrverbindungen und Formstücken

Prescriptions communes pour tuyaux pression en béton y compris joints et pièces spéciales

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ICS:

23.040.50	Cevi in fittingi iz drugih materialov	Pipes and fittings of other materials
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EUROPEAN STANDARD

EN 639

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Water pipelines, pressure pipes, potable water, water pipes, concrete tubes, specifications, materials, definitions, computation, dimensions, tests, quality, implementation, marking

English version

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CEN

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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Annexes :

- Annex A (informative) : Notation of main parameters.
- Annex B (informative) : Span pipe calculations.

FOREWORD

This European Standard for concrete pipes is a standard which was prepared by WG 5 "Concrete pipes" of the Technical Committee CEN/TC 164 "Water Supply", Secretariat of which is held by AFNOR.

During preparation of this standard the provisional results already available of CEN/TC 164/WG 1 "General requirements for external systems and components" and of CEN/TC 164/165/JWG 1 "Structural design" were considered.

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of an identical text or by endorsement, at the latest by April 1995, and conflicting national standards shall be withdrawn at the latest by April 1995.

In accordance with the CEN/CENELEC Internal Regulations, following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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0 INTRODUCTION

The product in permanent or temporary contact with water, intended for human consumption, shall not adversely affect the quality of the drinking water and shall not contravene the CE Directives and EFTA Regulations on the quality of drinking water.

This standard is not intended to be used alone. It shall be used as a combined document with one of the following as appropriate :

- | | |
|--------|---|
| EN 640 | Reinforced concrete pressure pipes and distributed reinforcement concrete pressure pipes (non cylinder type) including joints and fittings. |
| EN 641 | Reinforced concrete pressure pipe, cylinder type, including joints and fittings. |
| EN 642 | Prestressed concrete pressure pipes, non cylinder and cylinder type, including joints, fittings and specific requirements for prestressing steel for pipes. |

or any future additional product standard referring to this standard.

When the relevant EN dealing with general requirements, such as "General requirements for external systems and components" (CEN/TC 164/WG 1), "Materials in contact with water" (CEN/TC 164/WG 3) and "Structural design" (CEN/TC 164/165/JWG 1) are adopted, the present standard shall be revised, where appropriate, in order to ensure that these requirements comply with the relevant EN's.

To the present standard, are attached :

- Annex A (informative): Notation of main parameters ;
- Annex B (informative) : Span pipe calculations.

1 SCOPE

This European Standard specifies common requirements for the following components : concrete pressure pipes, joints and fittings including jacking pipes. These components are

Shall be considered as such any product used for the conveyance and distribution of water intended for human consumption.

intended to be used in water systems which carry water for human consumption, industrial purposes, irrigation or waste water.

2 NORMATIVE REFERENCES

This European Standard incorporates by 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 undated references, the latest edition of the publication referred to applies.

- | | |
|----------|--|
| EN 29001 | Quality systems - Model for quality assurance in design/development, production, installation and servicing. |
| EN 29002 | Quality systems - Model for quality assurance in production and installation. |
| EN 29003 | Quality systems - Model for quality assurance in final inspection and test. |

3 DEFINITIONS

For the purpose of this standard, the following definitions apply :

Adjustable joint : Joint which permits significant angular deflection at the time of installation but not thereafter.

Contractor : The person, company or corporation executing the contract or agreement for installation and commissioning of the pipeline.

Dead loads : The pipe weight, water weight, and all superimposed static loads applied to the outside of the pipe after installation.

Design internal diameter : The internal diameter specified in the manufacturer's documents and to which manufacturing tolerances are applicable.

Design pressure : The maximum sustained internal hydrostatic pressure to which the pipe is to be subjected as specified by the purchaser. Generally, the design pressure for each pipe, or portion of the pipeline, shall be the operating pressure or the static head specified by the purchaser, whichever is the greater.

DN/ID : Numerical designation of size of component, which is a convenient integer approximately equal to the specified internal diameter expressed in mm.

Effective length : Internal barrel length plus joint gap (provided by the manufacturer). (See Figure 1).

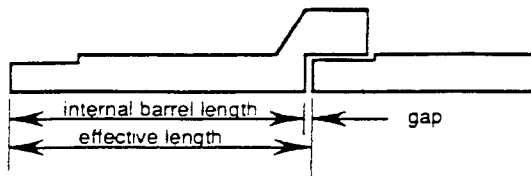


Figure 1 : Lengths

External diameter : The mean external diameter of the pipe barrel at any cross section.

Factory test pressure : The hydrostatic pressure applied for a relatively short duration to a pipe to test its integrity, watertightness and/or design.

Flexible joint : Joint which permits significant angular deflection, both during and after installation and which can accept a slight offset of the centre line.

Internal diameter : The mean internal diameter of the pipe barrel at any cross section.

Joint : The connection between the adjacent ends of two components including the means of sealing.

Live loads : All superimposed external transient loads applied to the outside of the pipe during and after installation, e.g. traffic loading.

Manufacturer : The person, company or corporation that actually manufactures the pipe.

Maximum design pressure : Design pressure plus surge pressure.

Normal operating conditions : A combination of design pressure and dead loads.

Purchaser : A person, company, corporation or agency entering into a contract or agreement to purchase pipes and fittings from the manufacturer.

Rigid joint : Joint that does not permit significant angular deflection, either during or after installation.

Surge pressure : Increases of short duration, to the operating pressure caused by changes in fluid velocity.

System test pressure : The hydrostatic pressure applied for a relatively short duration to a newly laid pipeline in order to test its integrity and tightness.

Transient conditions : Conditions due to surge pressures or live loads that vary normal operating conditions and are of short duration.

4 GENERAL

4.1 Concrete pipe behaviour

4.1.1 Reinforced and prestressed concrete pipes are normally used in a buried situation. In a homogenous environment, they perform satisfactorily. However where a heterogenous environment exists special arrangements may be necessary and agreed between purchaser and manufacturer.

In some cases, the environment may require specific arrangements for example :

- high sulfate content : if total soluble sulfate content greater than 3000 mg/kg of soil or greater than 600 mg/kg of ground water then sulfate resisting cement shall be used ;
- high chloride content : if total soluble chloride content greater than 500 mg/kg of soil or ground water then appropriate precautions shall be taken, to be determined in consultation with the manufacturer ;
- sea-water : sea-water resisting cement shall be used (or sulfate resisting cement). Note that in the case of sea-water the above mentioned contents of sulfate and chloride shall not apply ;
- lime carbonic dissolving acid : if greater than 60 mg/l of ground water then appropriate precautions shall be taken, to be determined in consultation with the manufacturer.

4.1.2 If concrete pipes are exposed to atmospheric environment, its effects shall be considered, for example :

- carbonation ;
- thermal expansion ;
- freeze-thaw.

4.1.3 If the pipeline carries aggressive fluids (distilled water, some industrial waste, etc)

appropriate precautions shall be taken to be determined in consultation with the manufacturer.

4.2 Plans and data to be supplied by purchaser

4.2.1 Design data

The purchaser shall specify the following design data applicable to each section of pipeline for which the pipe shall be manufactured, for example:

- design pressure ;
- maximum design pressure equal to design pressure plus surge (calculation of surge is recommended) ;
- external loads and installation conditions, including bedding, backfilling and trench support ;
- fluid characteristics (type of fluid, chemical composition, temperature if over 50° C, etc) ;
- site investigation and soil data ;
- special conditions : for example, if longitudinal beam strength is a design condition, the purchaser shall designate the load and support conditions for which the pipe is to be designed.

4.2.2 Specifications and drawings

The purchaser shall provide the manufacturer with plans, profiles and specifications, for example :

- internal diameters ;
- alignment and grades ;
- location of all outlets, connections, valves and special fittings ;
- design and maximum design pressures for each section of the pipeline.

4.2.3 Design responsibility

The purchaser or the purchaser's engineering representative is responsible for the overall concept and design of the pipeline project, including supporting structures. The manufacturer is responsible for supplying pipe in accordance with the criteria defined in 4.2.1 and any additional requirements specified by the purchaser.

The purchaser shall be aware of the following different types of concrete pressure pipes covered by this standard and may wish to state his options :

- | | | |
|---|---|--------|
| • Reinforced non-cylinder pipe |) | |
| • Distributed reinforcement non-cylinder pipe |) | EN 640 |
| • Reinforced cylinder pipe |) | EN 641 |
| • Prestressed cylinder pipe |) | |
| • Prestressed non-cylinder pipe |) | EN 642 |

Should the purchaser wish to state his options, this shall be done at the time of invitation to tender.

4.3 Data to be submitted by the manufacturer

4.3.1 Parameters for surge calculation

Calculation of surge shall be provided by the purchaser. All necessary data relative to the pipe for such calculations shall be provided by the manufacturer, e.g. wave velocity.

4.3.2 Detail drawings and schedules

The manufacturer shall prepare drawings and schedules showing full details of reinforcement, concrete, and joint dimensions for the pipe and fittings. These shall be submitted to the purchaser for approval when required in the contract documents. All pipes and fittings shall be fabricated in accordance with the approved drawings and schedules. Pipes may be supplied from stock unless the purchaser has indicated otherwise.

4.3.3 Tabulated layout schedule

When specifically required, the data submitted by the manufacturer shall include a tabulated layout schedule with reference to the stationing and grade line shown on the drawings supplied by the purchaser. The schedule shall show pressure zones, each of which shall be designated by the design pressure applicable therein. The point of change from one zone to the next shall be clearly indicated by station number. The diameter of the pipe and the area of circumferential steel reinforcement (per unit length of pipe wall) shall be listed for each portion of the pipeline.

4.4 Design requirements

Dead and live loads, coefficients for moments and thrust calculations and bedding angle shall be determined in accordance with appropriate national standards, transposing EN as available, or in the absence of such standards, with the appropriate regulations or recognised and accepted methods at the place where the pipeline is installed.

5 MATERIALS

5.1 Cement

Cement and cementitious materials shall comply with the national standards, transposing EN as available.

Minimum 28 day compressive strength for cement and cementitious materials shall be 35 MPa.

5.2 Aggregates

Aggregates shall consist of materials complying with the national standards, transposing EN as available. Gradings may be modified to suit the production process. Aggregates shall not contain harmful constituents in such quantities as may be detrimental to the performance of the final product.

5.3 Mixing water

The mixing water shall comply with the national standard, transposing EN as available. The mixing water shall not contain harmful constituents in such quantities as may be detrimental to the performance of the final product (in general in Europe, drinking water from public supply is suitable for concrete).

5.4 Admixtures and additives

Admixtures and additives shall comply with the national standards, transposing EN as available. They shall not be detrimental to the performance of the final product.

5.5 Steel for cylinders, fittings and specials

Steel for cylinders, fittings and specials shall comply with the national standards, transposing EN as available.

5.6 Steel for joint rings

Steel for joint rings shall comply with the national standards, transposing EN as available.

5.7 Reinforcing steel

Reinforcing steel shall comply with the national standards, transposing EN as available.

5.7.1 Steel or wire for reinforced concrete may be plain, indented or deformed and it shall be of weldable quality (where appropriate). Welded fabric shall be produced using these materials.

5.7.2 Prestressing steel shall be plain except for longitudinals where it may be indented or deformed and may be combined in strands.

5.8 Sealing rings

Sealing rings shall be of elastomeric material complying with the national standards, transposing EN 681.1 as available.

5.9 Chloride content

The maximum allowable calculated chloride content in the concrete or mortar shall be, in percentages of weight of cement :

- reinforced concrete pipes : 0,4 % ;
- prestressed concrete pipes : 0,2 %.

6 COMMON REQUIREMENTS FOR PRODUCTS

6.1 Geometry and dimensions

Internal diameter, wall thickness(es), internal barrel length and geometrical characteristics of the joint shall be in accordance with the factory documents.

6.1.1 Nominal sizes

The list of typical nominal sizes (DN/ID) is given in Table 1.

Table 1 : Typical nominal sizes : DN/ID

200	250	300	400	500	600
700	800	900	1000	1100	1200
1250	1300	1400	1500	1600	1800
2000	2100	2200	2400	2500	2600
2800	3000	3200	3500	4000	

The above-mentioned nominal sizes (DN/ID) shall be normative from December 31st, 2000.

6.1.2 Internal diameters

After December 31st, 2000, the design internal diameter shall be equal to DN/ID expressed in mm. Until then, it may be greater as shown in the manufacturer's documents, but shall not be less than DN/ID expressed in mm. The tolerances applicable to the design internal diameter are given in Table 2.