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**Avlopp – Rör och rördelar av oarmerad,
stålfiberarmerad och armerad betong**

**Concrete pipes and fittings, unreinforced,
steel fibre and reinforced**

ICS 23.040.50; 93.030

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NORME EUROPÉENNE
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EN 1916

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ICS 23.040.50; 93.030

English version

Concrete pipes and fittings, unreinforced, steel fibre and reinforced

Tuyaux et pièces complémentaires en béton non armé,
béton fibré acier et béton armé

Rohre und Formstücke aus Beton, Stahlfaserbeton und
Stahlbeton

This European Standard was approved by CEN on 18 August 2002.

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 Management Centre 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, 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 1916:2002 has been prepared by Technical Committee CEN/TC 165 "Wastewater engineering", the secretariat of which is held by DIN.

It is a companion standard to EN 1917 "Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced".

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of an identical text or by endorsement, at the latest by April 2003, and conflicting national standards shall be withdrawn at the latest by October 2004.

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.

This European Standard includes eleven normative annexes and one informative annex. Annexes A, B, C, D, E, F, G, H, I, J and K are normative, annex ZA is informative.

When the text of this European Standard was approved, complete agreement could not be achieved for all requirements in the existing national specifications of CEN members and so it includes only those requirements and associated test methods for which a consensus could be reached. Consensus was achieved on the requirements for quality control.

NOTE For the time being, for specification purposes, complementary (i.e. non-conflicting) requirements and associated test methods outside the scope of this European Standard (see Table 1) will be needed at national level. In order not to create any barrier to trade, any call for conformity to complementary requirements should always be qualified by incorporating the words 'or equivalent' after the reference to them.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies performance requirements as defined in Table 1 and describes test methods for precast concrete pipes and fittings, unreinforced, steel fibre and reinforced, with flexible joints (with seals either integrated in the units or supplied separately) and nominal sizes not exceeding DN 1 750 for units with a circular bore or WN/HN 1 200/1 800 for units with an egg-shaped bore, for which the main intended use is the conveyance of sewage, rainwater and surface water under gravity or occasionally at low head of pressure, in pipelines that are generally buried.

Provision is made for the evaluation of conformity of units to this European Standard.

Marking conditions are included.

Table 1 — Specified characteristics and exclusions

Characteristic	Exclusions
Materials	Specifications where relevant European Standards have not yet been published.
Concrete	Types and value(s) of minimum content of cement plus any pozzolanic or latent hydraulic addition, according to serviceability conditions.
Finish	Limitations on size of blemishes.
Geometrical characteristics	<ul style="list-style-type: none"> — nominal sizes; — internal dimensions with tolerances; — tolerances on the wall thickness; — tolerances on the internal barrel length; — deviation from straightness and from squareness of ends.
Joints and joint seals	<ul style="list-style-type: none"> — the choice of method from those listed in 4.3.4.2 for demonstrating the durability of joints; — provisions for interchangeability; — requirements for additional testing where watertightness of the joint assembly is dependent upon an internal pressure.
Crushing strength	Specific strength classes and corresponding minimum crushing loads.
Longitudinal bending moment resistance	None.
Watertightness	None.
Special requirements for steel fibre concrete pipes, reinforced concrete pipes, jacking pipes and pipes with inlet	<ul style="list-style-type: none"> — strength class exceeding class 165 for steel fibre and reinforced concrete units; — value(s) of minimum concrete cover for reinforced concrete units; — limitations on the spacing of reinforcement; — relationship between internal and external reinforcement cages; — requirements for weld testing of reinforcement cages; — tolerances on the external diameter of jacking pipes; — jacking pipe collars of materials other than weldable structural steel plate, stainless steel plate or reinforced plastics.
Marking	<ul style="list-style-type: none"> — symbols or letters for identifying the material of a unit; — symbols or letters for identifying serviceability conditions other than normal conditions as stated in 4.3.8.
<p>NOTE Provisions for the following are also outside the scope of this European Standard:</p> <ul style="list-style-type: none"> - units with nominal sizes greater than DN 1 750 or WN/HN 1 200/1 800; - units with a bore other than circular or egg-shaped; - lifting facilities; - resistance to high pressure jetting; - circumstances other than those stated; - any receiving inspection by, or on behalf of, the purchaser. 	

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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 latest edition of the publication referred to applies (including amendments).

EN 681-1, *Elastomeric seals - Materials requirements for pipe joint seals used in water and drainage applications - Part 1: Vulcanized rubber.*

EN 10002-1, *Metallic materials - Tensile testing - Part 1: Method of test at ambient temperature.*

EN ISO 4287, *Geometrical product specification (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997).*

EN ISO 4288, *Geometrical product specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture (ISO 4288:1996).*

ISO 3384, *Rubber, vulcanized or thermoplastic - Determination of stress relaxation in compression at ambient and at elevated temperatures.*

ISO 4012, *Concrete - Determination of compressive strength of test specimens.*

ISO 10544, *Cold reduced steel wire for the reinforcement of concrete and the manufacture of welded fabric.*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1.1

pipe

hollow precast concrete unit of uniform bore throughout its internal barrel length, except in the vicinity of the joint profile, manufactured with or without base. Joints of units are preformed as spigot and socket and incorporate one or more joint seals

3.1.2

unreinforced concrete pipe

pipe that does not contain structural steel reinforcement or steel fibre strengthening

3.1.3

steel fibre concrete pipe

pipe that is structurally strengthened by steel fibres

3.1.4

reinforced concrete pipe

pipe that is structurally reinforced with one or more steel cages, suitably positioned to resist tensile stresses in the pipe wall

3.1.5

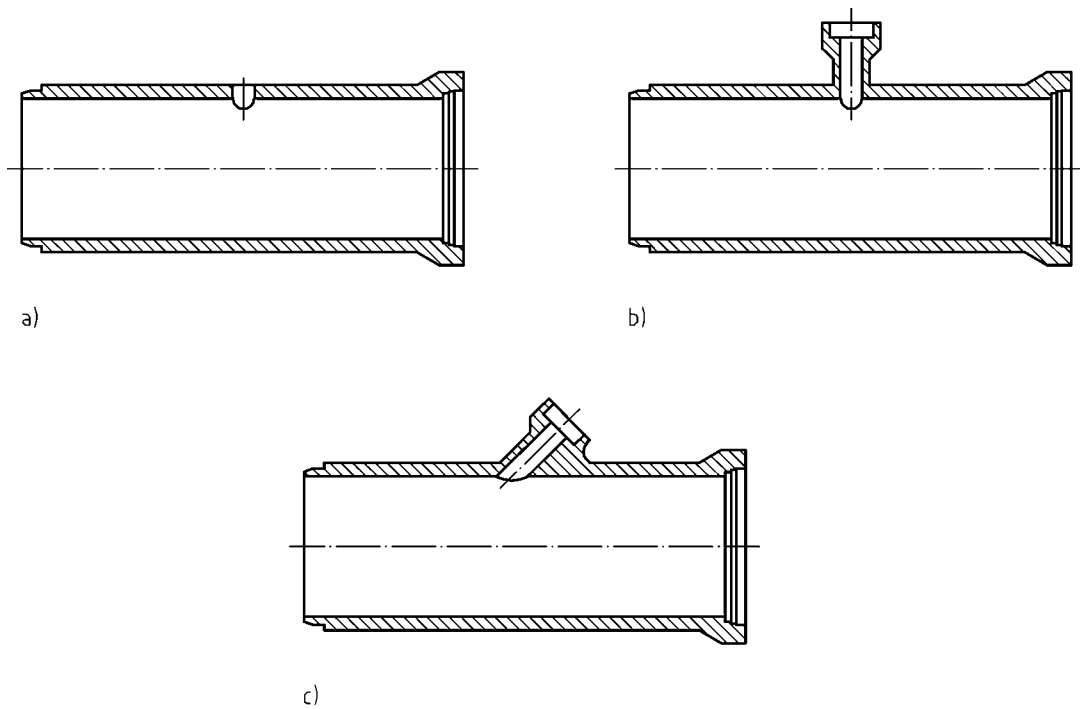
jacking pipe

unreinforced, steel fibre or reinforced concrete pipe, incorporating a flexible joint within the wall thickness, rebated or butt-ended with collar and which is intended for jacking

3.1.6

pipe with inlet

pipe as shown typically in Figure 1a, with one or more inlet-holes provided during or after manufacture



Key

- a) Typical pipe with inlet
- b) Typical junction with right-angled inlet
- c) Typical junction with angled inlet

NOTE Types of joint other than those shown are available.

Figure 1 — Junctions and pipes with inlet

3.1.7

circular pipe

pipe whose barrel cross-section in a plane perpendicular to its longitudinal axis is described by two concentric circles

3.1.8

fitting

adaptor, bend, connecting pipe, junction or taper (reducer)

3.1.9

adaptor

fitting that provides for connections to structures, to pipes of other materials, or to valves

3.1.10

bend

fitting that provides for a change of alignment within a pipeline