



Handläggande organ

Fastställd

Utgåva

Sida

SVENSK MATERIAL- & MEKANSTANDARD, SMS

2000-05-12

1

1 (1+21)

© Copyright SIS. Reproduction in any form without permission is prohibited.

Malleable cast iron fittings with compression ends for polyethylene (PE) piping systems

The European Standard EN 10284:2000 has the status of a Swedish Standard. This document contains the official English version of EN 10284:2000.

Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Rördelar – Rördelar av aducerat gjutjärn med kompressionsändar för rörledningssystem av polyetylene

Europastandarden EN 10284:2000 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 10284:2000.

Motsvarigheten och aktualiteten i svensk standard till de publikationer som omnämns i denna standard framgår av "Katalog över svensk standard", som ges ut av SIS. I katalogen redovisas internationella och europeiska standarder som fastställts som svenska standarder och övriga gällande svenska standarder.

ICS 23.040.10

Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.
Postadress: SIS, Box 6455, 113 82 STOCKHOLM
Telefon: 08 - 610 30 00. Telefax: 08 - 30 77 57
E-post: sis.sales@sis.se. Internet: www.sisforlag.se

Upplysningar om **sakinnehållet** i standarden lämnas av SMS.
Telefon: 08 - 459 56 00. Telefax: 08 - 667 85 42
E-post: info@sms-standard.se

Prisgrupp Q

Tyckt i juli 2000

EUROPEAN STANDARD

EN 10284

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2000

ICS 23.040.40

English version

Malleable cast iron fittings with compression ends for polyethylene (PE) piping systems

Raccords en fonte malléable avec joints à compression pour systèmes de canalisation en polyéthylène (PE)

Tempergußfittings mit Klemmanschlüssen für Polyethylen(PE)-Rohrleitungssysteme

This European Standard was approved by CEN on 12 November 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.



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

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

Contents

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Types of fittings	6
4 Definitions.....	6
5 Materials.....	7
6 Corrosion protection	8
7 Design	9
8 Performance requirements	10
9 Test requirements	10
10 Assessment of conformity.....	12
11 Designation of fittings	13
12 Marking	13
Annex A (informative) Examples of design	15
Annex B (informative) Quality assurance system.....	20
Bibliography	21

Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes", the secretariat of which is held by UNI.

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 September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

This standard includes the following annexes :

Annex A (informative) : Examples of design ;

Annex B (informative) : Quality assurance system ;

Bibliography.

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.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the products covered by this standard :

- 1) this standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA ;
- 2) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of these products remain in force.

1 Scope

This standard specifies the requirements for the design, performance and testing of fittings made of malleable cast iron (see also clause 5 Materials) with compression ends for polyethylene piping systems. It applies to piping systems in polyethylene (PE) materials for different application fields, such as water and gas supply, water distribution, irrigation and gaseous fuel systems.

The malleable cast iron fittings specified in this standard are of compression end type for the connection of PE pipes or of transition type with combined compression ends for pipes in different materials or with combined compression and threaded ends in conformance with prEN 10226-1. Their range of sizes covers nominal outside diameters of PE pipes d_n 16 to d_n 125 mm and pipe thread sizes 1/2 to 4.

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 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.

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

prEN 682, *Elastomeric seals - Material requirements for joint seals used in pipes and fittings carrying gas and hydrocarbon fluids.*

EN 751-1, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds.*

EN 751-2, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 2: Non-hardening jointing compounds.*

EN 751-3, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 3: Unsintered PTFE tapes.*

prEN 1555-1, *Plastics piping systems for gaseous fuels supply - Polyethylene (PE) - Part 1: General.*

prEN 1555-2, *Plastics piping systems for gaseous fuels supply - Polyethylene (PE) - Part 2: Pipes.*

prEN 1555-5, *Plastics piping systems for gaseous fuels supply - Polyethylene (PE) - Part 5: Fitness for purpose of the system.*

EN 1562, *Founding - Malleable cast irons.*

prEN 10226-1, *Pipe threads where pressure tight joints are made on the threads - Part 1: Taper external threads and parallel internal threads – Dimensions, tolerances and designation.*

prEN 10226-2, *Pipe threads where pressure tight joints are made on the threads - Part 2: Taper external threads and taper internal threads – Dimensions, tolerances and designation.*

prEN 12201-1, *Plastics piping systems for water supply - Polyethylene (PE) - Part 1: General.*

prEN 12201-2, *Plastics piping systems for water supply - Polyethylene (PE) - Part 2: Pipes.*

prEN 12201-5, *Plastics piping systems for water supply - Polyethylene (PE) - Part 5: Fitness for purpose of the system.*

EN 10204, *Metallic products: Types of inspection documents.*

ISO 228-1:1994, *Pipe threads where pressure-tight joints are not made on the threads - Part 1: Designation, dimensions and tolerances.*

ISO 10838-1¹⁾, *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels – Part 1 : Metal fittings for pipes of nominal outside diameter less than or equal to 63 mm.*

ISO 10838-2¹⁾, *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels – Part 2 : Metal fittings for pipes of nominal outside diameter greater than 63 mm.*

3 Types of fittings

For types of fittings, see typical examples of design in Annex A (informative).

4 Definitions

For the purpose of this standard the following definitions apply.

**4.1
fitting**
connecting piece for pipes

**4.2
transition fitting**
a fitting jointing different types of pipe and/or comprising different types of outlet

**4.3
fitting size**
size designation of the nominal outside diameter, d_n , of the connecting PE pipe or of the size of the jointing thread

**4.4
outlet**
end of a fitting which connects with a pipe by compression or with a threaded piping component

**4.5
run**
two principal axially aligned outlets of a tee

**4.6
branch**
side outlet of a tee

**4.7
compression end**
an end of a fitting in which the joint is made by the compression of a ring or sleeve on the wall of the pipe to provide for pressure integrity, leaktightness and resistance to end loads

**4.8
supporting sleeve (insert stiffener)**
cylindrical ring providing a permanent support for the pipe to prevent creep in the pipe wall under radial compressive forces

**4.9
grip ring**
ring that holds the pipes in place and prevents pull out from the joint

NOTE In some cases, the supporting sleeve at the same time constitutes a grip ring.

1) To be published.

4.10

minimum bore

smallest internal diameter measured at any cross-section of the assembled fitting

4.11

jointing thread

thread complying with prEN 10226-1 or prEN 10226-2

4.12

fastening thread

thread complying with ISO 228-1:1994

4.13

component test

test to verify the performance of a fitting carried out on the fitting with or without the internal parts

4.14

jointing test

test to verify the fitness for purpose of an assembled joint, including the fitting with the connecting pipes

5 Materials

5.1 Material of the fitting body

5.1.1 Malleable cast iron

The material used for the fitting body shall be malleable cast iron conforming to EN 1562. The grade of material used shall be selected from the following grades :

Grade EN-GJMW-400-5 or EN-GJMW-350-4 for fittings in white heart malleable iron.

Grade EN-GJMB-350-10 or EN-GJMB-300-6 for fittings in black heart malleable iron.

Fittings shall be designated by material symbols according to the selected material mentioned above and as given in Table 1.

Table 1- Material symbols

Material symbol	Material grade
A	EN-GJMW-400-5 or EN-GJMB-350-10
B	EN-GJMW-350-4 or EN-GJMB-300-6

5.1.2 Other ferrous materials

Notwithstanding this requirement, any other ferrous materials, e.g. ductile cast iron, which give mechanical properties at least equivalent to those malleable cast irons specified above will be allowed.

5.2 Material of the fitting components

Materials of the internal parts of the fittings in contact with PE pipe shall not adversely affect pipe performance, e.g. by initiation of stress cracking.

If a lubricant (detergent, grease, etc) is used for assembling it shall have no detrimental effect on the properties of the pipe and shall not cause the assembly to fail the functional requirements.

5.3 Elastomers

The material of elastomeric sealing rings used in fittings shall be chosen for drinking water application from EN 681-1 and for gas supply from prEN 682 depending on the specific application and shall conform to the appropriate class respectively type.

6 Corrosion protection

6.1 General

In applications where materials are susceptible to corrosion, the components shall be adequately protected.

6.2 Hot dip galvanizing

Where a protection by zinc coating is required, the zinc coating shall be applied by the hot dip process and shall meet the following requirements.

NOTE For fittings supplied in other ferrous materials (see 5.1.2) alternative zinc coating may be provided by agreement with the purchaser.

6.2.1 Chemical composition of the zinc coating

The content by mass of the accompanying elements in the finished zinc coating shall not exceed the following maximum values :

antimony	(Sb)	0,01 %
arsenic	(As)	0,02 %
bismuth	(Bi)	0,01 %
cadmium	(Cd)	0,01 %
lead	(Pb)	1,6 % in individual cases 1,8 %

6.2.2 Coating mass per surface unit

The areic mass of the zinc coating shall be not less than 500 g/m², as an average of 5 fittings. This corresponds to a medium layer thickness of 70 µm.

It shall be not less than 450 g/m² (63 µm) when it is measured on an individual sample. The medium layer thickness \bar{s} of the zinc coating in µm may be calculated by using the approximation formula

$$\bar{s} = \frac{m_A}{7,2}$$

where

m_A is the surface related mass of the zinc coating, in g/m².

6.2.3 Surface conditions of the zinc coating

The zinc coating on the internal surface of the fitting shall be continuous with the exception of machined surfaces. In the special case of larger material cross-sections the iron-zinc alloy phases may grow through. The internal zinc coating shall be free from zinc blisters, zinc burrs, non-metallic remainders.

6.3 Non-metallic coating

Depending on external and internal conditions of use, also non-metallic coating may be used, for example plastic coatings, if they are accepted by the purchaser.

6.4 Dispatch conditions of finished fittings

The surface of the fittings shall be free of polycyclic aromatic hydrocarbons.

7 Design

7.1 General

The fitting shall be capable of field assembly to PE pipes complying with

- prEN 12201-2 for drinking water distribution ;

and/or

- prEN 1555-2 for gas supply.

If special mechanical assembly tools are required, they shall be made available and they shall have sufficiently large bearing surfaces to avoid causing visible deformation during assembly. The fitting and tools shall be designed to avoid any weakening which would influence the performance of the joint assembly.

The fitting shall be so designed and manufactured that it can be buried or used above ground.

The fitting shall not induce twisting of the PE pipe during assembly.

Transition fittings shall include, if requested, means for anchoring an antishear sleeve, which could lessen detrimental effects from shear loading.

Examples of design are shown in Annex A.

7.2 Geometrical characteristics

Fittings according to this standard shall be designed for PE pipe diameters and jointing threads as follows :

- nominal outside diameter, d_n , of PE pipes :
16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125 mm ;
- size of jointing threads :
 $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4.

7.3 Supporting sleeve

The outside diameter of the internal supporting sleeve (insert stiffener) shall be such to comply with the internal diameter of the connecting PE pipe.

Where the clamping of the tube end is made by expending the supporting sleeve or by using a taper sleeve (insert stiffener), the tube end may be sized up.

For gas supply a rigid supporting sleeve other than a split tubular stiffener shall be used in conjunction with the fitting. For other application than gas supply the use of a supporting sleeve is left to the discretion of the manufacturer, depending on design.

The supporting sleeve shall be capable of insertion into the appropriate PE pipe without heating, except to an extent appropriate to rerounding of the pipe at a temperature below -5 °C.