SLOVENSKI STANDARD
SIST EN 489:2004

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Nadomešča:
SIST EN 489:2000

Cevi za daljinsko ogrevanje – Izolirani vezani cevni sistemi za podzemeljska toplovodna omrežja – Sestav spojev za jeklene cevi, poliuretanske toplotne izolacije in zunanjega polietilenskega plašča

District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Joint assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene

Fernwärmerohre - Werkmaßig gedämmte Verbundmantelrohrsysteme für direkt erdverlegte Fernwärmenetze - Rohrverbindungen für Stahlmediumrohre mit Polyurethan-Wärmedämmung und Außenmantel aus Polyethylen

Tuyaux de chauffage urbain - Systemes bloqués de tuyaux pré-isolés pour les réseaux d'eau chaude enterrés directement - Assemblage pré-isolé pour tube de service en acier, isolation thermique en polyuréthane et tube de protection en polyéthylene

Ta slovenski standard je istoveten z: **EN 489:2003**

ICS:

23.040.10	Železne in jeklene cevi	Iron and steel pipes
91.140.65	Oprema za ogrevanje vode	Water heating equipment

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EUROPEAN STANDARD

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English version

District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Joint assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene

Tuyaux de chauffage urbain - Systèmes bloqués de tuyaux pré-isolés pour les réseaux d'eau chaude enterrés directement - Assemblage pré-isolé pour tube de service en acier, isolation thermique en polyuréthane et tube de protection en polyéthylène

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This European Standard was approved by CEN on 28 November 2002.

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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.

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

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Contents

Foreword

This document (EN 489:2003) has been prepared by Technical Committee CEN/TC 107 "Prefabricated district heating pipe systems", the secretariat of which is held by DS.

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 August 2003, and conflicting national standards shall be withdrawn at the latest by August 2003.

This document will supersede EN 489:1994.

Annex A is normative. Annexes B and C are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The first edition of EN 489 was approved in 1994. The main areas of the revision are the following:

— the title has been amended by ”District heating pipes”;

— the term ”underground” has been changed to ”directly buried”;

— definitions for ”polyethylene weld” and ”double sealing” have been added;

— the requirements for the qualification of work force have been changed and annex C has been added;

— requirements concerning double sealing have been added;

— the water content of the sand used in the sand box has been limited to maximum 0,5 % (mass fraction).

— the former annex C “Assumptions made to establish functional requirements of joints” and all references to it have been deleted and substituted by a reference to EN 13941.

This specification is part of the series of standards for bonded systems using polyurethane foam thermal insulation applied to bond to a steel service pipe and a polyethylene casing.

For information on the minimum expected thermal life with operation at various temperatures with respect to PUR foam performance see EN 253:2003, annex B.

The other standards from TC 107 are:

EN 253:2003, *District heating pipes – Preinsulated bonded pipe systems for directly buried hot water networks – Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene.*

EN 448:2003, *District heating pipes – Preinsulated bonded pipe systems for directly buried hot water networks – Fitting assemblies of steel service pipes, polyurethane thermal insulation and outer casing of polyethylene.*

EN 488:2003, *District heating pipes – Preinsulated bonded pipe systems for directly buried hot water networks – Steel valve assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene.*

EN 13941:2003, *Design and installation of preinsulated bonded pipe systems for district heating.*

NOTE The following draft in connection with the above mentioned is under development:

prEN 14419, *District heating pipes – Preinsulated bonded pipe systems for directly buried hot water networks – Surveillance systems.*

As information to the users of this standard CEN/TC 107 has decided to mention that at the time of publication of this European Standard CEN/TC 107 had already concluded on the investigation and further preparation of the following topics:

— appropriate short and long term type tests for all jointing systems;

— incorporation of the findings of running research activities to introduce new test procedures and requirements;

— establishment of normative references for PE welding;

— further preparation of annex C aiming at making this annex normative.

The above mentioned items should be dealt with and the intention is to include the results in the next revision of this standard.

1 Scope

This European Standard specifies requirements for joints, made under field conditions, between adjacent preinsulated pipes and/or fittings in district heating networks. The specified general requirements are also valid for field made T-branches, bends, reducers, caps, etc.

The standard covers jointing of steel service pipes by means of fusion welding, the connecting of casing ends with joint casings and the thermal insulation with poured rigid PUR foam.

This standard specifies methods for type tests of complete joints and PUR-foam for joints under laboratory conditions. The type tests apply only to straight casing joints which are not-welded.

The requirements of this standard can also be applied to casing pipe weldings/connections of on site made fittings.

The requirements of this standard are aiming at obtaining a technical life of the joints of at least 30 years.

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 253:2003, *District heating pipes – Preinsulated bonded pipe systems for directly buried hot water networks – Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene.*

EN 287-1, *Approval testing of welders – Fusion welding – Part 1: Steels.*

EN 288-1:1992, *Specification and qualification of welding procedures for metallic materials – Part 1: General rules for fusion welding.*

EN 444, *Non-destructive testing – General principles for radiographic examination of metallic materials by X- and gamma-rays.*

EN 583-1, *Non-destructive testing – Ultrasonic examination – Part 1: General principles.*

EN 1435, *Non-destructive examination of welds – Radiographic examination of welded joints.*

EN 1712, *Non-destructive examination of welds – Ultrasonic examination of welded joints – Acceptance levels.*

EN 1714, *Non-destructive examination of welds – Ultrasonic examination of welded joints.*

EN 13941, *Design and installation of preinsulated bonded pipe systems for district heating.*

EN 25817:1992, *Arc-welded joints in steel materials – Guidance on quality levels for imperfections (ISO 5817:1992).*

ISO 6520, *Welding and allied processes – Classification of geometric imperfections in metallic materials.*

ISO 9692, *Metal-arc welding with covered electrode, gas-shielded metal-arc welding and gas welding – Joint preparations for steel.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 253:2003 together with the following apply.

3.1
joint
complete construction of the connection between adjacent pipes and/or fittings

3.2
joint casing
part that connects the two pipe casing ends in a joint

3.3
steel weld
connection between the steel service pipes by welding

3.4
polyethylene weld
molecular jointing of polyethylene to polyethylene under influence of heat, pressure and time

3.5
double sealing
two sealing systems independently installed on the same joint, not influencing each other negatively and thus independently functioning during the service life of the joint

3.6
surveillance system
system that consists of measuring sections and measuring instruments for surveillance of pipe systems

4 Requirements

4.1 General requirements

NOTE The assumptions of EN 13941 have been taken as the base for these requirements.

4.1.1 General requirements for the joint

The joint shall be:

— watertight;

— able to withstand axial forces initiated by axial movements of the pipe in the ground;

— able to withstand radial forces and bending moments;

— able to withstand effects of temperature and temperature variations.

In case of double sealing each one of the sealing systems and the combination of both systems shall fulfil the requirements of the type test as described in clause 5.

4.1.2 Construction of the joint

Each individual step in the construction of a joint shall follow the system supplier's installation instructions in order to ensure that the joint obtained is equivalent to the joint as previously type-tested.

4.1.3 Competence of the welder and fitter

Persons installing joints on preinsulated pipe networks shall possess a valid evidence of qualification stating that they have received training relevant to the system and the type of joint.

Steel service pipe welders shall possess a valid certificate in accordance with EN 287-1.

Polyethylene welders shall possess a valid evidence of qualification which documents their ability to perform reproductive welding of the quality specified.

Recommended subjects for training are given in annex C.

4.1.4 Expected thermal life and long term temperature resistance

The requirements for expected life and long term temperature resistance shall be in accordance with 4.5.4 of EN 253:2003.

4.1.5 Steel service pipe weld

The steel service pipe weld shall:

— be tight when tested in accordance with A.5;

— have mechanical properties equivalent to those of the service pipe.

4.1.6 Polyurethane rigid foam insulation (PUR)

The foaming of a joint shall be carried out in a confined space.

The PUR foam shall completely fill the joint.

The requirements for the rigid PUR foam insulation shall be in accordance with 4.4.2, 4.4.3, 4.4.4 and 4.4.5 of EN 253:2003.

4.1.7 Joint casing

The joint casing shall be tight against external water pressure.

All joints shall be subject to a leak-test. If this is not possible, a type specific procedure of 100 % visual test in combination with a destructive spot test scheme shall be described in the manufacturer's documentation.

NOTE Leakage testing of joints should be carried out with air or another suitable gas. The test pressure of 20 kPa should be applied at a temperature of ≤ 40 °C for a minimum of 2 min. The leak-tightness should be checked by means of a suitable indicator liquid or a leakage detector. The indicator liquid should be detrimental neither to the casing and joint material nor to the environment.

Proper handling and installation procedures and type specific test procedures for the verification of leak-tightness of installed joint casings shall be described in the manufacturer's documentation.

4.2 Type test requirements

4.2.1 Soil stress test

No water ingress shall be detected after the soil stress test in accordance with 5.1.

4.2.2 Polyurethane rigid foam insulation (PUR) properties

The polyurethane rigid foam insulation (PUR) for joint assemblies shall meet the requirements of 4.4, 4.5.4 and 4.5.5 of EN 253:2003.

4.3 Installation instructions

4.3.1 General

Installation instructions, crucial for the quality of the installed joint and for achieving the expected life, shall be a part of the manufacturer's documentation and shall be supplied together with the component parts.

The installation instructions shall, as a minimum, deal with the topics mentioned in 4.3.2 to 4.3.7.

4.3.2 Work environment

Proper procedures to obtain optimum work conditions on site shall be specified.

4.3.3 Cleaning

Proper procedures for the cleaning and drying shall be specified for:

— steel pipe surfaces;

— insulation surfaces;

— joint casing surfaces;

— casing surfaces.

The sentence ”Any wet foam shall be removed from the pipe ends” shall be included in the instructions.

4.3.4 Surveillance system

When a surveillance system is installed proper procedures for connecting the surveillance system shall be specified. This specification shall, as a minimum, include:

— general handling instructions to avoid damaging the system;

— procedures for positioning and connecting adjacent pipes to ensure the function of the system;

— procedures and test methods to check the function of the surveillance system during construction.

4.3.5 Steel site weld

Proper procedures for the steel weld shall be described. This description shall, as a minimum, include the parts "Welding process" and "Preparation for welding and lining up" in accordance with annex A.

4.3.6 Joint casing

Proper handling and installation procedures for the joint casing shall be specified.

Type specific test procedures for leak-tightness of installed joints shall be described.