SLOVENSKI STANDARD
SIST EN 489-1:2020

01-februar-2020

Nadomešča:
SIST EN 489:2009

Cevi za daljinsko ogrevanje - Predizolirani enocevni ali dvocevni sistemi za vkopana vročevodna omrežja - 1. del: Spojeni cevni sestavi in toplotna izolacija za vročevodna omrežja v skladu z EN 13941-1

District heating pipes - Bonded single and twin pipe systems for buried hot water networks - Part 1: Joint casing assemblies and thermal insulation for hot water networks in accordance with EN 13941-1

Fernwärmerohre - Einzel- und Doppelrohr-Verbundsysteme für erdverlegte Heißwasser-Fernwärmenetze - Teil 1: Mantelrohrverbindungen und Wärmedämmung für Heißwasser-Fernwärmenetze nach EN 13941-1

Tuyaux de chauffage urbain - Systèmes bloqués de tuyaux monotubes et bitubes pour les réseaux d'eau chaude enterrés - Partie 1 : Assemblage des joints de tube de protection pour les réseaux d'eau chaude conformes à l'EN 13941-1

Ta slovenski standard je istoveten z: **EN 489-1:2019**

ICS:

23.040.07	Cevovodi za daljinsko ogrevanje in njihovi deli	Pipeline and its parts for district heat
23.040.60	Prirobnice, oglavki in spojni elementi	Flanges, couplings and joints
91.140.65	Oprema za ogrevanje vode	Water heating equipment

SIST EN 489-1:2020 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 489-1

October 2019

ICS 23.040.07; 23.040.60

Supersedes EN 489:2009

English Version

District heating pipes - Bonded single and twin pipe systems for buried hot water networks - Part 1: Joint casing assemblies and thermal insulation for hot water networks in accordance with EN 13941-1

Tuyaux de chauffage urbain - Systèmes bloqués de tuyaux monotubes et bitubes pour les réseaux d'eau chaude enterrés - Assemblage des joints de tube de protection pour les réseaux d'eau chaude conformes à l'EN 13941-1

Fernwärmerohre - Einzel- und Doppelrohr-Verbundsysteme für erdverlegte Heißwasser-Fernwärmenetze - Teil 1: Mantelrohrverbindungen und Wärmedämmung für Heißwasser-Fernwärmenetze nach EN 13941-1

This European Standard was approved by CEN on 12 August 2019.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 489-1:2019 E

Contents

Page

European foreword

This document (EN 489-1:2019) has been prepared by Technical Committee CEN/TC 107 “District heating and cooling”, 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 April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 489:2009.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The first edition of EN 489 was approved in 1994 and updated in 2003 and 2009. The main areas of this revision are the following:

— Terms and definitions has been moved to EN 13941-1;

— Ageing resistance test for PUR foam has been removed;

— requirements to plugs have been added;

— requirements and test methods for PUR foam properties are back in EN 253;

— requirements for marking of joints have been added;

— preparation of test specimen, under supervision of the test institute, has been added;

— it is valid for twin-pipe systems as well;

— Annex C was moved to EN 13941-2;

— concerning the soil stress test - the possibility of either overfill with 1 m sand or use of a rigid plate was removed and is replaced by a total load of a rigid plate plus 0,3 m of sand to a total of 18 kN/m²;

— larger pipe diameters may be tested in soil stress test.

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.

Other standards from TC 107 are:

— EN 253, *District heating pipes — Bonded single pipe systems for buried hot water networks — Factory made pipe assembly of a steel service pipe, polyurethane foam thermal insulation and a casing of polyethylene*;

— EN 448, *District heating pipes — Bonded pipe systems for buried hot water networks — Factory made fitting assemblies of steel service pipes, polyurethane thermal insulation and a casing of polyethylene*;

— EN 488, *District heating pipes — Bonded single pipe systems for directly buried hot water networks — Factory made steel valve assembly for steel service pipes, polyurethane foam thermal insulation and a casing of polyethylene*;

— EN 13941-1, *District heating pipes — Design and installation of thermal insulated bonded single and twin pipe systems for buried hot water networks — Part 1: Design*

— EN 13941-2, *District heating pipes — Design and installation of thermal insulated bonded single and twin pipe systems for buried hot water networks — Part 2: Installation*

— EN 17248, *District heating and district cooling pipe systems - Terms and definitions*

— EN 14419, *District heating pipes — Bonded single and twin pipe systems for directly buried hot water networks — Surveillance systems.*

— EN 15632 (all parts), *District heating pipes - Pre-insulated flexible pipe systems*

— EN 15698-1, *District heating pipes — Bonded twin pipe systems for directly buried hot water networks — Part 1: Factory made twin pipe assembly of steel service pipes, polyurethane foam thermal insulation and one casing of polyethylene*

— EN 15698-2, *District heating pipes — Bonded twin pipe systems for directly buried hot water networks — Part 2: Factory made fitting and valve assemblies of steel service pipes, polyurethane thermal insulation and one casing of polyethylene*

1 Scope

This document specifies requirements and test methods for joints between adjacent factory made pipe, and/or fitting and/or valve assemblies for buried hot water networks in accordance with EN 13941-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 253:2019, *District heating pipes — Bonded single pipe systems for buried hot water networks — Factory made pipe assembly of a steel service pipe, polyurethane foam thermal insulation and a casing of polyethylene*

EN 12814-1, *Testing of welded joints of thermoplastics semi-finished products — Part 1: Bend test*

EN 13941-2, *District heating pipes — Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks — Part 2: Installation*

EN 17248, *District heating and district cooling pipe systems — Terms and definitions*

EN 14419, *District heating pipes — Bonded single and twin pipe systems for directly buried hot water networks — Surveillance systems*

ISO 16770, *Plastics — Determination of environmental stress cracking (ESC) of polyethylene — Full-notch creep test (FNCT)*[1]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17248 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

4 Requirements

4.1 General

Requirements which shall be fulfilled for all joints:

[1] Under preparation. Stage at the time of publication: ISO/DIS 16770

Table 1 — Requirements to be tested on different systems

Joint requirements	Welded joint	Sealed joint
Soil stress	if SCR is not possible 4.3.4	4.3.4
Stress Crack Resistance SCR	4.3.6	-
Water tightness	4.3.5	4.3.5
Foam properties	4.3.3	4.3.3
Plug properties	4.3.7	4.3.7.2

4.2 General requirements for type testing

4.2.1 General

The assumptions of EN 13941-1 have been taken as the base for these requirements.

On testing each joint casing system and all relevant products shall be provided with installation instructions, product data sheet and, if relevant, safety datasheet.

NOTE Annex A gives a categorization of different joint casing systems.

4.2.2 General requirements for the joint

The joint shall be:

— watertight;

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

— able to withstand radial forces and bending moments;

— able to withstand effects of temperature and temperature variations.

4.2.3 Installation of the joint

Each individual step in the installation 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.

4.3 Requirements for joints of single and twin pipes

4.3.1 General

There are no differences in requirements for single and twin pipe joints.

4.3.2 Welding of steel service pipes

Welds between steel service pipes shall be made in conformance with EN 13941-2.

4.3.3 Polyurethane (PUR) foam thermal insulation

4.3.3.1 General

The installation of the on-site filled insulation or the pre-fabricated thermal joint insulation shall be carried out according to the supplier's installation instruction.

The insulation shall completely fill the joint.

4.3.3.2 Foam density

The requirement for foam density shall be in accordance with EN 253.

4.3.3.3 Compressive strength

The requirement for compressive strength shall be in accordance with EN 253.

4.3.3.4 Cell size

The requirement for the average cell size in radial direction shall be in accordance with EN 253.

4.3.3.5 Water absorption at elevated temperature

The requirement for water absorption at elevated temperature shall be in accordance with EN 253.

4.3.4 Soil stress test

Joints shall, as mentioned in Table 1, pass the soil stress test in accordance with 5.2.

4.3.5 Water tightness

For all joint casing systems it applies that no water ingress shall be detected after the water tightness test in accordance with 5.3.

4.3.6 Stress crack resistance (SCR)

Each circumferential and longitudinal weld shall be individually tested for SCR. When tested in accordance with 5.4 the time until failure shall be at least 300 h.

If SCR test is not possible the soil stress test according to 5.2 shall be performed.

4.3.7 Plugs

4.3.7.1 General

Joint casing system to be foamed on-site shall have its foaming and venting holes securely closed by:

- plugs sealed by adhesive or similar (sealed plugs);
- plugs fused by welding (welded plugs).

4.3.7.2 Sealed plugs

Sealed plugs shall be tested following the approach of the sealed joint casing system. This means the sealed plugs shall be present in the soil stress test and water tightness test as part of the joint casing system. The definitions of single sealed, double sealed or multiple sealed are given in Annex A together with the tests that shall be carried out.

4.3.7.3 Welded plugs

Welded plugs shall fulfil the requirement of the bending test in accordance with 5.7.

They shall be tested following the approach of the joint casing system in which they are used.

The bending test of the welded plug according to 5.7 is to be performed after the watertightness test

4.3.8 Melt mass-flow rate (MFR) of welded plug

The melt mass-flow rate (MFR) of the welded plug material shall be determined in accordance with 5.5. The MFR, in g/10 min, shall be within 0,2 ≤ MFR ≤ 1,0 g/10 min.

4.4 Installation instructions

4.4.1 General

Installation instructions, crucial for the quality of the joint and for achieving the expected lifetime, shall be a part of the manufacturer's documentation. These installation instructions shall be a part of the type test report.

The installation instructions shall, as a minimum, deal with the topics mentioned in 4.4.2 and shall be followed at any installation.

4.4.2 Requirements for installation instruction

The intention of the installation instruction is to enable the installer to install the product in a correct way. It is the responsibility of the supplier to formulate a complete instruction, but it has as a minimum to deal with the following topics:

a) storage conditions of components;

b) environmental conditions for installation;

c) identification of components;

d) required installation equipment and tools;

e) proper procedures for the cleaning, drying and preparation of surfaces;

f) relevant test procedures for leak-tightness of joint shall be described;

g) recommendation to check the quality and consistency of the foam components;

h) necessary quantity of foaming material for each joint dimension;

i) procedures for on-site testing.

4.5 Surveillance system

When measuring elements for a surveillance system are installed in the joint, proper procedures for connecting the surveillance system shall be specified before the assembly takes place. This specification shall comply with EN 14419.

5 Test methods

5.1 Preparation of test specimen

The test specimens, to be used in a type test, shall be prepared under the witness of the testing institute doing the test, in order to make sure that the installation instructions provided by the manufacturer are followed.