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District heating pipes - Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks - Part 1: Design

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NATIONAL FOREWORD

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See Eesti standard EVS-EN 13941-1:2019 sisaldab Euroopa standardi EN 13941-1:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 13941-1:2019 consists of the English text of the European standard EN 13941-1:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 17.04.2019.	Date of Availability of the European standard is 17.04.2019.
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ICS 23.040.10, 91.140.10

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13941-1

April 2019

ICS 23.040.10; 91.140.10

Supersedes EN 13941:2009+A1:2010

English Version

District heating pipes - Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks - Part 1: Design

Tuyaux de chauffage urbain - Conception et installation des systèmes bloqués de monotubes ou bitubes isolés thermiquement pour les réseaux d'eau chaude enterrés directement - Partie 1 : Conception

Auslegung und Installation von werkmäßig gedämmten Verbundmantelrohren für die Fernwärme

This European Standard was approved by CEN on 14 December 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Ref. No. EN 13941-1:2019 E

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European foreword

This document (EN 13941-1:2019) has been prepared by Technical Committee CEN/TC 107 "Prefabricated district heating and district cooling pipe system", 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of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

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 13941:2009+A1:2010.

EN 13941, *District heating pipes — Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks* consists of the following parts:

— *Part 1: Design*;

— *Part 2:* Installation.

In comparison to EN 13941:2009+A1:2010, the following changes have been made:

a) EN 13941 is considered to be the "system standard", including all requirements for materials and components and where necessary referring to the related product standards

b) chapters related to installation are moved to EN 13941-2;

c) terms and definitions are moved to EN 17248

d) the document structure is improved, giving a better balance between standard text and annexes;

e) twin pipes are included in a new Annex E;

f) Annex H: "Scope of EN 13941 in relation to Pressure Equipment Directive (PED)" was added;

g) requirements for horizontal and vertical stability and for parallel excavations are made more explicit;

h) minimum free distances between parallel pipes are introduced as well as a warning to be aware of works of third parties that might endanger the integrity or the required design conditions of the district heating pipes;

i) requirements for horizontal directional drillings are included (also in EN 13941-2);

j) required properties and testing methods for expansion cushions are included;

k) a design fatigue curve for fillet welds (e. g in single use compensators) is included;

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l) the use of stress concentration factors for butt welds in district heating pipes is, in line with present international pipeline codes, not considered necessary anymore;

m) a great number of smaller adjustments and editorial improvements.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This document has been prepared by CEN/TC 107/WG 13 “Prefabricated district heating and district cooling pipe system”.

According to the scope of CEN/TC 107:

— the task of CEN/TC 107/WG 13 is to specify rules for design, calculation and installation for factory made thermal insulated bonded single and twin pipe systems for directly buried hot water networks;

— CEN/TC 107/WG 13 also contributes to rules for functional tests for thermal-insulated bonded pipe systems for underground hot water networks;

When use is made of the standard, the different sections of which it is made up is to be interpreted as being interdependent and, because of this, cannot be dissociated.

The revision of EN 13941:2009+A1:2010 involves the subdivision of the document in two separate documents:

— EN 13941-1, *District heating pipes — Design and installation of thermal insulated bonded single and twin pipe systems for directly 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 directly buried hot water networks — Part 2: Installation.*

This volume (Part 1) consists of a main part and eight annexes.

Annexes A, and F are normative. Annexes B, C, D, E, G, H, I, J and K are informative.

This document contains a number of requirements aimed at ensuring the sound execution of distribution networks and transportation pipelines for district heating.

The requirements and regulations contained in this document should be assessed and applied in compliance with the intentions of the standard and in due consideration of the development taking place in the field it concerns. It is therefore assumed that the user of the standard has the requisite technical insight and that the user of the standard has adequate knowledge of legal and other external regulations that are of consequence to the practical application of the standard.

NOTE Some paragraphs of this standard are possibly covered by national regulations in some countries which naturally apply instead of this standard.

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1 Scope

This document specifies requirements for design, calculation and installation of factory made thermal insulated bonded single and twin pipe systems for buried hot water networks for continuous operation with treated water at various temperatures up to 120 °C and occasionally peak temperatures up to 140 °C for maximum 300 h/a, and maximum internal pressure 2,5 MPa.

Flexible pipe systems according to the EN 15632 series are not under the scope of this standard.

The standard EN 13941, *Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks* consists of two parts:

a) EN 13941-1: *Design*;

b) EN 13941-2: *Installation*.

The requirements in this part, EN 13941-1, form a unity with those of EN 13941-2.

The principles of the standard may be applied to thermal insulated pipe systems with pressures higher than 2,5 MPa, provided that special attention is paid to the effects of pressure.

Adjacent pipes, not buried, but belonging to the network (e.g. pipes in ducts, valve chambers, road crossings above ground etc.) may be designed and installed according to this standard.

This document presupposes the use of treated water, which by softening, demineralization, de-aeration, adding of chemicals, or otherwise has been treated to effectively prevent internal corrosion and deposits in the pipes.

NOTE For further information on water qualities to be used in district heating pipe systems see also bibliographic entry [2].

This standard is not applicable for such units as:

a) pumps;

b) heat exchangers;

c) boilers, tanks;

d) systems behind domestic substations.

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

EN 448, *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, *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 489-1, *District heating pipes — Bonded single and twin pipe systems for directly buried hot water networks — Casing joint assemblies and thermal insulation for hot water networks in accordance with EN 13941-1*

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EN 10204, *Metallic products - Types of inspection documents*

EN 10216-2, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-2, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-5, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10253-2, *Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements*

EN 13480-3, *Metallic industrial piping - Part 3: Design and calculation*

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

EN 15698 (all parts), *District heating pipes —Bonded twin pipe systems for directly buried hot water networks*

EN 17248,[1] *District heating and district cooling pipe systems - Terms and definitions*

EN ISO 1856, *Flexible cellular polymeric materials - Determination of compression set (ISO 1856)*

3 Terms and definitions, units and symbols

3.1 Terms and definitions

For the purpose of this document, the terms and definitions given in prEN 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 http://www.iso.org/obp

[1] Under preparation. Time at stage of publication: prEN 17248:2018.

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