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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

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For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

District heating and district cooling pipes - Bonded single and twin pipe systems for directly buried hot and cold water networks - Part 2: Qualification testing of PE-Welder

Tuyaux de chauffage et de refroidissement urbains -
Systèmes bloqués de monotubes et bitubes pour les
réseaux d'eau chaude et froide enterrés directement -
Partie 2 : Épreuve de qualification de soudeur de PE

Fernwärme- und Fernkälterohre - Ein- und
Doppelrohr-Verbundsysteme für direkt erdverlegte
Fernwärme- und Fernkältenetze - Teil 2: Prüfung von
PE-Schweißern

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 107.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 18213-2:2025) by Technical Committee CEN/TC 107 “District heating and cooling systems”, the secretariat of which is held by DS.

This document is currently submitted to the CEN Enquiry.

Introduction

The installation quality of the joint casing application and of measuring elements for surveillance systems also as welding of PE-casings is crucial for the service life and efficiency of district heating and cooling networks, built with factory-made thermally insulated pipe, fitting and valve assemblies. Damage caused by improper application leads to moisture ingress into the thermal insulation and to corrosion of the steel service pipe.

This document deals with the installation of weldable joint casing systems according to [EN 489-1\[1\]](#) as well as with hot gas welding and hot gas extrusion welding.

The PE-welder's ability to follow verbal or written instructions and to evidence his skills are important factors in ensuring the integrity of the joint casing connection.

This document serves as the basis for the general recognition by test and certification bodies of the PE-welder's competency and qualification.

PE-welders can also take an examination according to [prEN 18213-1\[2\]](#) to demonstrate their ability to install sealable joint casing systems.

This document is an integral part of the standards for bonded pipe systems for district heating and cooling.

Other standards from CEN/TC 107 covering this subject: [EN 253\[3\]](#), [EN 448\[4\]](#), [EN 489-1\[1\]](#), [EN 13941-1\[5\]](#), [EN 13941-2\[6\]](#), [EN 14419\[7\]](#), [EN 15698-1\[8\]](#), [EN 15698-2\[9\]](#), [EN 17248\[10\]](#), [EN 17415-1\[11\]](#), [EN 17415-2\[12\]](#), [EN 17415-3\[13\]](#), [EN 17878-1\[14\]](#), [EN 17878-2\[15\]](#), [EN 17878-3\[16\]](#) and [prEN 18213-1\[2\]](#) are listed in the bibliography.

1 Scope

This document specifies the methods of examining the knowledge and skill set of the PE-welder required to carry out on-site joint casing connections on thermally insulated single and twin pipe systems for directly buried hot and cold water networks according to [EN 13941-1:2019\[17\]](#) and [EN 13941-2:2019\[18\]](#).

The application of these specified methods specifications ensures that the examination is carried out according to a standardised examining procedure.

This document applies to the following processes:

- preparatory works for joint casing assembly;
- assembling and testing the elements for surveillance systems;

NOTE *For special surveillance systems it can be important to have additional training.*

- preparatory works for joint casing system installation;
- assembling weldable joint casing system;
- executing hot gas welding and hot gas extrusion welding
- verifying joint tightness (leakage testing);
- thermally insulating the joint casing (PUR foaming or half-shell);
- sealing fill & vent openings (weldable plugs);
- assessing overall installation quality of the completed joint connection (non-destructive).

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 a casing of polyethylene*

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

EN 489-1, *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*

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

EN 17248:2019, *District heating and district cooling pipe systems - Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17248:2019 apply.

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>

- IEC Electropedia: available at <http://www.electropedia.org/>

4 Qualification of Test Institute, Supervisor

4.1 Test Institute

The test institute is a recognized centre for the examination of PE-welders.

NOTE The training of PE-welders can also take place at the test institute.

Test institutes can be companies that:

- manufacture factory made district heating and district cooling pipe, fitting and valve assemblies ,
- distribute factory made district heating and district cooling pipe, fitting and valve assemblies,
- carry out joint installation work on factory made bonded and flexible pipe systems for district heating and district cooling,

who have demonstrated extensive theoretical and practical experience in joint casing installation over a minimum period of 5 years.

or:

- institutions whose business activities include the education and examination of specialist staff, however with additional personnel requirements, in case extensive theoretical and practical expertise over a minimum period of 5 years cannot be demonstrated.

Factual requirements for the test institute are suitable equipment engineering, testing technology and premises for knowledge and practical skills tests.

The application for recognition as testing institute shall be submitted in writing to the Euroheat & Power association (EHP), followed by an examination of the required specialist knowledge of the supervisors as well as by an inspection of the required spatial and factual infrastructure. A group of experts decides on the award or refusal of the certificate of recognition or raises deficiencies for rectification.

The rules of procedure for the entire recognition process should be adhered to

- process of the recognition procedure
- duration of validity
- recognition of additional supervisors
- issuance, expiry or withdrawal of recognition
- monitoring
- review
- extension of the period of validity
- change of recognition
- complaints procedure

The recognition is valid for a period of 5 years. In order to maintain its recognition, the test institute shall ensure the necessary premises, technical equipment, further training and the availability of a recognized supervisor.

4.2 Supervisor

The qualification of a supervisor shall be:

- an engineer, bachelor, master, technician or state-recognized master craftsman respectively master chamber of industry and commerce in a relevant technical profession;
- proving extensive theoretical and practical experience over a minimum period of 5 years in joint casing installation as well as in the assessment of joint casing quality characteristics, in particular in the joint casing installation processes to be tested;
- having served at least 3 observations/internships during PE-welder examinations;
- knowledgeable and experienced in PE-welding processes.

Instead of the 5 years of practical experience, the necessary skills can be demonstrated through the following evidence:

- a valid test certificate according to this document, and
- a valid test certificate according to [prEN 18213-1\[2\]](#), and
- at least 10 days observation/internship on joint casing installation construction sites.

5 Admission to qualification

Only applicants whose training and/or previous activities show that they are likely to pass the planned test may be admitted as a candidate.

As a rule, this is the case if one of the following is met:

- completed apprenticeship as plastics fabricator;
- at least one year experience as joint casing installation assistant, confirmed by employer's declaration;
- completion of both a theoretical and practical training course in preparation for the PE-welder's qualification test.

The applicant shall be trained in handling of isocyanate.

NOTE Further information can be found in the European REACH regulation.

The content of the training course is defined in [Annex A](#).

6 Testing knowledge and skills

6.1 General

The candidate shall demonstrate in qualification tests his theoretical knowledge according to [6.2](#) and practical skills according to [6.3](#).

6.2 Theoretical test

6.2.1 General

The candidate's knowledge of the practical rules for skillful and safe working shall be evaluated in a theoretical test.

This part of the qualification test is carried out under the supervision of the supervisor.

The candidate shall answer 20 multiple-choice questions. Filling in the questionnaire shall not exceed one hour and be continuous without access to teaching aids.

The questions shall cover the subjects in [6.2.2](#).

6.2.2 Questions

The questions shall be related to the following subjects, as appropriate:

- personal protective equipment (PPE) (observe the national requirements)
- preparation of pipe trench
- storage, transport and handling of chemicals and flammable/corrosive substances
- proper installation equipment and tools
- surrounding conditions for joint casing installation
- working and ambient conditions
- systems and products to be used
- preparatory works for joint casing installation
- assembly and test of surveillance systems
- preparation of welding areas
- installation of weldable joint casing systems
- execution of hot gas welding and hot gas extrusion welding (if a qualification is intended for)
- tightness testing of the joint casing prior to thermal insulation
- production of PUR foam sample
- thermal insulation of joint casing cavity
- sealing foam and vent openings
- self-assessment possibilities of welded joint casing assembly
- awareness of health and safety requirements.

6.3 Practical test

6.3.1 General

The practical test shall be carried out under the supervision of the supervisor on a weldable joint casing system approved in accordance with EN 489-1 and / or on a test piece according to [6.3.4](#).

Assembling the test piece is to be carried out following the installation instructions.

Prior to the practical test, the supervisor shall inform the candidates about the procedure of examining and rating the individual installation steps. During the practical test, the supervisor shall not provide any advice.

All materials and documents necessary for the practical test shall be available to the candidate.

The PE-welder himself is responsible for the personal protective and suitable installation equipment.

The PE-welder himself can decide whether to use his own tools and equipment (or those of his employer) or those of the test centre. Unless the PE-welder uses the tools and equipment of the test centre, separate proof shall be provided about its flawless condition, functionality and calibration.

Depending on the qualification aimed for, the PE welder shall produce a separate test piece for joint casing systems 4.1 and 5.1 in accordance with EN 489-1 as well as for the hot gas welding and hot gas extrusion welding processes according to [6.3.4](#).

The practical test shall be conducted within 120 minutes per test piece.

Subject areas of the practical test are:

- preparatory works for weldable joint casing assembly or T-piece according to [6.3.4](#);
- assembly of measuring elements and test of surveillance system;
- preparation of welding areas;
- handling of joint casing system;
- execution of hot gas welding and hot gas extrusion welding (if qualification is intended for);
- tightness test of joint casing, if applicable;
- handling of PUR foam
- closing of foam and vent openings, if applicable;
- visual inspection of assembled joint casing system / T-piece;
- documentation of joint casing system / T-piece installation.

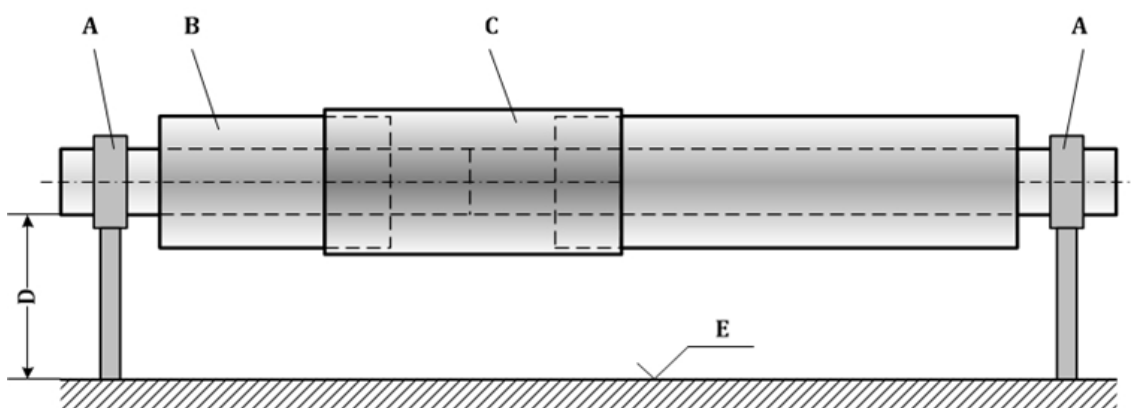
6.3.2 Equipment

The equipment to be used in the practical test shall be in flawless condition, functional and calibrated. Equipment can be the one of the candidate or of the test institute.

6.3.3 Test piece preparation and assembling of weldable joint casing system

The test piece shall be positioned above ground level similarly to the situation on site. The height of the supports to be attached to the free ends of the steel service pipe shall be between 200 and 400 mm from the floor to the bottom edge of the steel service pipe, see [Figure 1](#).

The test piece shall be properly prepared for assembling of the joint casing system by the candidate.



Key

A Non-rotating pipe fixings

- B Factory made pipe assembly according to EN 253
- C Weldable joint casing system according to EN 489-1
- D Distance between floor and bottom edge of the service pipe (200 mm to 400 mm)
- E Floor

Figure 1 — Set-up of the test piece for the preparation and assembly of the joint casing system

6.3.4 Test piece preparation and assembling of T-piece for hot gas welding and hot gas extrusion welding

A T-piece is used as the test piece. It shall be positioned above ground level similarly to the situation on site. The height of the supports to be attached to the free ends of the steel service pipe shall be between 200 and 400 mm from the floor to the bottom edge of the steel service pipe, see [Figure 2](#).

Further possible examples for hot gas welding and hot gas extrusion welding are shown in [Annex C](#). If a test piece other than shown in [Figure 2](#) is used in the practical test, it shall be mentioned in the Certificate.

The test piece shall be properly prepared for assembling of the casing construction by the applicant.