

DIN EN 13941-2:2022-06 (E)

District heating pipes - Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks - Part 2: Installation (includes Amendment A1:2021)

Contents		Page
European foreword		6
Introduction		7
1	Scope	8
2	Normative references	8
3	Terms and definitions and symbols	11
3.1	Terms and definitions	11
3.2	Symbols	11
3.3	Abbreviations	11
4	Procurement	11
4.1	Manufacturer of thermal insulated pipe elements	11
4.2	Performing assembly of casing joints and PE-welding on casings	11
5	General requirements	12
6	Required information	12
6.1	Documents from the design phase	12
6.2	Documents from the manufacturers	12
6.3	Existing construction and underground systems	13
6.3.1	General	13
6.4	Wiring design diagram	13
7	Quality control	13
7.1	General	13
7.2	Installation and approval	14
8	Site preparation	15
8.1	General	15
8.2	Liason with Authorities and other parties concerned	16
8.3	Site access	16
8.4	Equipment and material	16
9	Trenching	17
9.1	General	17
9.2	Groundwater extraction	17
9.3	Installation of pipelines crossing or parallel with other constructions and existing conduits	18
9.4	Excavations crossing or parallel to existing district heating pipelines, reducing of soil cover, etc	18
10	Transport and storage of pipe elements, pipe components and other materials	18
10.1	General	18
10.2	Transport and delivery	18
10.2.1	Loading and unloading	18
10.2.2	Checking of the delivery	19

10.3	Storage	19
10.3.1	General	19
10.3.2	Storage of pipe assemblies	19
10.3.3	Storage of fitting and valve assemblies	20
10.3.4	Storage of joint casing systems and other materials	20
11	Pipe laying	20
11.1	General	20
11.2	Installation in the trench	21
11.3	Welding and testing of welds	21
11.3.1	Welding of the steel service pipe and testing of the welds	21
11.4	Venting and Draining	30
11.5	Test for leak tightness and strength	34
11.5.1	General	34
11.5.2	Visual test with "overpressure" by air	34
11.5.3	Visual test below atmospheric pressure by air	35
11.5.4	Hydrostatic test	35
11.6	Joint Casing	39
11.6.1	General	39
11.6.2	Joints	39
11.6.3	Site prepared components	39
11.7	Surveillance system	42
11.8	Expansion cushions	43
11.9	Electrical and telecommunication cable of the systems	45
11.10	Requirements for horizontal directional drilling (HDD)	45
11.11	Requirements for critical locations	45
11.11.1	Wall penetrations	45
11.11.2	Connections to other pipe systems	46
11.11.3	Pipe laying in protection tubes	46
11.11.4	Protection against external impact for above ground installations	46
11.12	Position of pipeline	46
12	Backfilling	47
12.1	General	47
12.2	Bedding material and composition	48
13	Commissioning	49
14	Operation	49
15	Documentation	49
15.1	Information on operation and maintenance	49
15.1.1	Range of application	49
15.1.2	Documentation -- aims and uses	49
15.1.3	Technical documentation	50
15.1.4	Drawings of the technical documentation	54
15.1.5	As-built documentation	58
15.2	Documentation under the scope of the PED	58
Annex A (informative) Venting and Draining		59
A.1	General	59
A.2	Venting and draining devices	59
A.3	Draining devices for large pipeline dimensions	61
A.4	Venting of new pipe sections	62
A.4.1	Venting by house connection pipeline	62
A.4.2	Venting by venting cabinets	63
Annex B (informative) Recommendations for HDD		65
B.1	General	65
B.2	Depth under roads	65

B.3	Minimum intermediate distances	66
B.4	Casing and casing field joints	66
B.5	Drilling fluid composition	66
B.6	Drilling fluid pressures	66
B.7	Borehole dimensions and borehole stability	67
B.8	Ballasting	67
B.9	Installation of pipe bundles	68
B.10	Determination of position and route corrections	68
B.11	Registration and control of HDD	69
B.12	Drilling Tolerances	69
B.13	Verification of design and methodology for the pullback operation	70
B.14	As-Built information	70
Annex C (informative) Qualification of fitters installing joints in pre-insulated bonded pipe networks		71
C.1	Knowledge and skills	71
C.2	Background for training and testing	71
C.3	Subjects for training and testing	71
C.3.1	General	71
C.3.2	Casing of polyethylene (PE)	72
C.3.2.1	Important construction characteristics and properties	72
C.3.2.2	Technological behaviour of PE	72
C.3.2.3	Mechanical properties of PE	72
C.3.2.4	Conditions for casing elements under load	73
C.3.3	Surveillance	73
C.3.4	PUR-foam system	73
C.3.4.1	PUR-foam as a two component material	73
C.3.4.2	Insulation procedures on job site	73
C.3.5	Joint types/jointing systems	74
C.3.5.1	General	74
C.3.5.2	Shrink sleeve joint with mastic/adhesive sealing	74
C.3.5.3	Welded joints/systems	74
C.3.6	Installation of joints	75
C.3.6.1	General	75
C.3.6.2	Installation of surveillance system	75
C.3.6.2.1	General	75
C.3.6.2.2	Preparation of installation	75
C.3.6.2.3	Installation of surveillance systems and their components	76
C.3.6.2.4	Measurements after insulation	76
C.3.6.3	Sealed joints	76
C.3.6.4	Welded joints	77
C.3.6.4.1	Joint face forms and welding procedures in accordance with joint types described in C.3.4.2	77
C.3.6.4.2	Training and testing	77
C.3.6.5	Insulation of joints	77
C.3.6.5.1	Special factors of influence to job site conditions	77
C.3.6.5.2	On-site foaming work	77
C.3.6.5.3	Prefabricated joint insulation installation work	78
C.3.6.6	Documentation	78
Annex D (informative) Quality control program and documentation		79
Annex E (normative) Commissioning		92
E.1	Commissioning	92
E.1.1	General	92
E.1.2	Filling with water for initial operation	93
E.1.3	Surveillance system	93
Annex F (informative) Operation		94
Bibliography		95