

# 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)

---

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

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