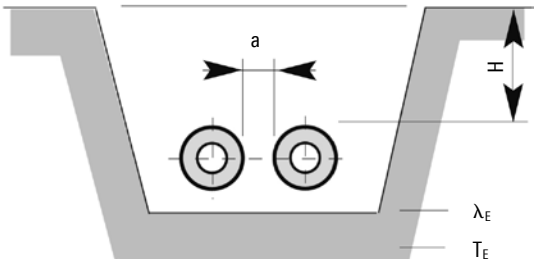
Heat loss

Insulation thickness 1

Heat losses q [W/m] for one pipe										
PREMANT	**U-value**	**Average temperature between VL/RL T_B [°C]**								
	W/mK	**50 °C**	**60 °C**	**70 °C**	**80 °C**	**90 °C**	**100 °C**	**110 °C**	**120 °C**	**130 °C**
26.9 - 90	0.1292	5.2	6.5	7.8	9.0	10.3	11.6	12.9	14.2	15.5
33.7 - 90	0.1572	6.3	7.9	9.4	11.0	12.6	14.2	15.7	17.3	18.9
42.4 - 110	0.1607	6.4	8.0	9.6	11.2	12.9	14.5	16.1	17.7	19.3
48.3 - 110	0.1843	7.4	9.2	11.1	12.9	14.7	16.6	18.4	20.3	22.1
60.3 - 125	0.2054	8.2	10.3	12.3	14.4	16.4	18.5	20.5	22.6	24.6
76.1 - 140	0.2410	9.6	12.0	14.5	16.9	19.3	21.7	24.1	26.5	28.9
88.9 - 160	0.2484	9.9	12.4	14.9	17.4	19.9	22.4	24.8	27.3	29.8
114.3 - 200	0.2599	10.4	13.0	15.6	18.2	20.8	23.4	26.0	28.6	31.2
139.7 - 225	0.3002	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0
168.3 - 250	0.3557	14.2	17.8	21.3	24.9	28.5	32.0	35.6	39.1	42.7
219.1 - 315	0.3887	15.5	19.4	23.3	27.2	31.1	35.0	38.9	42.8	46.6
273.0 - 400	0.3779	15.1	18.9	22.7	26.5	30.2	34.0	37.8	41.6	45.3
323.9 - 450	0.4342	17.4	21.7	26.0	30.4	34.7	39.1	43.4	47.8	52.1
355.6 - 500	0.4239	17.0	21.2	25.4	29.7	33.9	38.2	42.4	46.6	50.9
406.4 - 560	0.4514	18.1	22.6	27.1	31.6	36.1	40.6	45.1	49.6	54.2
457.2 - 630	0.4548	18.2	22.7	27.3	31.8	36.4	40.9	45.5	50.0	54.6
508.0 - 710	0.4413	17.7	22.1	26.5	30.9	35.3	39.7	44.1	48.5	53.0
610.0 - 800	0.5380	21.5	26.9	32.3	37.7	43.0	48.4	53.8	59.2	64.6
711.0 - 900	0.6097	24.4	30.5	36.6	42.7	48.8	54.9	61.0	67.1	73.2
813.0 - 1000	0.6840	27.4	34.2	41.0	47.9	54.7	61.6	68.4	75.2	82.1
914.0 - 1100	0.7550	30.2	37.7	45.3	52.8	60.4	67.9	75.5	83.0	90.6
1016.0 - 1200	0.8315	33.3	41.6	49.9	58.2	66.5	74.8	83.1	91.5	99.8

Type of installation: 2-pipe, laid in the ground
Pipe distance: a = 0.20 m
Ground temperature: T_E = 10 °C
Coverage height: H = 0.8 m
Soil conductivity: λ_E = 1.2 W/mK
Conductivity of PE jacket: λ_{PE} = 0.4 W/mK
Conductivity of PUR foam: λ_{PUR} = 0.0260 W/mK



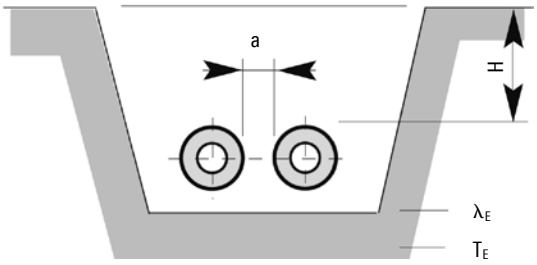
Heat loss during operation:
$q = U \cdot (T_B - T_E)$ [W/m]
U = Heat transfer coefficient [W/mK]
T_B = Average temperature between VL/RL [°C]
T_E = Average ground temperature [°C]

Heat loss

Insulation thickness 2

Heat losses q [W/m] for one pipe										
PREMANT	**U-value**	**Average temperature between VL/RL T_B [°C]**								
	W/mK	**50 °C**	**60 °C**	**70 °C**	**80 °C**	**90 °C**	**100 °C**	**110 °C**	**120 °C**	**130 °C**
26.9 - 110	0.1110	4.4	5.5	6.7	7.8	8.9	10.0	11.1	12.2	13.3
33.7 - 110	0.1311	5.2	6.6	7.9	9.2	10.5	11.8	13.1	14.4	15.7
42.4 - 125	0.1424	5.7	7.1	8.5	10.0	11.4	12.8	14.2	15.7	17.1
48.3 - 125	0.1606	6.4	8.0	9.6	11.2	12.8	14.5	16.1	17.7	19.3
60.3 - 140	0.1794	7.2	9.0	10.8	12.6	14.4	16.1	17.9	19.7	21.5
76.1 - 160	0.2009	8.0	10.0	12.1	14.1	16.1	18.1	20.1	22.1	24.1
88.9 - 180	0.2105	8.4	10.5	12.6	14.7	16.8	18.9	21.0	23.2	25.3
114.3 - 225	0.2193	8.8	11.0	13.2	15.4	17.5	19.7	21.9	24.1	26.3
139.7 - 250	0.2530	10.1	12.7	15.2	17.7	20.2	22.8	25.3	27.8	30.4
168.3 - 280	0.2870	11.5	14.3	17.2	20.1	23.0	25.8	28.7	31.6	34.4
219.1 - 355	0.3047	12.2	15.2	18.3	21.3	24.4	27.4	30.5	33.5	36.6
273.0 - 450	0.2985	11.9	14.9	17.9	20.9	23.9	26.9	29.9	32.8	35.8
323.9 - 500	0.3412	13.6	17.1	20.5	23.9	27.3	30.7	34.1	37.5	40.9
355.6 - 560	0.3297	13.2	16.5	19.8	23.1	26.4	29.7	33.0	36.3	39.6
406.4 - 630	0.3425	13.7	17.1	20.5	24.0	27.4	30.8	34.2	37.7	41.1
457.2 - 710	0.3899	15.6	19.5	23.4	27.3	31.2	35.1	39.0	42.9	46.8
508.0 - 800	0.3357	13.4	16.8	20.1	23.5	26.9	30.2	33.6	36.9	40.3
610.0 - 900	0.3879	15.5	19.4	23.3	27.2	31.0	34.9	38.8	42.7	46.5
711.0 - 1000	0.4381	17.5	21.9	26.3	30.7	35.0	39.4	43.8	48.2	52.6
813.0 - 1100	0.4899	19.6	24.5	29.4	34.3	39.2	44.1	49.0	53.9	58.8
914.0 - 1200	0.5405	21.6	27.0	32.4	37.8	43.2	48.6	54.0	59.4	64.9

Type of installation: 2-pipe, laid in the ground
Pipe distance: a = 0.20 m
Ground temperature: T_E = 10 °C
Coverage height: H = 0.8 m
Soil conductivity: λ_E = 1.2 W/mK
Conductivity of PE jacket: λ_{PE} = 0.4 W/mK
Conductivity of PUR foam: λ_{PUR} = 0.0260 W/mK



Heat loss during operation:

$q = U \cdot (T_B - T_E)$ [W/m]

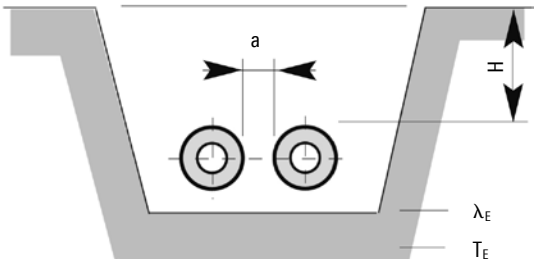
U = Heat transfer coefficient [W/mK]
T_B = Average temperature between VL/RL [°C]
T_E = Average ground temperature [°C]

Heat loss

Insulation thickness 3

Heat losses q [W/m] for one pipe										
PREMANT	**U-value**	**Average temperature between VL/RL T_B [°C]**								
	W/mK	**50 °C**	**60 °C**	**70 °C**	**80 °C**	**90 °C**	**100 °C**	**110 °C**	**120 °C**	**130 °C**
26.9 - 125	0.1019	4.1	5.1	6.1	7.1	8.2	9.2	10.2	11.2	12.2
33.7 - 125	0.1186	4.7	5.9	7.1	8.3	9.5	10.7	11.9	13.0	14.2
42.4 - 140	0.1294	5.2	6.5	7.8	9.1	10.3	11.6	12.9	14.2	15.5
48.3 - 140	0.1442	5.8	7.2	8.7	10.1	11.5	13.0	14.4	15.9	17.3
60.3 - 160	0.1562	6.2	7.8	9.4	10.9	12.5	14.1	15.6	17.2	18.7
76.1 - 180	0.1754	7.0	8.8	10.5	12.3	14.0	15.8	17.5	19.3	21.0
88.9 - 200	0.1857	7.4	9.3	11.1	13.0	14.9	16.7	18.6	20.4	22.3
114.3 - 250	0.1930	7.7	9.7	11.6	13.5	15.4	17.4	19.3	21.2	23.2
139.7 - 280	0.2162	8.6	10.8	13.0	15.1	17.3	19.5	21.6	23.8	25.9
168.3 - 315	0.2388	9.6	11.9	14.3	16.7	19.1	21.5	23.9	26.3	28.7
219.1 - 400	0.2505	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.6	30.1
273.0 - 500	0.2514	10.1	12.6	15.1	17.6	20.1	22.6	25.1	27.7	30.2
329.0 - 560	0.2774	11.1	13.9	16.6	19.4	22.2	25.0	27.7	30.5	33.3
355.3 - 630	0.2676	10.7	13.4	16.1	18.7	21.4	24.1	26.8	29.4	32.1
406.4 - 670	0.3044	12.2	15.2	18.3	21.3	24.3	27.4	30.4	33.5	36.5
457.2 - 710	0.3435	13.7	17.2	20.6	24.0	27.5	30.9	34.4	37.8	41.2
508.0 - 900	0.2704	10.8	13.5	16.2	18.9	21.6	24.3	27.0	29.7	32.4
610.0 - 1000	0.3105	12.4	15.5	18.6	21.7	24.8	27.9	31.1	34.2	37.3
711.0 - 1100	0.3494	14.0	17.5	21.0	24.5	28.0	31.4	34.9	38.4	41.9
813.0 - 1200	0.3895	15.6	19.5	23.4	27.3	31.2	35.1	39.0	42.8	46.7

Type of installation: 2-pipe, laid in the ground
Pipe distance: a = 0.20 m
Ground temperature: T_E = 10 °C
Coverage height: H = 0.8 m
Soil conductivity: λ_E = 1.2 W/mK
Conductivity of PE jacket: λ_{PE} = 0.4 W/mK
Conductivity of PUR foam: λ_{PUR} = 0.0260 W/mK



Heat loss during operation:

$q = U \cdot (T_B - T_E)$ [W/m]

U = Heat transfer coefficient [W/mK]
T_B = Average temperature between VL/RL [°C]
T_E = Average ground temperature [°C]