

## Heat losses

### Calculation prerequisites for pre-insulated single and double pipe systems

#### Conditions of installation

Height of back-filling above highest point of pipe (H)	0,6m
Distance between pipes	0,2m

#### Ground conditions:

Thermal conductivity	$\lambda_m = 1,5 \text{ W/m}^\circ \text{K}$
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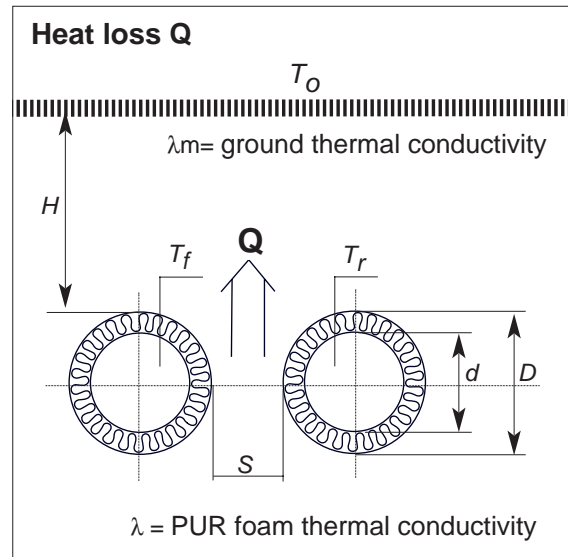
#### PUR foam insulation:

Thermal conductivity	$\lambda_i = 0,029 \text{ W/m}^\circ \text{K}$
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#### Temperatures, yearly average (primary system):

Flow pipelines	$T_f = 85^\circ \text{C}$
Return pipelines	$T_r = 55^\circ \text{C}$
Ambient temperature	$T_o = 5^\circ \text{C}$
$\Delta T$	$= 65^\circ \text{C}$

If  $\Delta T$  is changed  $10^\circ$ , the heat losses are influenced by  $\frac{10}{65} = 15\%$



## Single pipe systems

### Heat losses at $\Delta T = 65^{\circ}\text{C}$

DN	Series 1		Series 2		Series 3	
	W/ m	kWh/ m year	W/ m	kWh/ m year	W/ m	kWh/ m year
20	18.9	166	16.2	142	14.9	131
25	24.6	215	19.3	169	17.5	153
32	25.1	220	20.9	183	19.2	168
40	28.9	253	23.8	183	21.4	188
50	32.4	284	26.7	233	23.3	204
65	39.0	342	30.5	265	26.2	230
80	39.9	349	31.6	277	27.6	242
100	41.6	365	32.9	288	28.8	252
125	48.3	423	37.8	368	32.0	280
150	57.4	503	43.3	379	35.8	314
200	62.9	551	46.1	403	37.6	329
250	61.0	534	45.1	395	37.7	330
300	70.5	618	51.8	453	41.6	365
350	68.3	598	49.9	437	40.0	350
400	73.3	642	51.9	454	41.4	365
500	107.0	937	67.6	592	50.8	445
600	148.0	1300	83.5	731	58.7	514
700	190.0	1663	96.5	846	67.1	588
800			112.4	984		

## Double pipe systems

### Heat losses at $\Delta T = 65^{\circ}\text{C}$

DN	W/ m	kWh/ m year
2 x 15	15.0	131
2 x 20	14.8	130
2 x 25	14.4	126
2 x 32	15.7	138
2 x 40	18.8	165
2 x 50	18.4	161
2 x 65	21.8	190
2 x 80	24.7	216
2 x 100	24.7	216
2 x 125	22.6	198
2 x 150	27.0	236

