Typical outputs - isopex 9.1

Typical outputs - isopex					
at 100 Pa/m (10 mm water column/m) and medium temp. of 80°C					
Carrier pipe	Velocity	Mass flow	Output at Δt=30°C	Output at Δt=40°C	Output at Δt=50°C
d (mm)	(m/s)	(m^3/h)	(kW)	(kW)	(kW)
20	0,31	0,23	7,8	10,4	13,0
25	0,38	0,43	15,1	20,0	25,2
32	0,44	0,85	29,0	38,7	48,3
40	0,52	1,56	53,3	71,1	88,9
50	0,61	2,85	97,4	130,0	162,0
63	0,71	5,28	181,0	241,0	301,0
75	0,80	8,42	288,0	384,0	480,0
90	0,90	13,76	471,0	628,0	785,0
110	1,03	23,49	804,0	1072,0	1340,0
125	1,12	32,76	1140,0	1500,0	1840,0
140	1,20	45,29	1567,5	2061,6	2534,3

See section 1 on design calculations.

isoplus Piping Systems A/S · Tel.: +45 64 41 61 09 · E-mail: iso@isoplus.dk · www.isoplus.dk

Heat loss - isopex 9.2

Assumptions - heat loss

When comparing heat loss data, it is important to know the assumptions used in their calculation.

Several factors other than the properties of the pre-insulated pipe are of fundamental importance for heat loss.

The following parameters must be equal if a valid comparison of heat loss is to be made:

- Dimensions of carrier and jacket pipes
- Carrier pipe temperatures
- Soil lambda value
- Soil temperature
- Surface resistance
- Laying depth
- Distance between pipes

As it is actually the lambda value of the insulation material that is compared, it is of course also important that the correct lambda value be used. The lambda values given below are the average values.

The following pages contain heat loss tables for pre-insulated pipes. Heat loss calculations are based on the following assumptions.

Depending on the mechanical properties of the foam, pipes can be produced with a variety of lambda values down to 0,0225 W/m◦C.

$Lambda_{soil}$	1.2000	W/m°C
Lambda continuous production	0.024	W/m°C
R_o	0.0685	m^2 °C/W
Laying depth H	600	mm
t_{flow}	80.0	°C
t_{return}	40.0	°C
t_{soil}	8.0	°C
Distance between pipes C	100	mm

Thermal conductivity - soil / sand
Values of 1.5-2.0 W/m°C are typical for moist soils.
Dry sand has a thermal conductivity of approx. 1.0 W/m°C.

Surface resistance
According to the EUHP District Heating Handbook, a value of 0.0685 m^2 °C/W is usually suitable.

Laying depth
Should be stated in mm from upper edge of jacket pipe to soil surface (unpaved areas) or lower surface of paving.

Heat loss - isopex - heating 9.2.1

Heat loss - isopex - heating - single pipe - series 1

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20*	2,0	16,0	65	2,2	12,3	0,118
25	2,3	20,4	75	2,2	13,1	0,126
32	2,9	26,2	75	2,2	16,5	0,159
40	3,7	32,6	90	2,2	17,0	0,164
50	4,6	40,8	110	2,5	17,4	0,168
63	5,8	51,4	125	2,5	19,6	0,188
75	6,8	61,4	140	3,0	21,5	0,207
90	8,2	73,6	160	3,0	22,9	0,221
110	10,0	90,0	180	3,0	26,0	0,250
125	11,4	102,2	180	3,0	33,0	0,317
140*	12,7	114,6	200	3,0	35,1	0,337

Heat loss - isopex - heating - single pipe - series 2

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20*	2,0	16,0	75	2,2	11,0	0,106
25	2,3	20,4	90	2,2	11,3	0,108
32	2,9	26,2	90	2,2	13,7	0,132
40	3,7	32,6	110	2,5	14,0	0,134
50	4,6	40,8	125	2,5	15,2	0,146
63	5,8	51,4	140	3,0	17,4	0,167
75	6,8	61,4	160	3,0	18,1	0,174
90	8,2	73,6	180	3,0	19,5	0,188
110	10,0	90,0	200	3,2	26,0	0,250
125	11,4	102,2	200	3,2	28,0	0,269

U-values are specified per metre pipe. Heat loss is specified per metre trench.
*Delivery according to agreement.

isoplus Piping Systems A/S · Tel.: +45 64 41 61 09 · E-mail: iso@isoplus.dk · www.isoplus.dk

Heat loss - isopex - heating 9.2.2

Heat loss - isopex - heating - double pipe - series 1

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20+20	2,0	16,0	75	2,2	10,1	0,195
25+25	2,3	20,4	90	2,2	10,2	0,168
32+32	2,9	26,2	110	2,5	10,8	0,208
40+40	3,7	32,6	125	2,5	12,1	0,232
50+50	4,6	40,8	160	3,0	11,4	0,219
63+63	5,8	51,4	180	3,0	13,5	0,259
75+75	6,8	61,4	200	3,2	16,1	0,309

Heat loss - isopex - heating - double pipe - series 2

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20+20	2,0	16,0	90	2,2	8,0	0,153
25+25	2,3	20,4	110	2,2	7,9	0,153
32+32	2,9	26,2	125	2,5	9,0	0,173
40+40	3,7	32,6	140	2,5	10,2	0,197
50+50	4,6	40,8	180	3,0	9,5	0,184
63+63	5,8	51,4	200	3,2	11,5	0,222

Heat loss - isopex - heating - double pipe - series 3

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20+20	2,0	16,0	110	2,5	6,6	0,127
25+25	2,3	20,4	125	2,5	7,0	0,134

U-values are specified per metre pipe. Heat loss is specified per metre trench.
isopex is continuously produced with a diffusion barrier inserted between the jacket pipe and the polyurethane foam.

Heat loss - isopex - domestic water 9.2.3

Heat loss - isopex - domestic water - single pipe - series 1

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
20*	2,8	14,4	65	2,2	12,3	0,118
25	3,5	18,0	75	2,2	13,0	0,125
32	4,4	23,2	75	2,2	16,4	0,157
32	4,4	23,2	90	2,2	13,6	0,131
32	4,4	23,2	110	2,5	11,6	0,111
40	5,5	29,0	90	2,2	16,9	0,162
50	6,9	36,2	110	2,5	18,5	0,178
63	8,7	45,6	125	2,5	20,8	0,200
75*	10,3	54,4	140	3,0	22,7	0,219
90*	12,4	65,2	160	3,0	24,2	0,233
110*	15,1	79,8	180	3,0	27,4	0,264

Heat loss - isopex - domestic water - double pipe - series 1

PEX pipe			Jacket pipe		Heat loss	U-value
d outside mm	Wall thickness mm	d inside mm	D outside mm	Wall thickness mm	W/m Φtotal	Φtotal
16+16	2,2-2,2	11,6+11,6	90	2,2	6,8	0,131
25+20	3,5-2,8	18,0+14,4	90	2,2	9,3	0,178
32+20	4,4-2,8	23,2+14,4	110	2,5	9,0	0,174
40+25	5,5-3,5	29,0+18,0	125	2,5	9,7	0,186
40+32	5,5-4,4	29,0+23,2	140	3,0	8,1	0,155
40+40	5,5-5,5	29,0+29,0	140	3,0	9,0	0,173
50+32	6,9-4,4	36,2+23,2	140	3,0	11,2	0,215
50+40	6,9-5,5	36,2+29,0	140	3,0	10,3	0,198
63+32	8,7-4,4	45,6+23,2	160	3,0	11,1	0,213

U-values are specified per metre pipe. Heat loss is specified per metre trench.
isopex is continuously produced with a diffusion barrier inserted between the jacket pipe and the polyurethane foam.
*Delivery according to agreement.

isoplus Piping Systems A/S · Tel.: +45 64 41 61 09 · E-mail: iso@isoplus.dk · www.isoplus.dk

Laying rules - isopex 9.3

Connection at branches

Where isopex is connected to traditional steel pipes, the following rules must be observed:

- If tee branches are used, the isopex pipe can be connected without any need for relief measures, L= ∞. See fig. 1.
- If parallel branches are used, the isopex pipe must be bent immediately after the connection point, see fig. 2.

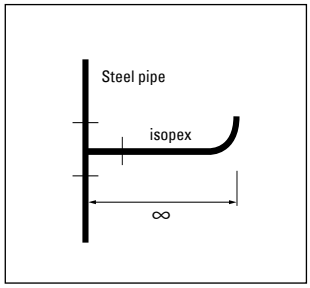

fig. 1

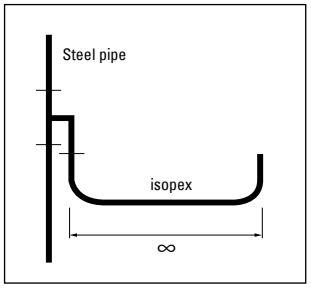

fig. 2

Connection to steel pipes

Where isopex is connected in extension of traditional steel pipes, the following rules must be observed:

- The maximum distance to a fix point on the pipe line must comply with fig. 3.
- When connecting isopex to steel pipes which are not fixated, the rules shown in fig. 4 must be observed.
- When connecting isopex to steel pipes > 13 m, follow the rules shown in fig. 5.

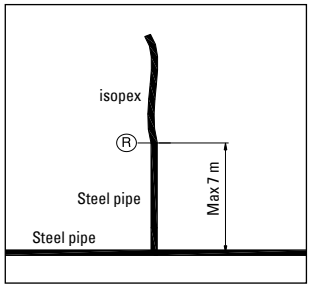

fig. 3

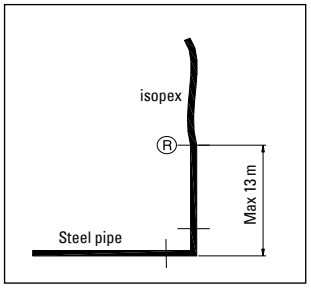

fig. 4

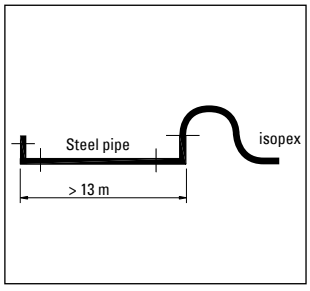

fig. 5

Unrolling flexible piping

Always unroll/bend flexible piping in the coil direction. (see fig. 6)

Where this is not possible, the piping should be handled as described in section 3.

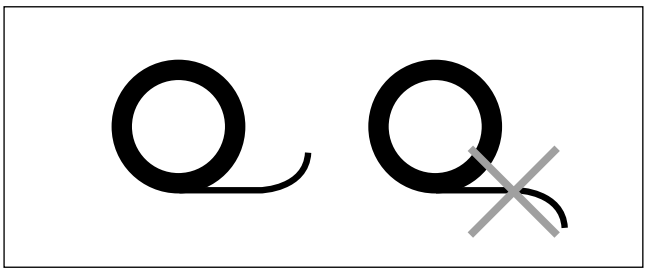

fig.6

Service lines

When leading service lines into buildings follow fig. 7 and fig. 8.

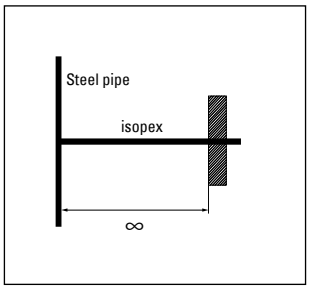

fig. 7

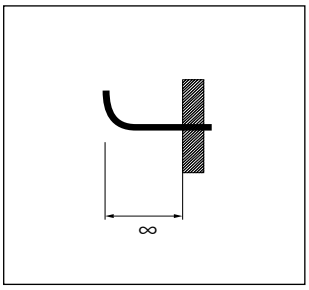

fig. 8

Where flexible piping is installed in conduits or using soil displacement techniques, there may be limitations on the stated lengths, or requirements on other expansion-related considerations.

Note: Laying rules apply for both single and double pipes.