



Pre-insulated Piping Systems Polyuretub

Quality management certified





This brochure is to be introduced to consulting organisations as well as project managers, all information relative to pre-insulated pipe networks by Inpal industries. This will encompass all the necessary data to use for conceiving, buying specifications and the objectives for achieving a profitable and reliable network.

This technical information can only be viewed as an indicative and informative tool. This document does not at any price disclose an offer to the client. Only the Inpal Industries Terms and Conditions do prevail as binding legal contractual documents. Hence, any information disclosed hereafter are liable to be modified at anytime and without prior notice in view of the research results aiming at improving the quality of our products.

However, we ought to remind you that network life optimization as well as profitability depend on its conception and installation, whose tasks have to be carried out by the Consulting Department and the installer, and this in accordance with the standards recommended by Inpal Industries.

Therefore, it is the full responsibility of the installer as well as the contract organisation to operate the network well and the compatibility of the Inpal Industries products to meet up with the contracting specific conditions.



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CASE STUDIES



The image features a vibrant green background. On the left, a long, slender green leaf extends diagonally upwards. In the lower right, a horizontal leaf is shown with two clear water droplets resting on its surface. The bottom of the image is filled with a close-up of water, showing intricate ripples and reflections of the green light. The text 'About INPAL' is positioned in the upper right quadrant, with two thin, wavy orange lines underneath it.

About INPAL

About INPAL

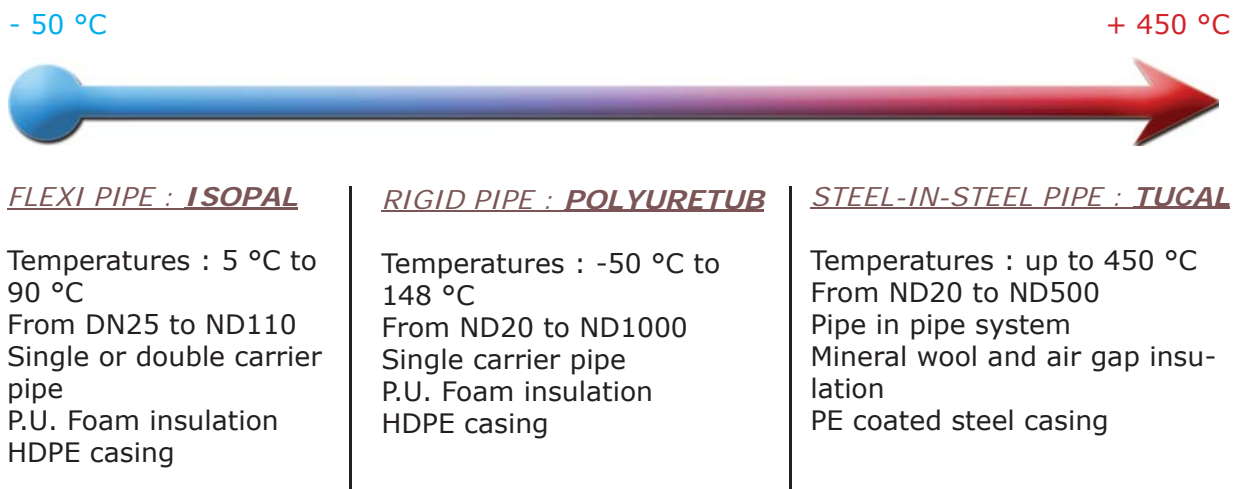
Demographic changes, scarcity of global oil resources, hence rising fuel prices, stringent legislation on carbon emissions, migration of population from rural areas to cities have contributed to the selection of cost effective solutions to curb CO₂ emissions.

In response to those immediate challenges many countries have adopted new environmental policies to fight the climate change and Inpal Industries is part of this important stake for the XXI century.

Inpal Industries has become one of the European key players in pre-insulated pipes by offering community heating solutions at an affordable cost for users and investors. Over a period of 30 years, and with more than 10000 Km of buried pipes, Inpal Industries has offered its know-how to optimise the energy usage and provided pipe routing solutions to generate significant savings to the client.

The energy distribution network is paramount in a Community Heating and Cooling project. Although the energy centre (CHP, Bio-mass, Geothermal and Solar) is an important part in the decision process, the pipework can also generate a lot of talks during the design stage, because it is easier to build up a network in a new regeneration flat area than in an old urban district. Inpal Industries has a great deal of experience with local authorities as well as energy services companies.

Our three main products cover an array of temperatures and allow us to offer a bespoke solution to any project :



A leak surveillance systems is also available for rigid and special pipe.

With its two production facilities in Sens (South Paris) and in Creutzwald (near Luxemburg), Inpal Industries is in the heart of Europe and can offer alternative solutions to reduce the carbon footprint by providing Europe with a network of reliable motorways. However, other means of transport can be discussed to facilitate the impact of carbon emissions.

Inpal Industries is unique. We try to differentiate ourselves from the competition by offering not only advice in the design and installation of the pipe network, but we are also proud to offer pro-activity during a project by providing special parts in a very short lead time.



QUALITY

The mastery of production technology, the expertise of its engineering department and the performance of the onsite assistance, contribute greatly to the quality of INPAL's products and services. They are the basis of the brand's success. The largest operators of district heating and cooling networks trust in INPAL.

Through ISO 9001, valid for all of our subsidiaries, and regular audits carried out in our factories by TÜV Saarland, we guarantee a constant quality of our products. We comply strictly with all provisions, beginning from the design of our products to the delivery. Strict compliance tests are performed throughout the whole manufacturing process, from the entry of raw materials to the shipment of finished products.

Our products comply with the following european standards :

- EN 253 for pre-insulated pipes
- EN 448 for fittings
- EN 488 for valves
- EN 489 for joints
- EN 14419 for leak detection systems
- EN 13941 for conception and calculation

The policy of continuous improvement is deeply rooted in our organization and is reflected by our commitment to deliver more efficient products, to maintain our level of responsiveness appreciated by our customers and improve our services.

The satisfaction of our customers remains the main goal of our organization.

ENVIRONMENT

This is a race to reduce CO₂ emissions all around the world, and Inpal Industries has the liability and responsibility to meet up with the challenges. We strive to implement as many measures as possible to use eco-friendly materials during the production process. All our insulation foams are CFC free. We also recycle all our waste in our different factories so that we can keep our high quality standards for the ISO 9001 but also aiding the ISO 14001 accreditation.

Inpal Industries also use IT technology to control the whole process of development, production and storage as well as installation of our products, so that we can monitor the environmental impact. This approach guarantees a continuous improvement in facilitating better service to our clients.

However, this is not only our challenge. It is also your challenge and we need to share ideas, concepts, solutions together so that we can be part of this XXI century global challenge.

Community heating is not only a financial exercise, it is also the quintessential solution to guarantee clean energy for future generations.



Insulation

Steel Pipe			Standard Insulation		Insulation ⊕		Insulation ⊕⊕	
			Outer Casing		Outer Casing		Outer Casing	
ND	Out. Ø	Wall thick	Out. Ø	Wall thick	Out. Ø	Wall thick	Out. Ø	Wall thick
mm	mm	mm	mm	mm	mm	mm	mm	mm
20	26,9	2,0	90	3,0	110	3	125	3,0
25	33,7	2,6	90	3,0	110	3	125	3,0
32	42,4	2,6	110	3,0	125	3	140	3,0
40	48,3	2,6	110	3,0	125	3	140	3,0
50	60,3	2,9	125	3,0	140	3	160	3,0
65	76,1	2,9	140	3,0	160	3	180	3,0
80	88,9	3,2	160	3,0	180	3	200	3,2
100	114,3	3,6	180	3,0	225	3,5	250	3,6
100	114,3	3,6	200	3,2	225	3,5	250	3,6
125	139,7	3,6	200	3,2	250	3,6	280	4,4
125	139,7	3,6	225	3,5*	250	3,6	280	4,4
150	168,3	4,0	250	3,6	280	4,4	315	4,5
200	219,1	4,5	315	4,5*	355	5,1	400	5,7
250	273,0	5,0	355	5,1*	450	7	500	7,8
250	273,0	5,0	400	5,7*	450	7	500	7,8
300	323,9	5,6	400	5,7*	500	7,8	560	8,8
300	323,9	5,6	450	7,0*	500	7,8	560	8,8
350	355,6	5,6	450	7,0*	560	8,8	630	9,8
350	355,6	5,6	500	7,8*	560	8,8	630	9,8
400	406,4	6,3	500	7,8*	630	9,8	710	11,1
400	406,4	6,3	560	8,8*	630	9,8	710	11,1
450	457,0	6,3	560	8,8*	630	9,8	710	11,1
500	508,0	6,3	630	9,8*	710	11,1	800	12,5
600	610,0	7,1	710	11,1*	800	12,5	900	14,0
700	711,0	8,0	900	14,0*	On request			
800	813,0	8,8	1000	15,6*	On request			
900	914,0	10,0	1100	On request				
1000	1016,0	11,0	1200	On request				

* We reserve the right to manufacture the minimum thickness required in the EN 253 at any time, without prior notification.

Straight Pipes

According to EN 253

Welded steel pipes to EN 10217-1, 10217-2, 10217-5*.

Seamless steel pipes to EN 10216-2*

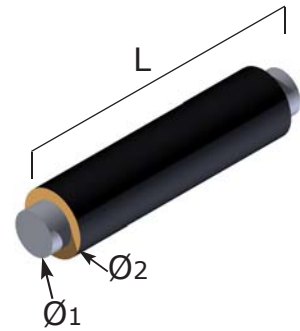
* The equivalent grades may be offered depending on the type and diameter of the pipes.

Maximum service temperature + 140°C

Butt-weld ends

150 mm at each end of the pipe are not insulated.

BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



Steel Pipe		Casing	PI Pipe		
ND	Out.Ø	Out. Ø	Length L	Weight	Water Content
mm	mm	mm	m	kg / m	l / m
20	26,9	90	6	2,5	0,4
25	33,7	90	6	2,9	0,7
32	42,4	110	12	4,2	1,1
40	48,3	110	12	4,5	1,5
50	60,3	125	12	6,1	2,3
65	76,1	140	12	8,2	3,9
80	88,9	160	12	9,8	5,3
100	114,3	180	12	12,9	9,0
100	114,3	200	12	13,6	9,0
125	139,7	200	12	15,0	13,8
125	139,7	225	12	16,1	13,8
150	168,3	250	12	20,9	20,2
200	219,1	315	12	33,0	34,7
250	273,1	355	12	42,7	54,4
300	323,9	400	12	55,3	76,8
300	323,9	450	12	59,6	76,8
350	355,6	450	12	62,6	93,2
350	355,6	500	12	67,8	93,2
400	406,4	500	12	81,7	121,8
450	457,0	560	12	91,5	155,1
500	508,0	630	12	106,0	192,8
600	610,0	710	12	137,0	278,8
700	711,0	900	12	196,0	379,4
800	813,0	1000	12	243,0	496,9
900	On request				
1000	On request				

Bends

1,5D standard angles : 90° and 45°

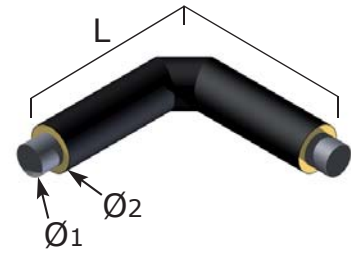
According to EN 448

Other angles on request.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings are factory welded.

BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



Steel Pipe		Casing	PI Bend				
ND	Out. Ø	Out. Ø	Radius	90° Branch	90° Indicative Weight	45° Branch	45° Indicative Weight
mm	mm	mm	mm	m	kg / pce	m	kg / pce
20	26,9	90	100,0	1,0 x 1,0	6	1,0 x 1,0	5
25	33,7	90	140,0	1,0 x 1,0	7	1,0 x 1,0	6
32	42,4	110	160,0	1,0 x 1,0	8	1,0 x 1,0	8
40	48,3	110	190,0	1,0 x 1,0	11	1,0 x 1,0	9
50	60,3	125	250,0	1,0 x 1,0	11	1,0 x 1,0	11
65	76,1	140	250,0	1,0 x 1,0	15	1,0 x 1,0	15
80	88,9	160	270,0	1,0 x 1,0	19	1,0 x 1,0	18
100	114,0	180	285,0	1,0 x 1,0	26	1,0 x 1,0	25
100	114,0	200	190,0	1,0 x 1,0	28	1,0 x 1,0	27
125	140,0	200	229,0	1,0 x 1,0	29	1,0 x 1,0	20
125	140,0	225	305,0	1,0 x 1,0	31	1,0 x 1,0	21
150	168,0	250	381,0	1,0 x 1,0	40	1,0 x 1,0	28
200	219,0	315	381,0	1,0 x 1,0	58	1,0 x 1,0	42
250	243,0	355	457,0	1,0 x 1,0	76	1,0 x 1,0	57
300	324,0	400	457,0	1,0 x 1,0	97	1,0 x 1,0	75
300	324,0	450	533,0	1,0 x 1,0	105	1,0 x 1,0	82
350	356,0	450	533,0	1,0 x 1,0	110	1,0 x 1,0	92
350	356,0	500	610,0	1,0 x 1,0	119	1,0 x 1,0	100
400	406,0	500	610,0	1,0 x 1,0	138	1,0 x 1,0	118
450	457,0	560	686,0	1,0 x 1,0	152	1,0 x 1,0	137
500	508,0	630	762,0	1,1 x 1,1	177	1,0 x 1,0	173
600	610,0	710	914,0	1,3 x 1,3	336	1,0 x 1,0	263
700	711,0	900	1067,0	1,4 x 1,4	489	1,0 x 1,0	401
800	813,0	1000	1219,0	1,6 x 1,6	670	1,0 x 1,0	515
900	On request						
1000	On request						

Bends

2,5D angles : 90° and 45°

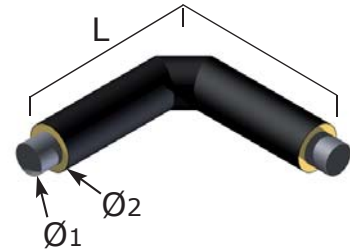
According to EN 448

Other angles on request.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position.



Steel Pipe		Casing	PI Bend				
ND	Out. Ø	Out. Ø	Radius	90° Branch	90° Indicative Weight	45° Branch	45° Indicative Weight
mm	mm	mm	mm	m	kg / pce	m	kg / pce
20	26,9	90	100,0	1,0 x 1,0	6	1,0 x 1,0	5
25	33,7	90	140,0	1,0 x 1,0	7	1,0 x 1,0	6
32	42,4	110	160,0	1,0 x 1,0	8	1,0 x 1,0	8
40	48,3	110	190,0	1,0 x 1,0	11	1,0 x 1,0	9
50	60,3	125	250,0	1,0 x 1,0	11	1,0 x 1,0	11
65	76,1	140	250,0	1,0 x 1,0	15	1,0 x 1,0	15
80	88,9	160	270,0	1,0 x 1,0	19	1,0 x 1,0	18
100	114,3	180	285,0	1,0 x 1,0	26	1,0 x 1,0	25
100	114,3	200	311,5	1,0 x 1,0	28	1,0 x 1,0	27
125	139,7	200	349,2	1,0 x 1,0	30	1,0 x 1,0	22
125	139,7	225	349,2	1,0 x 1,0	31	1,0 x 1,0	22
150	168,3	250	420,7	1,0 x 1,0	41	1,0 x 1,0	30
200	219,1	315	507,0	1,0 x 1,0	60	1,0 x 1,0	45
250	273,1	355	650,0	1,3 x 1,3	80	1,15 x 1,15	60
300	323,9	400	775,0	1,5 x 1,5	105	1,35 x 1,35	82
300	323,9	450	775,0	1,5 x 1,5	115	1,35 x 1,35	90
350	355,6	450	850,0	1,6 x 1,6	132	1,4 x 1,4	112
350	355,6	500	850,0	1,6 x 1,6	143	1,4 x 1,4	120
400	406,4	500	970,0	1,6 x 1,6	183	1,4 x 1,4	160
450	457,0	560	1122,0	1,4 x 1,4	239	1,0 x 1,0	216
500	508,0	630	1245,0	1,6 x 1,6	302	1,6 x 1,6	290
600	610,0	710	1525,0	1,9 x 1,9	510	1,0 x 1,0	398
700	711,0	900	1778,0	2,1 x 2,1	781	1,1 x 1,1	640
800	813,0	1000	2033,0	2.4 x 2.4	1062	1,2 x 1,2	807
900	On request						
1000	On request						

Branches with 45° jump

According to EN 448

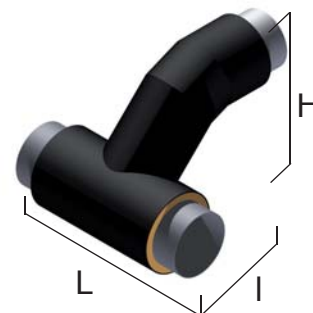
Tees are pre-fabricated at the factory and can be supplied in any combination from an equal tee to a reduction of minimum DN 20.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Different branch lengths can be manufactured on request.



Steel Pipe		Casing	PI Equal Branch			
ND	Out. Ø	Out. Ø	Main Length L	Branch Length. I	Dimension between axes H	Indicative Weight
mm	mm	mm	m	m	m	kg / pce
20 x 20	26,9	90	1,0	1,0	0,14	5
25 x 25	33,7	90	1,0	1,0	0,14	6
32 x 32	42,4	110	1,0	1,0	0,16	9
40 x 40	48,3	110	1,0	1,0	0,16	9
50 x 50	60,3	125	1,0	1,0	0,18	13
65 x 65	76,1	140	1,0	1,0	0,19	17
80 x 80	88,9	160	1,0	1,0	0,21	20
100 x 100	114,3	180	1,0	1,0	0,23	27
100 x 100	114,3	200	1,0	1,0	0,25	29
125 x 125	139,7	200	1,0	1,0	0,25	36
125 x 125	139,7	225	1,0	1,0	0,28	41
150 x 150	168,3	250	1,0	1,0	0,30	50
200 x 200	219,1	315	1,1	1,0	0,37	76
250 x 250	273,1	355	1,1	1,0	0,41	100
300 x 300	323,9	400	1,1	1,0	0,45	132
300 x 300	323,9	450	1,2	1,0	0,50	147
350 x 350	355,6	450	1,2	1,0	0,50	158
350 x 350	355,6	500	1,2	1,0	0,55	170
400 x 400	406,4	500	1,2	1,1	0,55	218
450 x 450	457,0	560	1,3	1,1	0,61	258
500 x 500	508,0	630	1,4	1,3	0,68	333
600 x 600	610,0	710	1,5	1,5	0,76	518
700 x 700	711,0	900	1,6	1,7	0,95	792
800 x 800	813,0	1000	1,7	1,9	1,05	1065
900 x 900	On request					
1000 x 1000	On request					

Reduced Branches with 45° jump

Branch		Main Pipe												
		20	25	32	40	50	65	80	100	100	125	125	150	200
		90	90	110	110	125	140	160	180	200	200	225	250	315
		L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	
20	90													
25	90													
32	110													
40	110													
50	125													
65	140													
80	160													
100	180													
100	200													
125	200													
125	225													

Branch		250	300	300	350	350	400	450	500	600	700	800
		355	400	450	450	500	500	560	630	710	900	1000
		L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l	L x l
20	90											
25	90											
32	110											
40	110											
50	125											
65	140											
80	160											
100	180											
100	200											
125	200											
125	225											
150	250											
200	315	1,2 x 1,0	1,2 x 1,0	1,2 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,1
250	355		1,2 x 1,0	1,2 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,1	1,1 x 1,1	1,1 x 1,1
300	400				1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,0	1,1 x 1,1	1,1 x 1,1	1,1 x 1,1	1,1 x 1,1
300	450				1,2 x 1,0	1,2 x 1,0	1,2 x 1,0	1,2 x 1,0	1,2 x 1,0	1,2 x 1,2	1,2 x 1,2	1,2 x 1,2
350	450						1,2 x 1,1	1,2 x 1,1	1,2 x 1,1	1,2 x 1,1	1,2 x 1,3	1,2 x 1,3
350	500						1,2 x 1,1	1,2 x 1,1	1,2 x 1,1	1,2 x 1,1	1,2 x 1,2	1,2 x 1,3
400	500							1,2 x 1,1	1,2 x 1,2	1,2 x 1,2	1,2 x 1,3	1,2 x 1,3
450	560								1,3 x 1,2	1,3 x 1,2	1,3 x 1,3	1,3 x 1,4
500	630									1,4 x 1,4	1,4 x 1,5	1,4 x 1,5
600	710										1,5 x 1,6	1,5 x 1,6
700	900											1,6 x 1,8

1,0 x 1,0

Parallel Branches

According to EN 448

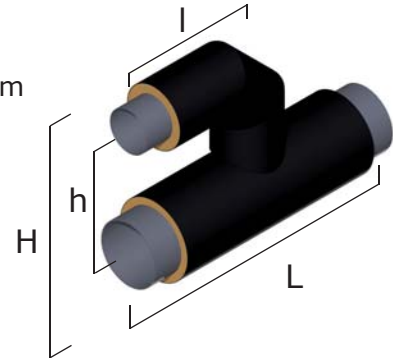
Tees are pre-fabricated at the factory and can be supplied in any combination from an equal tee to a reduction of minimum DN 20.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Different branch lengths can be manufactured.



Steel Pipe		Casing	PI Equal Branch			
ND	Out. Ø	Out. Ø	Main Length L	Dimension between axes h	Overall H	Indicative Weight
mm	mm	mm	m	m	m	kg / pce
20 x 20	26,9	90	1,0	0,24	0,33	4
25 x 25	33,7	90	1,0	0,24	0,33	5
32 x 32	42,4	110	1,0	0,26	0,37	7
40 x 40	48,3	110	1,0	0,26	0,37	7
50 x 50	60,3	125	1,0	0,28	0,40	10
65 x 65	76,1	140	1,0	0,29	0,43	14
80 x 80	88,9	160	1,0	0,31	0,47	17
100 x 100	114,3	180	1,0	0,34	0,51	23
100 x 100	114,3	200	1,0	0,35	0,55	24
125 x 125	139,7	200	1,1	0,39	0,60	34
125 x 125	139,7	225	1,1	0,40	0,63	36
150 x 150	168,3	250	1,2	0,45	0,70	52
200 x 200	219,1	315	1,4	0,56	0,88	90
250 x 250	273,1	355	1,5	0,66	1,00	132
300 x 300	323,9	400	1,7	0,76	1,16	198
300 x 300	323,9	450	1,7	0,78	1,20	211
350 x 350	355,6	450	1,8	0,86	1,31	245
350 x 350	355,6	500	1,8	0,88	1,34	262
400 x 400	406,4	500	2,0	0,96	1,46	359
450 x 450	457,0	560	2,1	1,07	1,62	434
500 x 500	508,0	630	2,3	1,18	1,80	552
600 x 600	610,0	710	2,6	1,37	2,08	894
700 x 700	711,0	900	2,9	1,62	2,51	1401
800 x 800	813,0	1000	3,2	1,82	2,83	1879
900 x 900	On request					
1000 x 1000	On request					

Reduced Parallel Branches

Branch		Main Pipe										
		25	32	40	50	65	80	100	100	125	125	150
		90	110	110	125	140	160	180	200	200	225	250
		L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	
20	90	1,0x0,24	1,0x0,25	1,0x0,25	1,0x0,26	1,0x0,27	1,0x0,28	1,0x0,29	1,0x0,30	1,0x0,30	1,0x0,31	1,0x0,32
25	90		1,0x0,25	1,0x0,25	1,0x0,26	1,0x0,27	1,0x0,28	1,0x0,29	1,0x0,30	1,0x0,30	1,0x0,31	1,0x0,32
32	110			1,0x0,26	1,0x0,27	1,0x0,28	1,0x0,29	1,0x0,30	1,0x0,31	1,0x0,31	1,0x0,32	1,0x0,33
40	110				1,0x0,27	1,0x0,28	1,0x0,29	1,0x0,30	1,0x0,31	1,0x0,31	1,0x0,32	1,0x0,33
50	125					1,0x0,28	1,0x0,29	1,0x0,30	1,0x0,31	1,0x0,31	1,0x0,33	1,0x0,34
65	140						1,0x0,30	1,0x0,31	1,0x0,32	1,0x0,32	1,0x0,33	1,0x0,35
80	160							1,0x0,32	1,0x0,33	1,0x0,33	1,0x0,34	1,0x0,36
100	180									1,0x0,35	1,0x0,37	1,0x0,38
100	200									1,0x0,35	1,0x0,37	1,0x0,38
125	200											1,1x0,42
125	225											1,1x0,42

Branch		200	250	300	300	350	350	400	450	500	600	700	800
		315	355	400	450	450	500	500	560	630	710	900	1000
		L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h	L x h
20	90	1,0x0,35	1,0x0,37	1,0x0,4	1,0x0,42	1,0x0,42	1,0x0,45	1,0x0,45	1,0x0,48	1,0x0,51	1,0x0,55	1,0x0,65	1,0x0,70
25	90	1,0x0,35	1,0x0,37	1,0x0,4	1,0x0,42	1,0x0,42	1,0x0,45	1,0x0,45	1,0x0,48	1,0x0,51	1,0x0,55	1,0x0,65	1,0x0,70
32	110	1,0x0,36	1,0x0,38	1,0x0,41	1,0x0,43	1,0x0,43	1,0x0,46	1,0x0,46	1,0x0,49	1,0x0,52	1,0x0,56	1,0x0,66	1,0x0,71
40	110	1,0x0,36	1,0x0,38	1,0x0,41	1,0x0,43	1,0x0,43	1,0x0,46	1,0x0,46	1,0x0,49	1,0x0,52	1,0x0,56	1,0x0,66	1,0x0,71
50	125	1,0x0,37	1,0x0,39	1,0x0,41	1,0x0,44	1,0x0,44	1,0x0,46	1,0x0,46	1,0x0,49	1,0x0,53	1,0x0,57	1,0x0,66	1,0x0,71
65	140	1,0x0,38	1,0x0,4	1,0x0,42	1,0x0,45	1,0x0,45	1,0x0,47	1,0x0,47	1,0x0,5	1,0x0,54	1,0x0,58	1,0x0,67	1,0x0,72
80	160	1,0x0,39	1,0x0,41	1,0x0,43	1,0x0,46	1,0x0,46	1,0x0,48	1,0x0,48	1,0x0,51	1,0x0,55	1,0x0,59	1,0x0,68	1,0x0,73
100	180	1,0x0,41	1,0x0,43	1,0x0,45	1,0x0,48	1,0x0,48	1,0x0,5	1,0x0,5	1,0x0,53	1,0x0,57	1,0x0,61	1,0x0,7	1,0x0,75
100	200	1,0x0,41	1,0x0,43	1,0x0,45	1,0x0,48	1,0x0,48	1,0x0,5	1,0x0,5	1,0x0,53	1,0x0,57	1,0x0,61	1,0x0,7	1,0x0,75
125	200	1,1x0,45	1,1x0,47	1,1x0,49	1,1x0,52	1,1x0,52	1,1x0,54	1,1x0,54	1,1x0,57	1,1x0,61	1,1x0,65	1,1x0,74	1,1x0,79
125	225	1,1x0,45	1,1x0,47	1,1x0,49	1,1x0,52	1,1x0,52	1,1x0,54	1,1x0,54	1,1x0,57	1,1x0,64	1,1x0,65	1,1x0,74	1,1x0,79
150	250	1,2x0,49	1,2x0,51	1,2x0,53	1,2x0,56	1,2x0,56	1,2x0,58	1,2x0,58	1,2x0,61	1,2x0,72	1,2x0,68	1,2x0,78	1,2x0,83
200	315		1,4x0,58	1,4x0,61	1,4x0,63	1,4x0,63	1,4x0,66	1,4x0,66	1,4x0,69	1,4x0,8	1,4x0,76	1,4x0,86	1,4x0,91
250	355			1,5x0,68	1,5x0,71	1,5x0,71	1,5x0,73	1,5x0,73	1,5x0,76	1,5x0,87	1,5x0,84	1,5x0,93	1,5x0,98
300	400					1,7x0,78	1,7x0,81	1,7x0,81	1,7x0,84	1,7x0,87	1,7x0,91	1,7x1,01	1,7x1,05
300	450					1,7x0,78	1,7x0,81	1,7x0,81	1,7x0,84	1,7x0,95	1,7x0,91	1,7x1,01	1,7x1,05
350	450							1,8x0,88	1,8x0,91	1,8x0,95	1,8x0,99	1,8x1,08	1,8x1,13
350	500							1,8x0,88	1,8x0,99	1,8x1,03	1,8x0,99	1,8x1,08	1,8x1,13
400	500								2,0x1,06	2,0x1,1	2,0x1,07	2,0x1,16	2,0x1,21
450	560									2,1x1,0	2,1x1,14	2,1x1,24	2,1x1,29
500	630										2,3x1,22	2,3x1,31	2,3x1,35
600	710											2,6x1,46	2,6x1,51
700	900												2,9x1,67

Vertical Branches

Vertical branches are mainly used for air-venting and draining.

Specific tees are available with venting pot.

According to EN 448

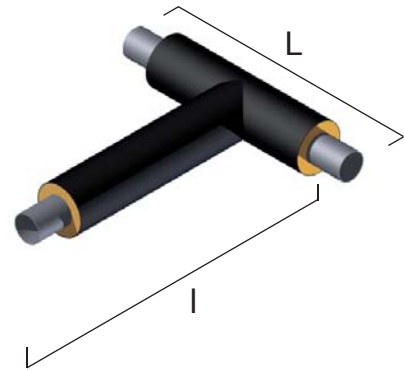
Tees are prefabricated at the factory and can be supplied in any combination from an equal tee to a reduction of minimum DN 20.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Different branch lengths can be manufactured on request.




Steel Pipe		Casing	PI Equal Branch		
ND	Out. Ø	Out. Ø	Main Length L	Branch Length I	Indicative Weight
mm	mm	mm	m	m	kg / pce
20 x 20	26,9	90	1,0	1,0	5
25 x 25	33,7	90	1,0	1,0	6
32 x 32	42,4	110	1,0	1,0	9
40 x 40	48,3	110	1,0	1,0	9
50 x 50	60,3	125	1,0	1,0	13
65 x 65	76,1	140	1,0	1,0	17
80 x 80	88,9	160	1,0	1,0	20
100 x 100	114,3	180	1,0	1,0	27
100 x 100	114,3	200	1,0	1,0	29
125 x 125	139,7	200	1,0	1,0	36
125 x 125	139,7	225	1,0	1,0	41
150 x 150	168,3	250	1,0	1,0	50
200 x 200	219,1	315	1,1	1,0	76
250 x 250	273,1	355	1,1	1,0	100
300 x 300	323,9	400	1,1	1,0	132
300 x 300	323,9	450	1,2	1,0	147
350 x 350	355,6	450	1,2	1,1	158
350 x 350	355,6	500	1,2	1,1	170
400 x 400	406,4	500	1,2	1,1	218
450 x 450	457,0	560	1,3	1,1	258
500 x 500	508,0	630	1,4	1,3	333
600 x 600	610,0	710	1,5	1,5	518
700 x 700	711,0	900	1,6	1,7	792
800 x 800	813,0	1000	1,7	1,9	1065
900 x 900	On request				
1000 x 1000	On request				

Reduced Vertical Branches

Branch		Main Pipe											
		25	32	40	50	65	80	100	100	125	125	150	200
		90	110	110	125	140	160	180	200	200	225	250	315
		L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	
20	90												
25	90												
32	110												
40	110												
50	125												
65	140												
80	160												
100	180												
100	200												
125	200												
125	225												
150	250												

Branch		250	300	300	350	350	400	450	500	600	700	800
		355	400	450	450	500	500	560	630	710	900	1000
		L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I	L x I
20	90											
25	90											
32	110											
40	110											
50	125											
65	140											
80	160											
100	180											
100	200											
125	200											
125	225											
150	250											
200	280	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
200	315		1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
250	355				1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
300	400				1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
300	450						1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
350	450						1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
350	500							1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0	1,1x1,0
400	500								1,2x1,0	1,2x1,0	1,2x1,0	1,2x1,0
450	560									1,3x1,0	1,3x1,0	1,3x1,0
500	630										1,4x1,0	1,4x1,0
600	710											1,5x1,0

 1,0 x 1,0

Anchors

Pre-insulated anchors are used to fix the expansion forces of the network in order to avoid uncontrolled movements of the pipelines.

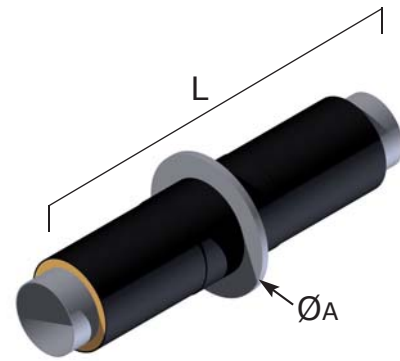
According to EN 448

Anchor points are supplied factory prefabricated, ready to be set into the concrete blocks.

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



Steel Pipe		Casing	PI Anchor			
ND	Out. Ø	Out. Ø	Plate Diam. A	Plate Thick. B	Length L	Indicative Weight
mm	mm	mm	mm	mm	m	kg / pce
20	26,9	90	200	12	2	7
25	33,7	90	200	12	2	8
32	42,4	110	220	14	2	12
40	48,3	110	220	14	2	12
50	60,3	125	235	15	2	16
65	76,1	140	250	18	2	20
80	88,9	160	270	20	2	24
100	114,3	180	290	20	2	32
100	114,3	200	310	20	2	34
125	139,7	200	310	25	2	42
125	139,7	225	335	25	2	45
150	168,3	250	370	25	2	57
200	219,1	315	450	25	2	78
250	273,1	355	560	30	2	100
300	323,9	400	630	35	2	117
300	323,9	450	630	35	2	122
350	355,6	450	680	35	2	134
350	355,6	500	680	35	2	139
400	406,4	500	750	35	2	165
450	457,0	560	810	40	2	200
500	508,0	630	880	40	2	337
600	610,0	710	960	50	2	407
700	711,0	900	1150	50	2	640
800	813,0	1000	1250	50	2	762
900	On request					
1000	On request					

Bellows

Axial

Pre-insulated and pre-stressed.

Delivered with under service auto-shearing pins, with protections, ready to set up.

Protections are not to be removed when laying, 150mm at each end of the pipe is not insulated.

The outer HDPE casing of fittings are factory welded. BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



Steel Pipe		Casing	PI Bellow		
ND	Out. Ø	Out. Ø	Expansion	Length	Indicative Weight
mm	mm	mm	mm	m	Kg / pce
40	48,3	110	100	2	10
50	60,3	125	100	2	14
65	76,1	140	100	2	18
80	88,9	160	100/150	2	26
100	114,3	180	125/155	2	31
100	114,3	200	125/155	2	33
125	139,7	200	125/160	2	41
125	139,7	225	125/160	2	48
150	168,3	250	125/165	2	110
200	219,1	315	170/125	2	163
250	273,1	355	170/125	2	138
300	323,9	400	125/190	2	189
300	323,9	450	125/190	2	194
350	355,6	450	125/200	2	218
350	355,6	500	125/200	2	234
400	406,4	500	125/200	2	273
450	457,0	560	125/200	2	353
500	508,0	630	200	2	361
600	610,0	710	200	2	817
700	711,0	900	On request		
800	813,0	1000	On request		
900	On request				
1000	On request				

Reducers

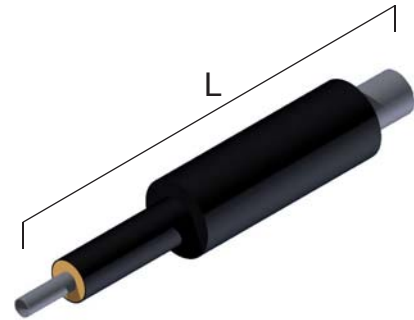
Reducers are pre-fabricated with a reduction of 1 to 3 casing diameters.

According to EN 448

150 mm at each end of the pipe are not insulated.

The outer HDPE casing of fittings is factory welded.

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



Length = 1,00 m for casing < 315

= 1,50 m for casing ≥ 500

Main Pipe			32	40	50	65	80	100	100	125	125	150	
			42,4	48,3	60,3	76,1	88,9	114,3	114,3	139,7	139,7	168,3	
			110	110	125	140	160	180	200	200	225	250	
Reducer													
20	26,9	90	x	x									
25	33,7	90	x	x	x								
32	42,4	110		x	x	x							
40	48,3	110			x	x	x						
50	60,3	125				x	x	x					
65	76,1	140					x	x	x				
80	88,9	160						x	x	x	x		
100	114,3	180							x	x	x	x	
100	114,3	200								x	x	x	
125	139,7	200										x	
125	139,7	225											x

Main Pipe			150	200	250	300	300	350	350	400	450	500	600	700	800
			168,3	219,1	273,1	323,9	323,9	355,6	355,6	406,4	457,0	508,0	610,0	711,0	813,0
			250	315	355	400	450	450	500	500	560	630	710	900	1000
Reducer															
150	168,3	250		x	x	x									
200	219,1	315			x	x	x	x							
250	273,1	355				x	x	x	x						
300	323,9	400					x	x	x	x					
300	323,9	450						x	x	x					
350	355,6	450							x	x	x				
350	355,6	500								x	x				
400	406,4	500									x	x	x		
450	457,0	560										x	x	x	
500	508,0	630											x	x	
600	610,0	710												x	
700	711,0	900													x

Ball Valves

The pre-insulated ball valves are installed directly in the ground during the laying of the pipelines.

We recommend that the valves are installed in a position free of expansion movements.

In district heating pipe systems high axial compressive and tensile forces due to temperature variations often occur. It is therefore very important that the performance of the pre-insulated valve is not affected by these axial forces so that you can be opened and closed at any time. This is achieved by using a fully welded body leading the axial forces through the outer part of the valve housing. In this way the forces do not affect vital parts of the valve. A sophisticated spring system ensures that the seals will always be pressed against the ball with a controlled operated force, independent of the axial forces.

Example of standard features of a valve :

The valve body is in steel S235JR according to EN 10025 (same as ST 37). The stem and the ball are in stainless steel. The seat rings are of carbon reinforced PTFE. They offer optimum tightness, controlled pressure against the ball and controlled operating torque. The seals are of PTFE / graphite

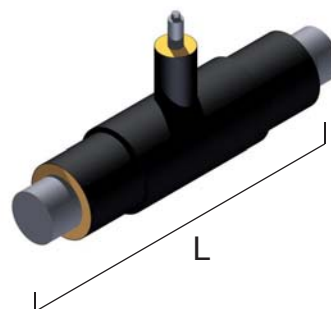
The stem packing box includes a 4 layer seal consisting of compressed PTFE and carbon. On request the stem height can be adjusted in factory before insulation.



Ball Valves

According to EN 488

Each end of carrier pipe is not insulated on 150 mm.
The outer HDPE casings of fittings are factory welded.
DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.



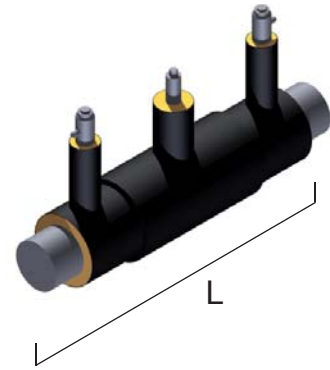
Steel Pipe		Casing	PI Ball Valve	
ND	Out. Ø	Out. Ø	Length	Indivative Weight
mm	mm	mm	m	kg / pce
20	26,9	90	1,5	3,8
25	33,7	90	1,5	3,9
32	42,4	110	1,5	4,5
40	48,3	110	1,5	5,4
50	60,3	125	1,5	6,38
65	76,1	140	1,5	9,44
80	88,9	160	1,5	11,27
100	114,3	180	1,5	16,09
100	114,3	200	1,5	16,76
125	139,7	200	1,5	31,60
125	139,7	225	1,5	32,57
150	168,3	250	1,5	43,50
200	219,1	315	1,5	82,67
250	273,1	355	1,5	157,60
300	323,9	400	1,5 ou 1,8	247,0
300	323,9	450	1,5 ou 1,8	253,4
350	355,6	450	1,5	293,5
350	355,6	500	1,5	303,9
400	406,4	500	2,1	547**
450	457,0	560	2,2	900**
500	508,0	630	2,2	804**
600	610,0	710	2,2	980,0
700	On request			
800	On request			

** Supplied with worm gear + bevel gear

Ball Valves with 2 airvents / drains

Material manufactured on request. When ordering please specify :

- The nominal valve dimension ND,
- The height of the stem H,
- The distance between service valves N,
- The nominal dimension of the service valves.



Steel Pipe		Casing	PI Ball Valve		
ND	Out. Ø	Out. Ø	Length	Service Valve	
mm	mm	mm	m	DN recom.	DN max.
20	26,9	90	1,5	20,0	20
25	33,7	90	1,5	25,0	25
32	42,4	110	1,5	32,0	32
40	48,3	110	1,5	32,0	40
50	60,3	125	1,5	32,0	50
65	76,1	140	1,5	32,0	50
80	88,9	160	1,5	32,0	50
100	114,3	180	1,5	32,0	50
100	114,3	200	1,5	32,0	50
125	139,7	200	1,5	32,0	50
125	139,7	225	1,5	32,0	50
150	168,3	250	1,5	50,0	50
200	219,1	315	1,5	50,0	50
250	273,1	355	2,1	50,0	50
300	323,9	400	2,1	50,0	50
300	323,9	450	2,1	50,0	50
350	355,6	450	2,1	50,0	50
350	355,6	500	2,1	50,0	50
400	406,4	500	2,1	50,0	50
450	457,0	560	2,8	50,0	50
500	508,0	630	2,8	50,0	50
600	610,0	710	2,8	50,0	50
700	On request				
800	On request				

Site Joint Kits

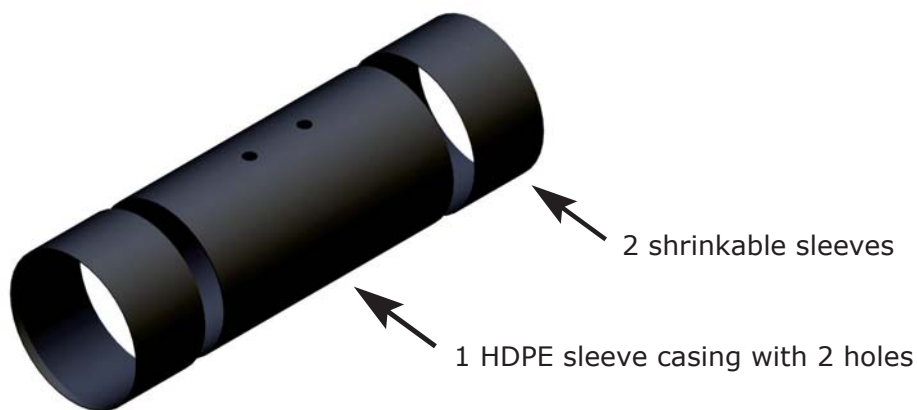
Depending on the nature of the site's ground and the customer's requirement, 3 types of site joints can be delivered.

According to EN 489

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Injected Site Joint Kits : i1

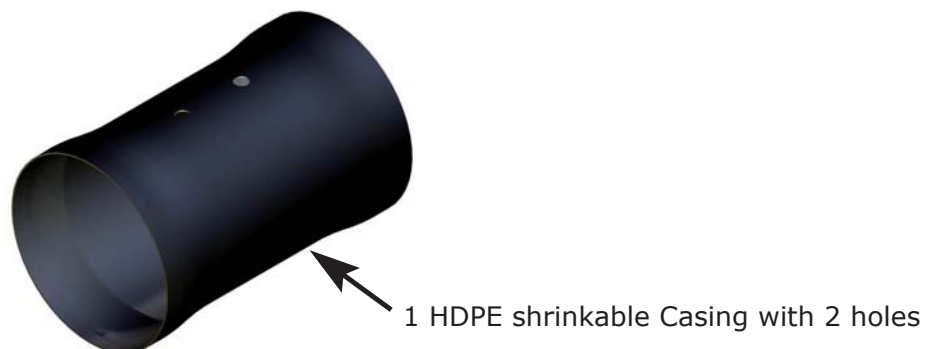
From DN 300 and for some thicknesses of insulation, the joints injected kits are available in 1/2 or 1/3 kits. Each kit includes 2 or 3 boxes of Polyol and 2 or 3 boxes of Isocyanate. The words «1/2 or 1/3 kit» are noted on the boxes.



Shrinkable Injected Casing Kit : i2

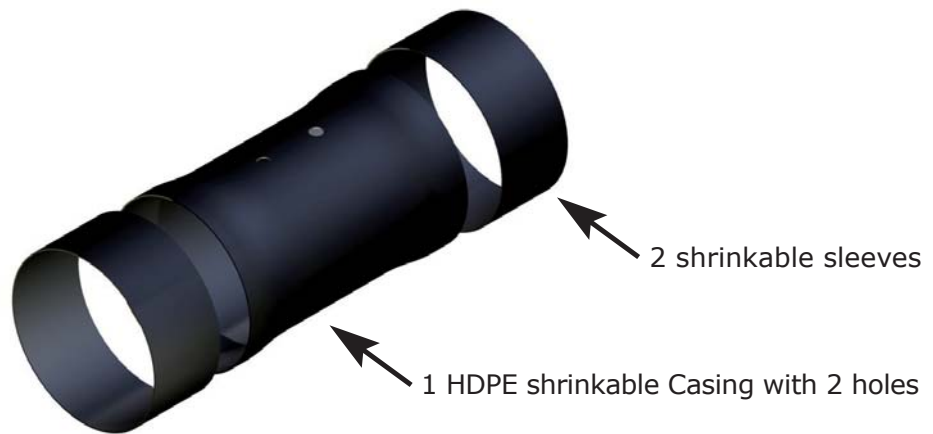
Standard site joints are available with an HDPE sleeve casing, 2 shrinkable sleeves, 2 venting plugs, 2 closing plugs, 2 foaming hole protection sleeves (FOPS) and a 2 component PU foam kit.

Joint insulation is manufactured by pouring the liquid polyurethane foam components into the joint volume at the work site.



Shrinkable Injected Casing Kit : i3

Thermo site joint kits are available with an HDPE shrinkable casing, 2 venting plugs, 2 closing plugs, 2 foaming hole protection sleeves (FOPS) and a 2 component PU foam kit. Joint insulation is manufactured by pouring the liquid polyurethane foam components into the casing joint on site.



Electro Welding Kit : i10

Electro welding kit are composed by HDPE shrinkable Casing, 2 Copper welding band, 2 venting plugs, 2 closing plugs, 2 foaming hole protection sleeves (FOPS) and a 2 component PU foam kit.

Joint insulation is manufactured by pouring the liquid polyurethane foam components into the joint volume at the work site.



Elbow insulation kit : i4

The I4 elbow insulation kit is composed of a 90° steel elbow which is cut to the required angle on site and a flexible shrinkable casing. The insulation is made by Polyurethane mousse injection.

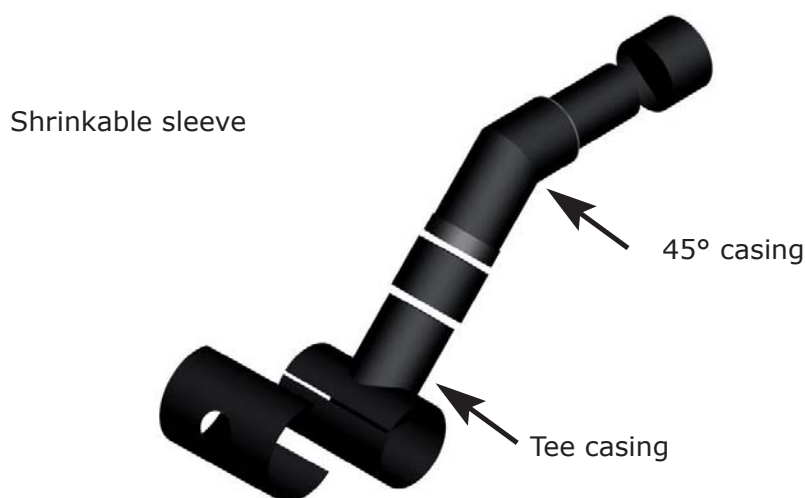


Insulation kit for Hot Tap Valves : i8

The insulation kit is composed by 2 HDPE elements, a tee casing for and a 45° casing. The assembly of the 2 different parts is made by pushing the one into the other. Water tightness is realized by installing shrinkable sleeves of different size.

Insulation is done by Polyurethan Foam (PUR Foam) injection on site.

Hot Tap Valves are not included in the insulation kit .



Injected Site Joint Kits



Isocyanate Polyol

According to EN 489

BRANDES or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Foam components quantity Injected Casing Kit i1

Steel Pipe	HDPE Casing / Pipe	Foam		Site joint kit	
ND	Out. Ø	Polyol	Isocyanate	Length	Indic. Weight
mm	mm	l	l	m	Kg / pce
20	90	0,076	0,087	0,5	1
25	90	0,072	0,082	0,5	1
32	110	0,107	0,121	0,5	1
40	110	0,101	0,115	0,5	1
50	125	0,124	0,141	0,5	1
65	140	0,143	0,162	0,5	1
80	160	0,183	0,208	0,5	1
100	180	0,199	0,227	0,5	2
100	200	0,278	0,316	0,5	3
125	200	0,230	0,262	0,5	2
125	225	0,339	0,387	0,5	2
150	250	0,352	0,401	0,5	3
200	315	0,528	0,601	0,5	4
250	355	0,530	0,605	0,5	4
300	400	0,567	0,647	0,5	5
300	450	1,005	1,145	0,5	8
350	450	0,793	0,893	0,5	8
350	500	1,272	1,450	0,5	10
400	500	0,873	0,966	0,5	9
450	560	1,078	1,229	0,5	10
500	630	1,429	1,629	0,5	11
600	710	1,359	1,549	0,5	12
700**	900	3,133	3,572	0,5	23
800**	1000	3,489	3,977	0,5	28
900	On request				
1000	On request				

** Delivered as 1/2 Kit.

Foam components quantity
Shrinkable Injected casing Kit i2 – i3 (idem Double Tightness)

Steel Pipe	HDPE Casing / Pipe	Foam		Site joint kit	
ND	Out. Ø	Polyol	Isocyanate	Length	Indicative Weight
mm	mm	l	l	m	kg / pce
20	90	0,102	0,116	0,5	1
25	90	0,098	0,112	0,5	1
32	110	0,143	0,163	0,5	1
40	110	0,137	0,156	0,5	1
50	125	0,165	0,188	0,5	1
65	140	0,191	0,218	0,5	1
80	160	0,242	0,275	0,5	1
100	180	0,265	0,302	0,5	1
100	200	0,355	0,405	0,5	2
125	200	0,307	0,350	0,5	2
125	225	0,431	0,491	0,5	2
150	250	0,455	0,518	0,5	2
200	315	0,668	0,762	0,5	3
250	355	0,696	0,793	0,5	4
300	400	0,780	0,889	0,5	5
300	450	1,233	1,405	0,5	7
350	450	1,011	1,153	0,5	6
350	500	1,590	1,812	0,5	8
400	500	1,195	1,362	0,5	8
450	560	1,433	1,634	0,5	10
500**	630	1,827	2,083	0,5	12
600**	710	1,944	2,216	0,5	15
700***	900	4,066	4,635	0,5	26
800***	1000	5,650	6,441	0,5	33
900	On request				
1000	On request				

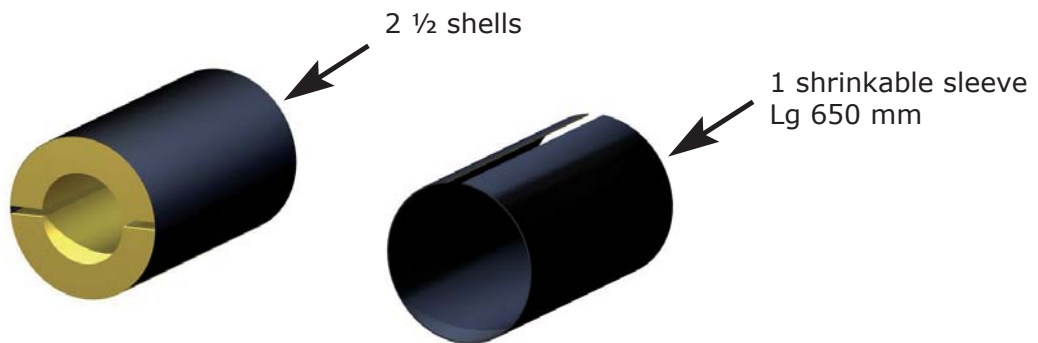
** Delivered as 1/2 Kit

*** Delivered as 1/3 Kit

1/2 Shell Site Joint Kits

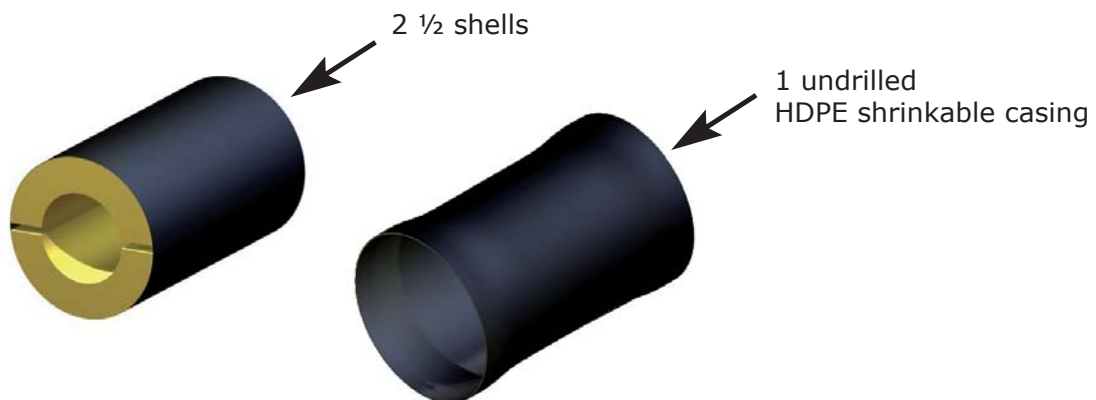
1/2 Shell - Shrinkable Sleeve : C1

The 1/2 shell - shrinkable sleeve kits are available with a 650 mm long shrinkable sleeve, 2 1/2 shells of rigid polyurethane foam and a protection film.



1/2 Shell - Shrinkable Casing : C2

The 1/2 shell - shrinkable casing kits are available with an undrilled HDPE shrinkable casing, 2 1/2 shells of rigid polyurethane foam and a protection film.



½ shells of PU foam

Steel Pipe		1/2 shells		Site joint kit	
ND	Out. Ø	Int. Diam	Out. Ø	Length L	Indicative Weight
mm	mm	mm	mm	m	kg / pce
20	26,9	30	90	0,5	1
25	33,7	37	90	0,5	1
32	42,4	45	110	0,5	1
40	48,3	52	110	0,5	1
50	60,3	63	125	0,5	1
65	76,1	80	140	0,5	1
80	88,9	93	160	0,5	1
100	114,3	121	180	0,5	2
100	114,3	121	200	0,5	3
125	139,7	139	200	0,5	2
125	139,7	139	225	0,5	2
150	168,3	175	250	0,5	3
200	219,1	222	315	0,5	4
250	273,1	280	355	0,5	4
300	323,9	330	400	0,5	5
300	323,9	330	450	0,5	8
350	355,6	362	450	0,5	8
350	355,6	362	500	0,5	10
400	406,4	413	500	0,5	9
450	457,0	464	560	0,5	10
500	508,0	515	630	0,5	11
600	610,0	620	710	0,5	12
700	711,0	720	900	0,5	23
800	813,0	825	1000	0,5	28
900	On request				
1000	On request				

Injected site joint reduction kits: i6

Site joint reduction kits consist of a reduced HDPE casing, 2 shrinkable sleeves and a 2 component PU foam kit.

The steel reducer is included in our supply.

Reducers are supplied for a reduction of 1 to 2 casing diameters.

It has to be placed on the pipe casing before welding the pipes together.

According to EN 489

DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

From DN 350 and for some thicknesses of insulation, the joints injected kits are available in 1 / 2 kits. Each kit includes 2 boxes of Polyol and 2 boxes of Isocyanate. The words «1/2 kit» are noted on the boxes.



Main pipe			32	40	50	65	80	100	100	125	125	150	200
			42,4	48,3	60,3	76,1	88,9	114,3	114,3	139,7	139,7	168,3	219,1
			110	110	125	140	160	180	200	200	225	250	315
Reducer													
20	26,9	90	x	x									
25	33,7	90	x	x	x								
32	42,4	110			x	x							
40	48,3	110				x	x						
50	60,3	125				x	x						
65	76,1	140					x	x					
80	88,9	160						x	x	x			
100	114,3	180							x	x	x		
100	114,3	200								x	x		
125	139,7	200								x	x		
125	139,7	225									x	x	

Main pipe			250	300	300	350	350	400	450	500	600	700	800	
			273,1	323,9	323,9	355,6	355,6	406,4	457,0	508,0	610,0	711,0	813,0	
			355	400	450	450	500	500	560	630	710	900	1000	
Reducer														
150	168,3	250	x											
200	219,1	315	x	x										
250	273,1	355		x	x	x								
300	323,9	400				x	x	x						
300	323,9	450					x	x	x					
350	355,6	450						x	x	x				
350	355,6	500							x	x				
400	406,4	500								x	x			
450	457,0	560									x	x		
500	508,0	630										x	x	
600	610,0	710											x	
700	711,0	900											x	

Termination caps

Depending on the nature of the site's ground and the customer's requirement, different types of termination caps can be delivered. They are used when pre-insulated pipes are left waiting for a future connection.

According to EN 489

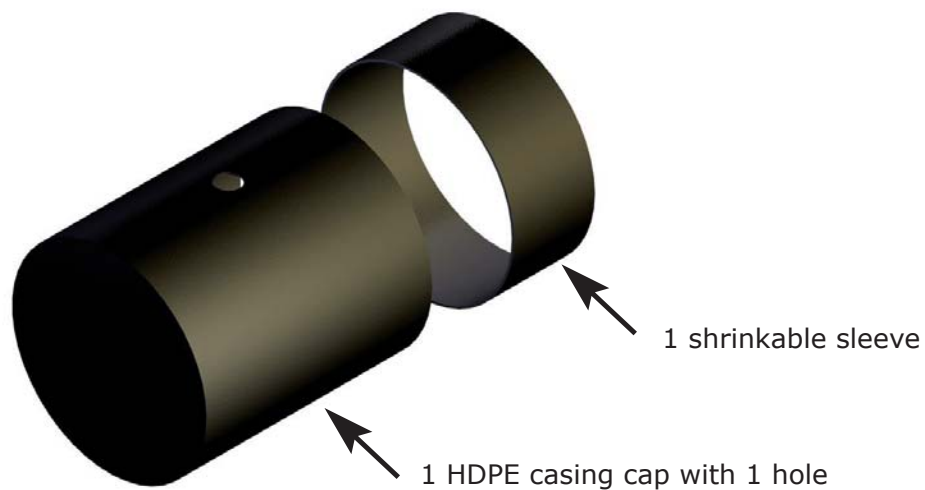
DELFIN or Nordic alarm wires placed in 10 past 10 o'clock position, on request.

Injected Termination Cap Kit: i5

Termination cap kits consist of an HDPE cap, a shrinkable sleeve and 2 component PU foam kit.

The steel cap is included in our supply.

From DN 350 and for some thicknesses of insulation, the joints injected kits are available in 1 / 2 kits. Each kit includes 2 boxes of Polyol and 2 boxes of Isocyanate. The words «1/2 kit» are noted on the boxes.



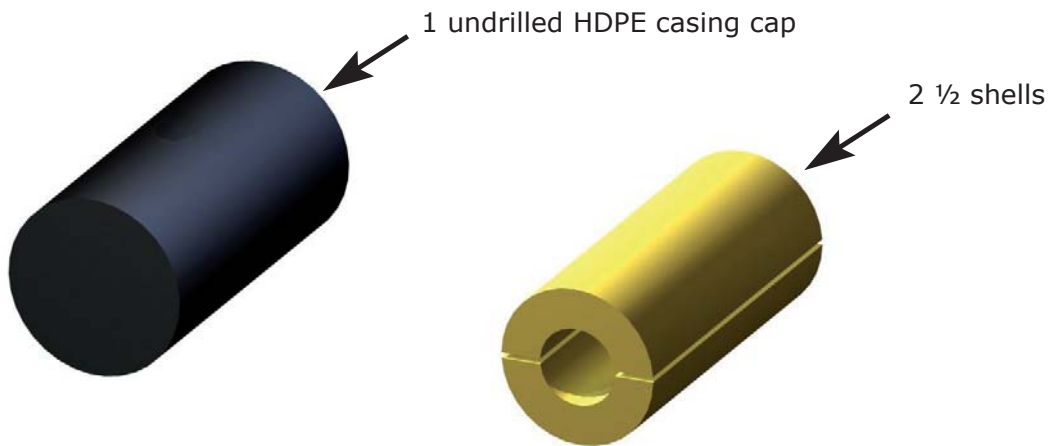
Foam component quantity
Injected Termination Cap Kit

Steel Pipe	HDPE Casing / Pipe	Foam		Termination cap kit	
ND	Out. Ø	Polyol	Isocyanate	Length	Indicative Total Weight
mm	mm	l	l	m	kg / pce
20	90	0,076	0,087	0,5	1
25	90	0,072	0,082	0,5	1
32	110	0,107	0,121	0,5	1
40	110	0,101	0,115	0,5	1
50	125	0,124	0,141	0,5	1
65	140	0,143	0,162	0,5	1
80	160	0,183	0,208	0,5	1
100	180	0,199	0,227	0,5	2
100	200	0,278	0,316	0,5	3
125	200	0,230	0,262	0,5	2
125	225	0,339	0,387	0,5	2
150	250	0,352	0,401	0,5	3
200	315	0,528	0,601	0,5	4
250	355	0,530	0,605	0,5	4
300	400	0,567	0,647	0,5	5
300	450	1,005	1,145	0,5	8
350	450	0,793	0,893	0,5	8
350	500	1,272	1,450	0,5	10
400	500	0,873	0,966	0,5	9
450	560	1,078	1,229	0,5	10
500	630	1,429	1,629	0,5	11
600	710	1,359	1,549	0,5	12
700**	900	3,133	3,572	0,5	23
800**	1000	3,489	3,977	0,5	28
900	On request				
1000	On request				

** Delivered as 1/2 Kit.

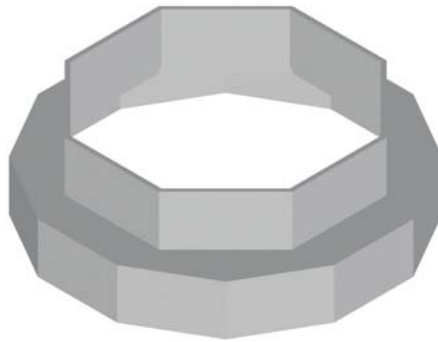
1/2 Shell Termination Cap Kit : C3

The 1/2 shell termination cap kits are available with an undrilled HDPE casing cap, two 1/2 shells of rigid polyurethane foam and a protection film. The steel cap is included in our supply.



Shrinkable End Caps DHEC

The district heating end cap (DHEC) is a heat-shrinkable piece, manufactured from a modified cross-linked polyolefin. The cap is coated with a special adhesive inside both outlets. It is designed to seal the annulus between carrier and outer pipe for pre-insulated pipe sections. During installation, one outlet of the cap shrinks down the pipe jacket while the other outlet recovers onto the service pipe. During the shrinking process, the adhesive forms a permanent seal between the service pipe and the outer jacket. The end cap (DHEC) has to be placed on the pipe casing end before welding the pipes together.



End Caps (DHEC) have to be used at each interruption of an insulated network (valve chamber, wall entry, and so on...) in order to avoid any water penetration inside the insulation.

Protection of insulation

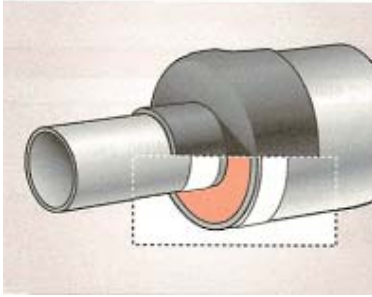
On installed pre-insulated piping systems the end cap (DHEC) prevents migration of water vapour across the joint in the event of a pipe leak or insulation jacket failure, thereby limiting insulation degradation to either one pipe length or the joint area.

Versatility

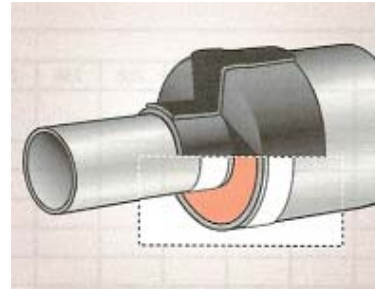
Each end cap (DHEC) size covers several pipe sizes and/or insulation thicknesses. It will also easily accommodate dimension variations of pipe insulation. End caps (DHEC) are available from stock in a range of standard size covering most existing pre-insulated pipe sizes. Special dimensions can be manufactured on request.

Economic interest

End cap (DHEC) can be installed in a few minutes. Once in service, the end cap will prevent degradation of insulation material over long lengths of the pipe network, thereby reducing repair costs to a minimum. The use of a leak detection system becomes in that way of minor importance.



DHEC
Up to DN 350/450



CCS-DHEC
From DN 350/500

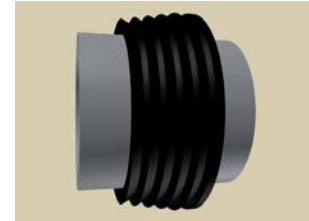
Steel Pipe		Casing	DHEC
ND	Out. Ø	Out. Ø	Part No.
mm	mm	mm	
20	26,9	90	2000
25	33,7	90	2100
32	42,4	110	2200
40	48,3	110	2300
50	60,3	125	2400
65	76,1	140	2400
80	88,9	160	2500
100	114,3	180	2600
100	114,3	200	2600
125	139,7	200	2630
125	139,7	225	2630
150	168,3	250	2700
200	219,1	315	2800
250	273,1	355	2900
300	323,9	400	3000
300	323,9	450	3000
350	355,6	450	3000
350	355,6	500	CCS DHEC
400	406,4	500	CCS DHEC
450	457,0	560	CCS DHEC
500	508,0	630	CCS DHEC
600	610,0	710	CCS DHEC
700	711,0	900	CCS DHEC
800	813,0	1000	CCS DHEC

Wall entry

Wall entry consists in a rubber ring which allows penetration in valve chambers, buildings or any masonry. The wall entry is installed as a seal against water penetration, but you must consider that exposed to ground water pressure, the wall entry will not be watertight. It allows small expansion movements at the penetration point. The drilling of the penetration hole is done with a diamond-drill.

Wall entry is in SBR of shore hardness $40 \pm 5^\circ$ IHR (indicative value).

The use of wall entry is compulsory at each interruption of the network (valve chamber, building penetration, and so on...) in order to allow the pre-insulated pipeline to expand without damages through the concrete wall.



Steel Pipe	Casing	Wall entry	
ND	Out. Ø	A	B
mm	mm	mm	mm
20	90	50	22
25	90	50	22
32	110	50	22
40	110	50	22
50	125	50	22
65	140	50	22
80	160	50	22
100	180	50	22
100	200	50	22
125	200	50	22
125	225	50	22
150	250	50	22
200	315	50	22
250	355	50	22
300	400	50	22
300	450	50	22
350	450	50	22
350	500	50	22
400	500	50	22
450	560	50	22
500	630	50	22
600	710	50	22
700	900	50	22
800	1000	50	22
900	1100	On request	
1000	1200	On request	

Expansion Pads

Expansion pads are used on the bends and branches for absorption of expansion movements. Foam pads and counter pads allow free movements of the underground network during the first expansion.

The maximal absorption of expansion movements is of 30 mm per lay of pad. You can use maximum 3 lays per piece.

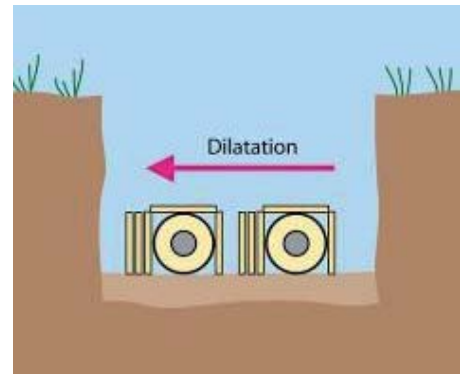
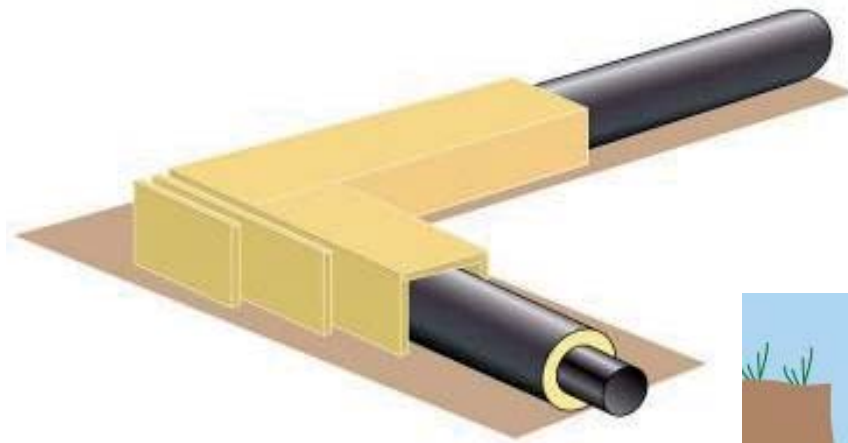


Expansion pads are made of flexible polyurethane foam flakes. The density is 100 kg/m³. The size of the foam pads depends on the dimension of the casing and can be read from the fol

Type of foam pad according to casing

Steel Pipe	Casing	Expansion Pad				Counter Expansion Pad		
ND	Out. Ø	Type	L	Wall thick	H	L	Ep.	H
mm	mm		mm	mm	mm	mm	mm	mm
20	90	I	1000	40	420	1000	40	140
25	90	I	1000	40	420	1000	40	140
32	110	I	1000	40	420	1000	40	140
40	110	I	1000	40	420	1000	40	140
50	125	I	1000	40	420	1000	40	140
65	140	I	1000	40	420	1000	40	140
80	160	II	1000	40	600	1000	40	200
100	180	II	1000	40	600	1000	40	200
100	200	II	1000	40	600	1000	40	200
125	200	II	1000	40	600	1000	40	200
125	225	III	1000	40	840	1000	40	280
150	250	III	1000	40	840	1000	40	280
200	315	IV	1000	40	1065	1000	40	355
250	355	IV	1000	40	1065	1000	40	355
300	400	V	1000	40	1350	1000	40	450
300	450	V	1000	40	1350	1000	40	450
350	450	V	1000	40	1350	1000	40	450
350	500	VI	1000	40	1680	1000	40	560
400	500	VI	1000	40	1680	1000	40	560
450	560	VI	1000	40	1680	1000	40	560
500	630	VII	1000	40	2340	1000	40	780
600	710	VII	1000	40	2340	1000	40	780
700	On request							
800	On request							
900	On request							
1000	On request							

Expansion Pads



Number of expansion pads according to expansion

Deflection arm	Expansion	Expansion	Expansion
L_A	$\Delta L < 30$ mm	$\Delta L 30 - 60$ mm	$\Delta L 60 - 90$ mm
M	Pce	Pce	Pce
1,0 - 1,4	1	1 + 1	
1,5 - 2,4	2	2 + 1	
2,5 - 3,4	3	3 + 2	3 + 2 + 1
3,5 - 4,4	4	4 + 3	4 + 3 + 2
4,5 - 5,4	5	5 + 4	5 + 4 + 2
5,5 - 6,4	6	6 + 4	6 + 5 + 4
6,5 - 7,4	7	7 + 5	7 + 6 + 4
7,5 - 8,4	8	8 + 6	8 + 7 + 5
8,5 - 9,4		9 + 6	9 + 7 + 5
9,5 - 10,4		10 + 7	10 + 8 + 6
10,5 - 11,4			11 + 9 + 7

Monitoring systems



For every operator of District Heating or networks of hot fluid, anticipating risks of leakage and therefore disaster is an imperative. One solution is the installation of a monitoring system in your pre-insulated pipes network.

The operation of a monitoring system is independent of the manufacture of piping elements. Several types of monitoring systems exist on the market. We have selected two: the Nordic System and the DELFIN System.

The systems are not interchangeable and come along with different components, especially the alarm wires. The desired system has to be selected before manufacturing the pipe.

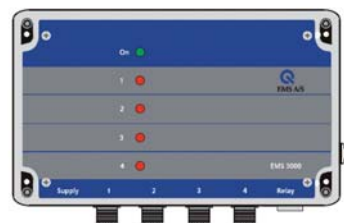
Both systems comply with the EN 14419 standard.



The Delfin monitoring system has been developed by INPAL for a use in combination with Brandes type detection wires.



EMS 2020



EMS 3000



Case Studies



The last Universal Exhibition of the XXth century

The construction work of the universal Exhibition of Lisbon began in March 1996 and ended in April 1998. The first European trigeneration plant has initially been dimensioned to supply energy to the hectares of the exhibition area. Up to 2010 this will be increased in order to cover the 350 hectares which will be transformed into an urban area for 25.000 inhabitants and 18.000 jobs. The plant develops 90 MW of cooling power and 44 MW of heating energy.

42 km of preinsulated pipelines POLYURETUB 130 have been supplied in order to provide energy to the 70 buildings erected on this site.

During 24 months INPAL Industries shipped 192 truckloads with pipes and accessories which have been buried or installed in technical galleries.

The network is operated by Climepace, GDF International and RAR Ambiente.



Service conditions

- CHILLED WATER 4° – 12° C 13 bar maximum
- HOT WATER 100° – 70° C 15 bar maximum

Supply

Polyuretub
DN 50 to 800
In length of 12 m



Carrier pipe

Long. welded carbon black steel. According to EN 10217.

Insulation

Polyurethan foam – Density 80 kg/m³.

Casing

High density polyethylen.

More than 3500 site joints



Universal Forum of Cultures
2004 May 9th – September 26th

The forum initiates one of the main urban works of renewal in Europe. Built on criterias of durability term life, it will give to Barcelona a fully renewed district, a new cultural, economic and residential area.

The area to renew covers fifteen hectares and is located between the sea and Besos river. Erection of new buildings, offices, hotels, shopping centres and university campus will facilitate the junction of this new district to Barcelona's city centre.



INPAL Industries supplied in 2003 – 2004 the first spanish network with 4 kilometres of pre-insulated pipelines POLYURETUB 130.

Pipes and fittings have been buried by Aigües de Barcelona and Acsa (Agbar Construction S.A.).

Owning the network, Districlima will be in charge the operation during 25 years. Districlima has been founded by the companies Elyo Iberica, Agbar, Tersa, Idae and Icaen.

Service conditions

- CHILLED WATER 5° – 12° C 13 bar maximum
- HOT WATER 100° – 70° C 15 bar maximum

Supply

Polyuretub
DN 80 to 500
In length of 12 m

Carrier pipe

Long. welded carbon black steel acc. to NFA 49142.

Insulation

Polyurethan foam – Densité 80 kg/m³.

Casing

High density polyethylen.

JIP Ball valves

ND 500 – 400 – 300 – 250.

DELFIN alarm system



22 @ - 2005-2007 BARCELONA - SPAIN

District of Poble Nou

22@ will be the first district of Barcelona to have a district heating and cooling network :

- A public service to the companies which will cover up to 70% of the district energy requirements.
- A project which will save 40% of energy.

On the occasion of the celebration of the Cultural Forum in 2004, the district heating and cooling plant of Besos has been built to power the main buildings of this area. This was the starting point for a future extension of the network.

Districlima, constructor of the whole installation, has been in charge of extending the network simultaneously to the arrival of new companies in the district in order to adapt the offer to the demand. A new auxiliary plant in Aranyo Street has been built and is now connected to the forum plant. This second installation uses the chimney of the old plant in order to incorporate the architectural heritage of the «Catalan Manchester».



The extension power Lull-, Pujades-, Llevant- and Llacuna-Street, as well as Central Park and the Audio-visual Park.

Constructor
Districlima

Engineer
Gecsa

Laying and civil works
Acsa and Copisa

The installation has been done by Talleres Cosgaya, Agrusolpi and Mones - Nervion Montajes y Mantenimientos OHL. Six constructors and Rubatec also participated on this project.

INPAL Industries supplied in 2005 – 2007 16 kilometres of Polyurétub 130 pre-insulated pipelines.

Service conditions

- | | | |
|-----------------|--------------|--------------|
| - CHILLED WATER | 6° – 12° C | 13 Bar maxi. |
| - HOT WATER | 110° – 75° C | 15 Bar maxi. |

Supply

Polyuretub
DN 50 to 800
In length of 12 m



Carrier pipe

Long. welded carbon black steel acc. to EN 10217.

Insulation

Polyurethan foam – Density 80 kg/m³.

Casing

High density polyethylen.

Ball valve

DN 50 to 600.

DELFIN alarm system

RIXHEIM – ALSACE - FRANCE - 2008

L'île Napoléon

Rixheim, dormitory suburb of the vicinity of Mulhouse, is deeply transformed. The "Communauté de Communes de l'Île Napoléon" decided to build a Geothermal / Biomass / Gas power plant and District Heating networks for supplying in energy the new district "Z.A.C. du Petit Prince" with energy. Coupled with a wood power plant, the geothermal doublet feeds through 10 km of pipelines, 2 collective buildings and 170 private houses. A major project for Rixheim. Future network extensions are scheduled starting from the pre-insulated ball valves at the end of the lines.



The power station has an output power of 10 to 12 megawatts. Geothermal water at 45°C is scooped from the water-bearing bed called "big oolithe", in 700 m depth. This technique stood the test for ten years in Riehen in Switzerland. Geothermy coupled to biomass for 60% and gas for 20% in case of cold weather allow cost saving of 30%. Rixheim participates to environmental protection. Through geothermy : no greenhouse gases, no particle emissions, no CO₂.



Constructor

Communauté de Communes de l'Île Napoléon – Sausheim (68390)

Engineering

BE GIRUS – Vaux en Velin (69120)

Sub-Contractor

EUROVIA : Kingersheim (68264)

Laying company

IMHOFF- Gérardmer (88400)



10 kilometres of pre-insulated Polyuretub 130 pipelines have been delivered between March and April 2008

Service conditions

- HOT WATER 109° – 89° C 4 bar maximum

Supply

Polyuretub
DN 25 to 250
In length of 12 m

Carrier pipe

Long, welded carbon black steel
According to EN 10217.

Insulation

Polyurethan foam
Density 80 kg/m³

Casing

High Density Polyethylen.

Spherical ball valve

DELFIN alarm system

CLIMESPACE - FRANCE – 2009

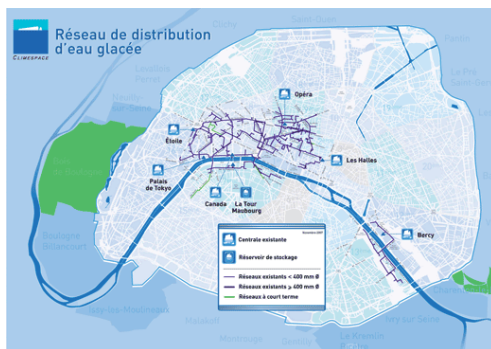
District Cooling network, PARIS

Concessionaire of the city of Paris, Climespace produces and distributes cooling energy for air conditioning circuits. During the last 18 years, INPAL Industries has delivered pipes for the 70 km network which has been installed in the sewers of Paris or buried.

The core network (Centre Network) spans the 1st, 2nd, 7th, 8th, 9th and 16th district of French capital. A second independent network, called «Bercy» stretches across the 12th and 13th district of Paris.

The whole pipe work is running underground, and to large extent through the wastewater installations or passes under the roads. 85% of the installations are walkable. The fully meshed and interconnected network is inspected and controlled on a daily basis.

Climespace entered into a cycle where both, new parts of the network have to be installed and more and more end-customer connections have to be accomplished



Constructor
CLIMESPACE - Paris

Laying Companies
SADE- Rosny sous Bois
ELYO Installation – Puteaux
SPAC Aulnay sous Bois
DARRAS ET JOUANIN
SUBURBAINE

Investment
231 M€ since 1991.

5 plants in operation

1 chilled water storage centre
of 10 MW

Installed capacity of 164 MW

2009 – Network Luxemburg, PARIS

1860 meters of DN 500 are installed in February, Boulevard Saint Germain at the intersection of Boulevard Raspail and street Courty and University street. The laying companies of this project are COFELY Installation and SADE Rosny sous Bois.

Service Conditions

- CHILLED WATER 4° – 14° C 16 Bar maxi.

Supply

Polyuretub
DN 500
In length of 12 m



Carrier pipe
Long. welded carbon black
steel
According to EN 10217

Insulation
Polyurethan foam
Density 80 kg/m³

Casing
High Density Polyethylen

300 Bends

800 Site joint kits



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