

Zakład Produkcyjno Usługowy
Międzyrzecz
POLSKIE RURY PREIZOLOWANE Sp. z o. o.
66-300 Międzyrzecz, ul. Zakaszewskiego 4

PRODUCT CATALOGUE

**ZPU MIĘDZYRZECZ Sp. z o. o.
PREINSULATED PIPE SYSTEM
TO FOR DIRECTLY BURIED HOT WATER
DISTRICT HEATING NETWORKS**

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www.zpum.pl

zpu@zpum.pl

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1 General Information on Application of ZPU Międzyrzecz Sp. z o. o. Preinsulated Tubes and Fittings

Preinsulated tubes and fittings by ZPU Międzyrzecz Sp. z o.o are to be used in the construction of thermal distribution networks, whose function is to transmit a heating medium from its source up to the reception point. Preinsulated tubes and fittings are resistant to the medium with maximal working temperature of 165°C predicted for thirty-year lifetime.

The function of preinsulated tubes and fittings manufactured by is to transmit a heating medium, characterised either by high or low working parameters, hot water or other media used for process or construction purposes.

Preinsulated tubes and fittings by ZPU Międzyrzecz Sp. z o.o are composed of a steel line tube coaxially fitted in a casing pipe made of hard polyethylene of high density (PEHD) and a layer of thermal insulation either standard or standard, plus or plus plus made of rigid polyurethane foam (PUR) filling up the space between the pipes. ZPU Międzyrzecz Sp. z o.o preinsulated pipes, used in the transmission of hot water, are manufactured within the nominal diameters of 20 to 1200 mm, in standard lengths of 6 m, 12 m and 16 m¹. Preinsulated products with galvanized steel carrier pipe are 6 m long, while the diameter range varies between 20 and 200 mm. The ends of preinsulate pipes and fittings are not insulated over a length of 150 mm ± 10 mm at diameters up to 200 mm, and over a length of 200 mm ± 10 mm for diameters 250 mm and more.

The pipes are produced by the continuous method (with or without an aluminum barrier) up to the diameter of the casing pipe Dz 355 mm, and by injection and foaming of PUR foam components in the full range of diameters.

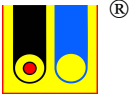
ZPU Międzyrzecz Sp. z o. o. preinsulated pipes and fittings meet the requirements set down by standards PN-EN 253, PN-EN- 448, PN-EN 488, PN-EN- 489, PN - EN 13941 and PN-EN 14419.

Tees are made in solutions in accordance with PN EN 448, as directly welded, reinforced, with a "pull neck" and forged. As a standard, we produce tees as directly welded, while for tees where the diameter of the passage and recoil are the same as forged tees. If a different solution is required, it should be specified at the inquiry stage and confirmed in the order. There is also a possibility of making tees from the so-called "Pull-neck" on HDPE conduit.

In order to protect the PUR foam against oxygen diffusion, an aluminium diffusion barrier can be used between the insulation and the protective casing or inside the protective casing, or a protective casing made of polyethylene (PE-HD) with a thickened wall - polyethylene barrier - can be used.

In the case of fittings with a polyethylene barrier (thickened wall of the casing pipe), the product symbol is created by adding its wall thickness to the diameter of the casing pipe (e.g. K-20 (90 * 5.0) / 90°, TW-32 (110 * 5.0) / 25 (90 * 5.0), etc.).

Suitability for use in construction of a construction product under the name: "Pre-insulated pipes, fittings and joint assemblies ZPU Międzyrzecz Sp.z o.o., to underground heating networks "states: National Technical Assessment ITB-KOT-2018/0286 edition 2, validity date 30 December 2024.



2 Properties of Materials Used in Preinsulated Pipes and Fittings by ZPU Międzyrzecz Sp. z o.o.

CARRIER PIPE

The service pipe is an attested, seamless, seamed, galvanized or other steel pipe made in accordance with the Contractor's order

To increase the adhesion of rigid polyurethane foam (PUR) to steel pipe, the external surface of the steel pipe is shot blasted till it attains grade cleanliness Sa 2 according to PN-EN ISO 8501-1.

Pipe ends are bevelled and ready to be welded according to PN-EN ISO 9692-1.

THERMAL (HEAT) INSULATION

Insulation is made of rigid polyurethane foam (PUR) homogenously filling the space between the pipes over the total length and in compliance with standard **PN-EN- 253**.

CASING PIPE

The casing pipe is made in accordance with the requirements of PN EN 253 with high density polyethylene (PEHD) in the PE 100 class.

The inner surface of polyethylene pipes is activated by the electrocoronation method to increase the adhesion of the rigid polyurethane foam.

The protective casing of pre-insulated pipes, fittings, armature and joint units of the ZPU Międzyrzecz Sp. z o.o. system has a test confirming the use of the products for the construction of above-ground heating networks.

3 Pipe Insulation Moisture Detection System

Preinsulated pipes and fittings ZPU Międzyrzecz Sp. z o.o. can be equipped with any system for detecting moisture in polyurethane insulation, i.e. impulse system (Nordic), resistive system (Brandes), HDW system or another indicated by the Customer. The installation consists of pipes built into the thermal insulation layer. This system signals moisture in the insulation where it occurs.



4 Cross-sections of Jacket and Carrier Pipes

ZPU Międzyrzecz Sp. z o. o. pipes and fittings are manufactured from jacket and carrier pipes of the following diameters:

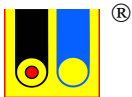
Steel Carrier Pipe				PEHD Jacket Pipe			PEHD Jacket Pipe			PEHD Jacket Pipe		
DN	Dz	welded	seamless	Insulation standard (Seria 1)			Insulation plus (Seria 2)			Insulation Plus Plus (Seria 3)		
		min[g]	min[g]	Dzp	gp min. stand.)	gpp min. thick.	Dzp	gp min. stand.	gpp min. thick.	Dzp	gp min. stand.	gpp min. thick.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
20	26,9	2,6	2,9	90 (75*)	3,0 (3,0*)	5,0 (5,0*)	110 (90*)	3,0 (3,0*)	5,0 (5,0*)	125 (110*)	3,0 (3,0*)	5,0 (5,0*)
25	33,7	2,6	2,9	90	3,0	5,0	110	3,0	5,0	125	3,0	5,0
32	42,4	2,6	2,9	110	3,0	5,0	125	3,0	5,0	140	3,0	5,0
40	48,3	2,6	2,9	110	3,0	5,0	125	3,0	5,0	140	3,0	5,0
50	60,3	2,9	3,2	125	3,0	5,0	140	3,0	5,0	160	3,0	5,0
65	76,1	2,9	3,2	140	3,0	5,0	160	3,0	5,0	200 (180*)	3,0 (3,0*)	5,0 (5,0*)
80	88,9	3,2	3,6	160	3,0	5,0	200 (180*)	3,2 (3,0*)	5,2 (5,0*)	225 (200*)	3,4 (3,2*)	5,4 (5,2*)
100	114,3	3,6	4,0	200	3,2	5,2	225	3,4	5,4	250	3,6	5,6
125	139,7	3,6	4,0	225	3,4	5,4	250	3,6	5,6	315 (280*)	4,1 (3,9*)	5,5 (5,7*)
150	168,3	4,0	4,5	250	3,6	5,6	315 (280*)	4,1 (3,9*)	5,5 (5,7*)	355 (315*)	4,5 (4,1*)	6,0 (5,5*)
200	219,1	4,5	6,3	315	4,1	5,5	355	4,5	6,0	400	4,8	6,3
250	273,0	5,0	7,1	400	4,8	6,3	450	5,2	6,7	500	5,6	7,1
300	323,9	5,6	7,1	450	5,2	6,7	500	5,6	7,1	560 (520*)	6,0 (5,7*)	7,5 (7,1*)
350	355,6	5,6	8,0	500	5,6	7,1	560 (520*)	6,0 (5,7*)	7,5 (7,1*)	630 (560*)	6,6 (6,0*)	7,6 (7,5*)
400	406,4	6,3	8,8	560 (520*)	6,0 (5,7*)	7,5 (7,1*)	630 (560*)	6,6 (6,0*)	7,6 (7,5*)	710 (630*) (670*)	7,2 (6,6*) (6,9*)	7,2 (7,6*) (6,9*)
450	457,0	6,3	10,0	630 (560*)	6,6 (6,0*)	7,6 (7,5*)	710 (630*) (670*)	7,2 (6,6*) (6,9*)	7,2 (7,6*) (6,9*)	800 (670*) (710*)	7,9 (6,9*) (7,2*)	7,9 (6,9*) (7,2*)
500	508,0	6,3	11,0	710 (630*) (670*)	7,2 (6,6*) (6,9*)	7,2 (7,6*) (6,9*)	800 (670*) (710*)	7,9 (6,9*) (7,2*)	7,9 (6,9*) (7,2*)	900 (800*)	8,7 (7,9*)	8,7 (7,9*)
600	610,0	7,1	-	800 (780*)	7,9 (7,7*)	7,9 (7,7*)	900	8,7	8,7	1000	9,4	9,4
700	711,0	8,0	-	900	8,7	8,7	1000	9,4	9,4	1100	10,2	10,2
800	813,0	8,8	-	1000	9,4	9,4	1100	10,2	10,2	1200	11,0	11,0
900	914,0	10,0	-	1100	10,2	10,2	1200	11,0	11,0	1300	11,8	11,8
1000	1016,0	11,0	-	1200	11,0	11,0	1300	11,8	11,8	1400	12,5	12,5
1100	1118,0	11,0	-	1300	11,8	11,8	1400	12,5	12,5	-	-	-
1200	1219,0	12,5	-	1400	12,5	12,5	-	-	-	-	-	-

DN - steel pipe nominal diameter; Dz - external diameter, Dzp - external diameter jacket pipe, gp - standard wall thickness, for pipes with a diffusion barrier and without a barrier; gpp - thickened wall, which is a diffusion barrier.

* jacket pipe diameters produced on individual order.

The recommended diameters of casing pipes for pre-insulated pipes and fittings are given in the tables later in the catalogue. The tables provide geometric dimensions of pipes and fittings up to DN 600. In the case of products with nominal diameters greater than DN 600, geometric dimensions should be agreed individually. In the specification of the ordered pre-insulated products, the steel grade of the carrier pipe (seamed, seamless or other), the type (series) of thermal insulation, the type of moisture detection system built into the polyurethane insulation or its absence, and in the case of pipes also their length and the symbols specified in the catalogue should be used.

The specification of the pre-insulated products ordered should include the kind pipe's steel grade (welded, seamless or other), type (series) of thermal insulation, type of moisture detection system built into the polyurethane insulation or its absence, and in the case of pipes, also their length and symbols specified in the catalogue.



5 Preinsulated pipes

5.1 Straight preinsulated pipes



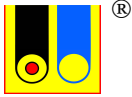
Table 1

Steel Carrier Pipe		Jacket pipe	Length	Weight		Catalogue reference number
Nominal diameter	External diameter	External diameter		seamless	welded	
DN	Dz	Dzp	L	1m	1m	
mm	mm	mm	m	kg	kg	
20	26,9	75	6;12**	2,7	2,5	R-20/75
25	33,7	90	6;12	3,2	3,0	R-25/90
32	42,4	110	6;12	4,2	3,9	R-32/110
40	48,3	110	6;12	4,6	4,3	R-40/110
50	60,3	125	6;12	6,7	5,7	R-50/125
65	76,1	140	6;12	7,7	7,2	R-65/140
80	88,9	160	6;12	10,0	9,8	R-80/160
100	114,3	200	6;12;16**	14,3	13,2	R-100/200
125	139,7	225	6;12;16*	17,5	16,2	R-125/225
150	168,3	250	6;12;16*	22,9	21,0	R-150/250
200	219,1	315	6;12;16*	40,4	31,2	R-200/315
250	273,0	400	6;12;16*	58,7	45,2	R-250/400
300	323,9	450	6;12;16*	70,1	58,6	R-300/450
350	355,6	500	6;12;16*	86,8	66,6	R-350/500
400	406,4	560	6;12;16*	108,0	83,9	R-400/560
450	457,0	560	6;12;16*	130,6	90,6	R-450/560
500	508,0	630	6;12;16*	161,3	104,2	R-500/630
600	610,0	800	6;12;16*	-	149,3	R-600/800
700	711,0	900	6;12;16*	-	180,4	R-700/900
800	813,0	1000	6;12;16*	-	222,9	R-800/1000
900	914,0	1100	6;12;16*	-	276,9	R-900/1100
1000	1016,0	1200	6;12;16*	-	335,8	R-1000/1200
1200	1219,0	1400	6;12;16*	-	448,1	R-1200/1400

Note: When ordering specify steel grade (welded, seamless or other). Preinsulated pipes of diameters exceeding DN 600 - DN 1200 are manufactured if their length and filling diameter (insulation thickness) have been agreed with the customer.

*Pipes with length L=16 m are manufacturing on individual customer's request.

** Optional production after individual agreement.



5.2 Straight preinsulated pipes with diffusion barrier

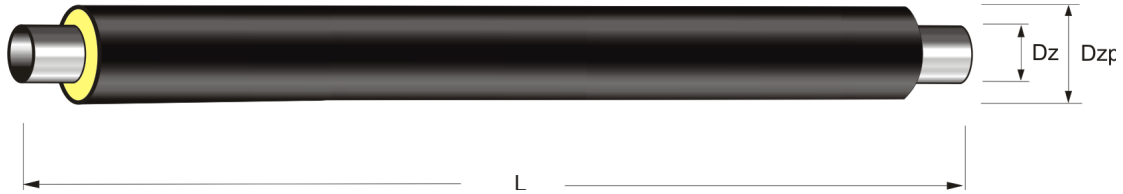


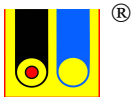
Table 1A

Steel Carrier Pipe		Jacket pipe	Length	Weight		Catalogue reference number
Nominal diameter	External diameter	External diameter		Nominal diameter	External diameter	
DN	Dz	Dzp	L	1m	1m	
mm	mm	mm	m	kg	kg	
25	33,7	90	6;12	3,2	3,0	RBAL-25/90
32	42,4	110	6;12	4,2	3,9	RBAL-32/110
40	48,3	110	6;12	4,6	4,3	RBAL-40/110
50	60,3	125	6;12	6,7	5,7	RBAL-50/125
65	76,1	140	6;12	7,7	7,2	RBAL-65/140
80	88,9	160	6;12	10,0	9,8	RBAL-80/160
100	114,3	200	6;12;16**	14,3	13,2	RBAL-100/200
125	139,7	225	6;12;16*	17,5	16,2	RBAL-125/225
150	168,3	250	6;12;16*	22,9	21,0	RBAL-150/250
200	219,1	315	6;12;16*	40,4	31,2	RBAL-200/315
250	273,0	400	6;12;16*	58,7	45,2	RBAL-250/400
300	323,9	450	6;12;16*	70,1	58,6	RBAL-300/450
350	355,6	500	6;12;16*	86,8	66,6	RBAL-350/500
400	406,4	560 (520***)	6;12;16*	108,0	83,9	RBAL-400/560

* Pipes with length L=16 m are manufacturing on individual customer's request.

** Optional production after individual agreement.

*** Jacket pipes diameters are manufacturing on individual customer's request.



5.3 Straight Preinsulated Pipes with polyethylene barrier

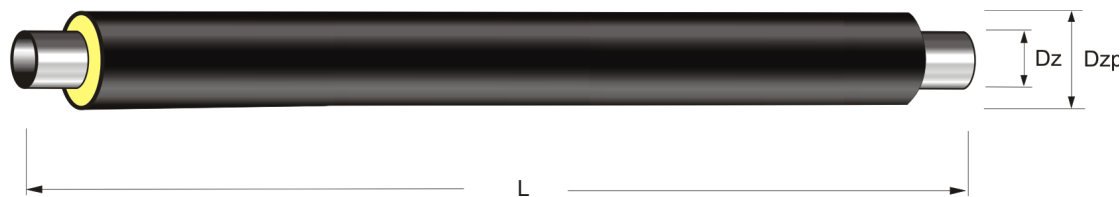


Table 1B

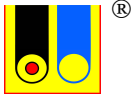
Steel Carrier Pipe		Jacket pipe	Length	Weight		Catalogue reference number
Nominal diameter	External diameter	External diameter		seamless	welded	
DN	Dz	Dzp	L	1m	1m	
mm	mm	mm	m	kg	kg	
20	26,9	75	6;12**	2,7	2,5	RBP-20/75*5,0
25	33,7	90	6;12	3,2	3,0	RBP-25/90*5,0
32	42,4	110	6;12	4,2	3,9	RBP-32/110*5,0
40	48,3	110	6;12	4,6	4,3	RBP-40/110*5,0
50	60,3	125	6;12	6,7	5,7	RBP-50/125*5,0
65	76,1	140	6;12	7,7	7,2	RBP-65/140*5,0
80	88,9	160	6;12	10,0	9,8	RBP-80/160*5,0
100	114,3	200	6;12;16**	14,3	13,2	RBP-100/200*5,2
125	139,7	225	6;12;16*	17,5	16,2	RBP-125/225*5,4
150	168,3	250	6;12;16*	22,9	21,0	RBP-150/250*5,6
200	219,1	315	6;12;16*	40,4	31,2	RBP-200/315*5,5
250	273,0	400	6;12;16*	58,7	45,2	RBP-250/400*6,3
300	323,9	450	6;12;16*	70,1	58,6	RBP-300/450*6,7
350	355,6	500	6;12;16*	86,8	66,6	RBP-350/500*7,1
400	406,4	560	6;12;16*	108,0	83,9	RBP-400/560*7,5
450	457,0	560	6;12;16*	130,6	90,6	RBP-450/560*7,5
500	508,0	630	6;12;16*	161,3	104,2	RBP-500/630*7,6

Note: When ordering specify steel grade (welded, seamless or other). Preinsulated pipes of diameters exceeding DN 600 - DN 1200 are manufactured if their length and filling diameter (insulation thickness) have been agreed with the customer.

* Pipes with length L=16 m are manufacturing on individual customer's request.

** Optional production after individual agreement.

*** For pipes with a diameter above DN 500/630, the diffusion barrier is the standard wall thickness of the casing pipe.



5.4. Preinsulated Bend Pipes

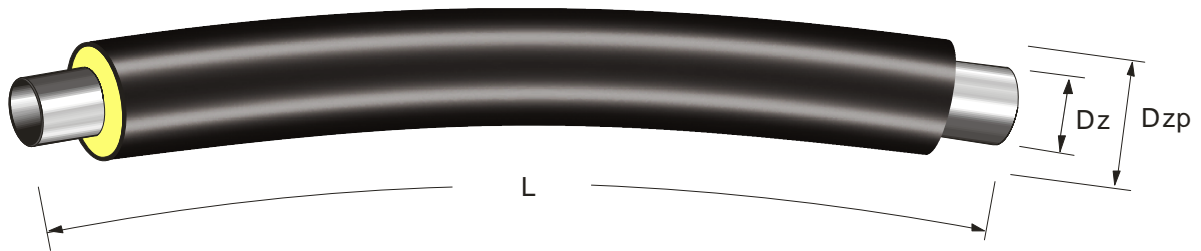


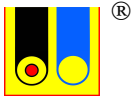
Table 2

Steel Carrier Pipe		Jacket pipe	Length	Weight		Catalogue reference number
Nominal diameter	External diameter	External diameter		Seamless	Welded	
DN	Dz	Dzp	L	1m	1m	
mm	mm	mm	m	kg	kg	
40	48,3	110	12	4,6	4,3	RG-40/110
50	60,3	125	12	6,7	5,7	RG-50/125
65	76,1	140	12	7,7	7,2	RG-65/140
80	88,9	160	12	10,0	9,8	RG-80/160
100	114,3	200	12	14,3	13,2	RG-100/200
125	139,7	225	12	17,5	16,2	RG-125/225
150	168,3	250	12	22,9	21,0	RG-150/250
200	219,1	315	12	40,4	31,2	RG-200/315
250	273,0	400	12	58,7	45,2	RG-250/400
300	323,9	450	12	70,1	58,6	RG-300/450
350	355,6	500	12	86,8	66,6	RG-350/500
400	406,4	560	12	108,0	83,9	RG-400/560
450	457,0	560	12	130,6	90,6	RG-450/560
500	508,0	630	12	161,3	104,2	RG-500/630

Note: When ordering specify steel grade (welded or seamless) and angle, bend direction. Preinsulated pipes of diameters exceeding DN 500 are manufactured if their length and filling diameter (insulation thickness) have been agreed with the customer.

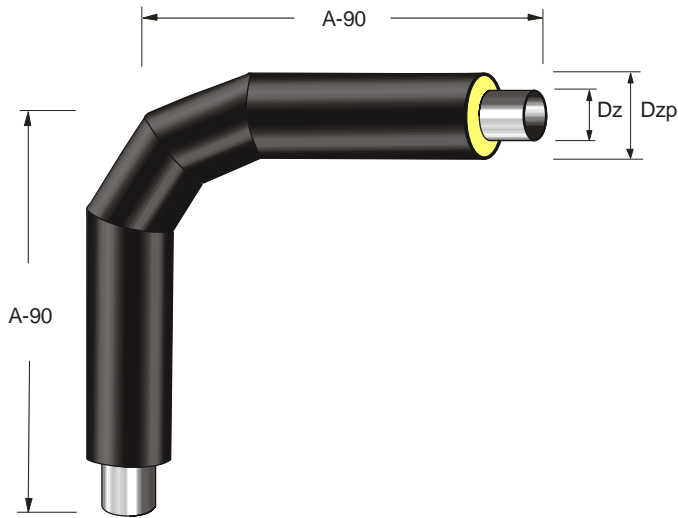
Other lengths of bent pipe sections are agreed individually with the Customer.

Bend pipes are manufactured without a diffusion barrier or with a diffusion barrier agreed with the Customer.



6 Specification of Preinsulated Fittings

6.1 Elbow 90°



Bend radius:
 Mechanical bending for:
 DN 20÷80 3 × Dz
 DN 100÷300 2,5 × Dz

With "Hamburg" elbows for:
 DN 350÷1000 1,5 × Dz
 *DN 100÷300 1,5 × Dz
 *DN 350÷1000 2,5 × Dz

Table 3

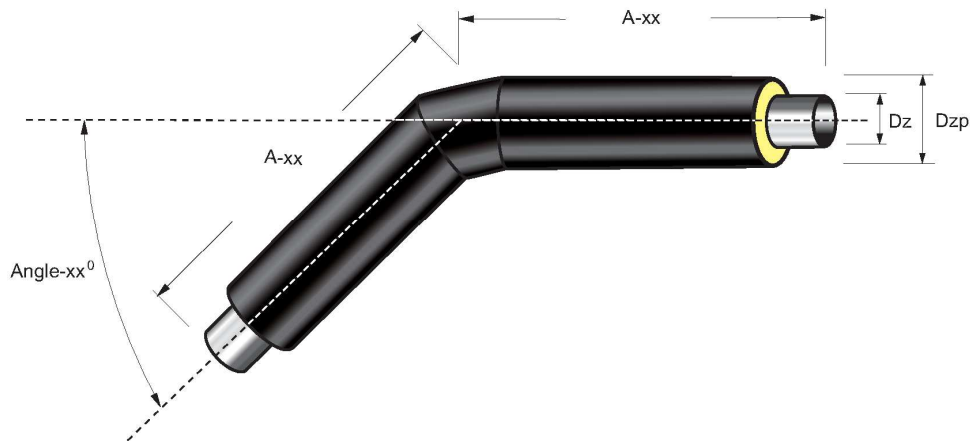
Steel Carrier Pipe		Jacket pipr	Dimension	Weight of preinsulated elbow	Catalogue reference number
Nominal diameter	External diameter	External diameter			
DN	Dz	Dzp	A 90		
mm	mm	mm	mm	1 pcs	
20	26,9	90	1000	5,6	K-20/90
25	33,7	90	1000	6,4	K-25/90
32	42,4	110	1000	8,0	K-32/90
40	48,3	110	1000	10,6	K-40/90
50	60,3	125	1000	13,0	K-50/90
65	76,1	140	1000	14,5	K-65/90
80	88,9	160	1000	17,5	K-80/90
100	114,3	200	1000	27,5	K-100/90
125	139,7	225	1000	33,0	K-125/90
150	168,3	250	1000	39,0	K-150/90
200	219,1	315	1000	50,0	K-200/90
250	273,0	400	1200	82,8	K-250/90
300	323,9	450	1500	151,0	K-300/90
350	355,6	500	1500	172,0	K-350/90
400	406,4	560	1500	218,0	K-400/90
450	457,0	630	1500	284,7	K-450/90
500	508,0	710	1500	328,8	K-500/90
600	610,0	800	1500	376,0	K-600/90

Note: Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.

* Bends radius are manufacturing on individual customer's request.



6.2 Elbow xx° (any angle)



XX° means any elbow angle specified by the customer
 (when placing an order)
 - normally performed every 15° (15° , 30° , 45° , 60° , 75°)

Bend radius:
 Mechanical bending for:
 DN 20÷80 $3 \times Dz$
 DN 100÷300 $2,5 \times Dz$

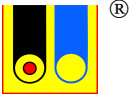
With "Hamburg" elbows for:
 DN 350÷1000 $1,5 \times Dz$
 *DN 100÷300 $1,5 \times Dz$
 *DN 350÷1000 $2,5 \times Dz$

Table 3A

Steel carrier pipe		Jacket pipe	dimension	Weight of preinsulated elbow	Catalogue reference number
Nominal diameter	External diameter	External diameter			
DN	Dz	Dzp	A xx		
mm	mm	mm	mm	1 pcs	
20	26,9	90	1000	5,6	K-20/xx
25	33,7	90	1000	6,4	K-25/xx
32	42,4	110	1000	8,0	K-32/xx
40	48,3	110	1000	8,5	K-40/xx
50	60,3	125	1000	12,0	K-50/xx
65	76,1	140	1000	14,5	K-65/xx
80	88,9	160	1000	19,5	K-80/xx
100	114,3	200	1000	28,5	K-100/xx
125	139,7	225	1000	36,5	K-125/xx
150	168,3	250	1000	43,5	K-150/xx
200	219,1	315	1000	70,5	K-200/xx
250	273,0	400	1200	104,4	K-250/xx
300	323,9	450	1500	177,0	K-300/xx
350	355,6	500	1500	199,0	K-350/xx
400	406,4	560	1500	253,0	K-400/xx
450	457,0	630	1500	284,7	K-450/xx
500	508,0	710	1500	328,8	K-500/xx
600	610,0	800	1500	429,0	K-600/xx

Note: Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.

* Bends radius are manufacturing on individual customer's request.



6.3 Elevated tee

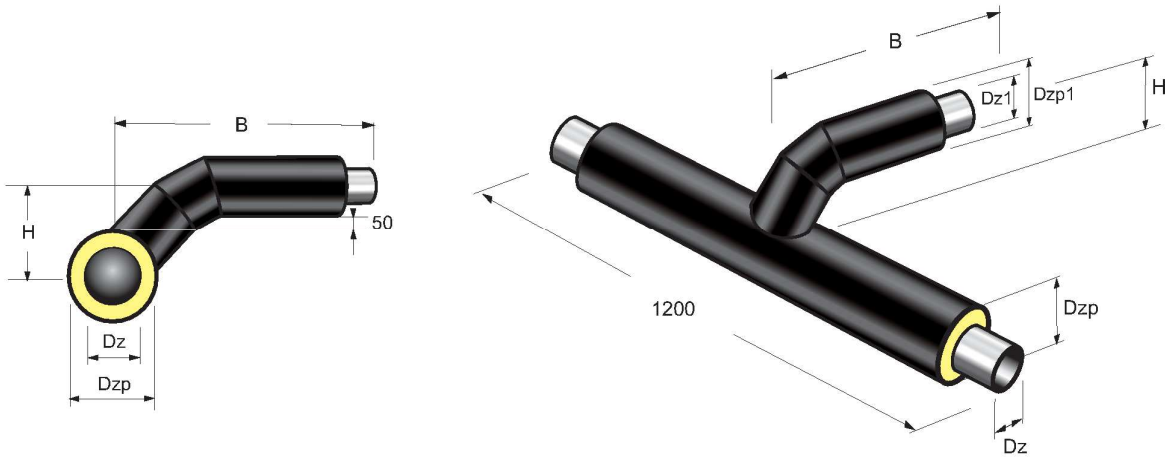
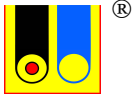


Table 4

Straight Section			Vertical section		H	B	Catalogue reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1	mm	mm	
mm	mm	mm	mm	mm	mm	mm	
20	26,9	90	26,9	90	140	700	TW-20/20
25	33,7	90	26,9	90	140	700	TW-25/20
32	42,4	110	33,7	90	150	700	TW-32/25
40	48,3	110	42,4	110	160	700	TW-40/32
50	60,3	125	48,3	110	170	700	TW-50/40
65	76,1	140	60,3	125	185	900	TW-65/50
80	88,9	160	76,1	140	200	900	TW-80/65
100	114,3	200	88,9	160	230	900	TW-100/80
125	139,7	225	114,3	200	265	900	TW-125/100
150	168,3	250	139,7	225	285	900	TW-150/125
200	219,1	315	168,3	250	335	900	TW-200/150
250	273,0	400	219,1	315	410	1100	TW-250/200
300	323,9	450	273,0	400	475	1100	TW-300/250

Note:

1. Tees are fabricated in a free selection of diameters
2. The H dimension changes along with branching off pipe diameter.
3. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.4 Reducing lateral tee

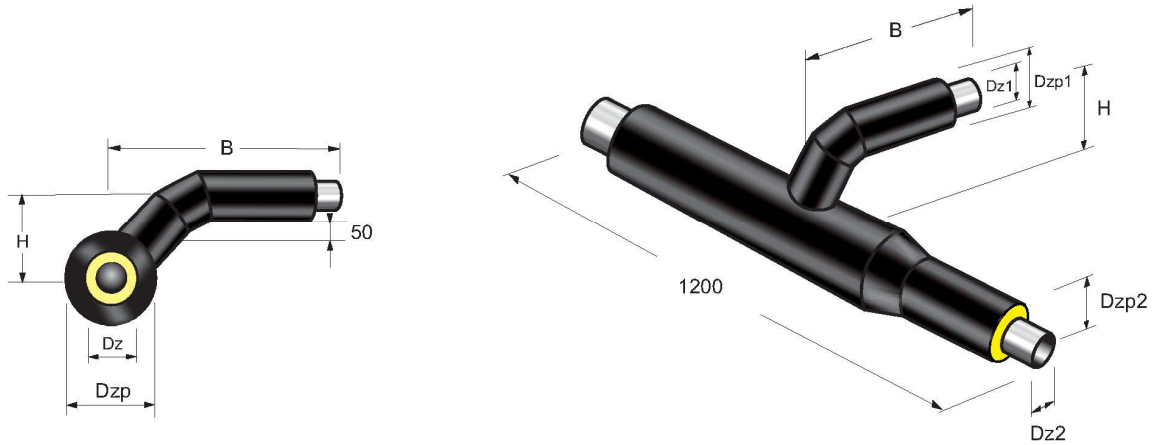
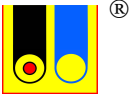


Table 5

Straight Section			Vertical section		Reduced pipe		H	B	Catalogue reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1	Dz2	Dzp2	mm	mm	
mm	mm	mm	mm	mm	mm	mm	mm	mm	
25	33,7	90	26,9	90	26,9	90	140	700	TWR-25/20/20
32	42,4	110	26,9	90	26,9	90	140	700	TWR-32/20/20
32	42,4	110	33,7	90	33,7	90	150	700	TWR-32/25/25
40	48,3	110	33,7	90	33,7	90	150	700	TWR-40/25/25
40	48,3	110	42,4	110	42,4	110	160	700	TWR-40/32/32
50	60,3	125	42,4	110	42,4	110	160	700	TWR-50/32/32
50	60,3	125	48,3	110	48,3	110	170	700	TWR-50/40/40
65	76,1	140	48,3	110	48,3	110	170	700	TWR-65/40/40
65	76,1	140	60,3	125	60,3	125	185	900	TWR-65/50/50
80	88,9	160	60,3	125	60,3	125	185	900	TWR-80/50/50
80	88,9	160	76,1	140	76,1	140	200	900	TWR-80/65/65
100	114,3	200	76,1	140	76,1	140	200	900	TWR-100/65/65
100	114,3	200	88,9	160	88,9	160	230	900	TWR-100/80/80
125	139,7	225	88,9	160	88,9	160	230	900	TWR-125/80/80
125	139,7	225	114,3	200	114,3	200	265	900	TWR-125/100/100
150	168,3	250	114,3	200	114,3	200	265	900	TWR-150/100/100
150	168,3	250	139,7	225	139,7	225	285	900	TWR-150/125/125
200	219,1	315	139,7	225	139,7	225	285	900	TWR-200/125/125
200	219,1	315	168,3	250	168,3	250	335	900	TWR-200/150/150
250	273,0	400	168,3	250	168,3	250	335	900	TWR-250/150/150
250	273,0	400	219,1	315	219,1	315	410	1100	TWR-250/200/200
300	323,9	450	219,1	315	219,1	315	475	1100	TWR-300/200/200
300	323,9	450	273,0	400	273,0	400	475	1100	TWR-300/250/250

Note:

- 1.Reducing tees are fabricated in a free selection of diameters
- 2.The H dimension changes along with branching off pipe diameter
3. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.5 Elevated Tee - Mk. 2

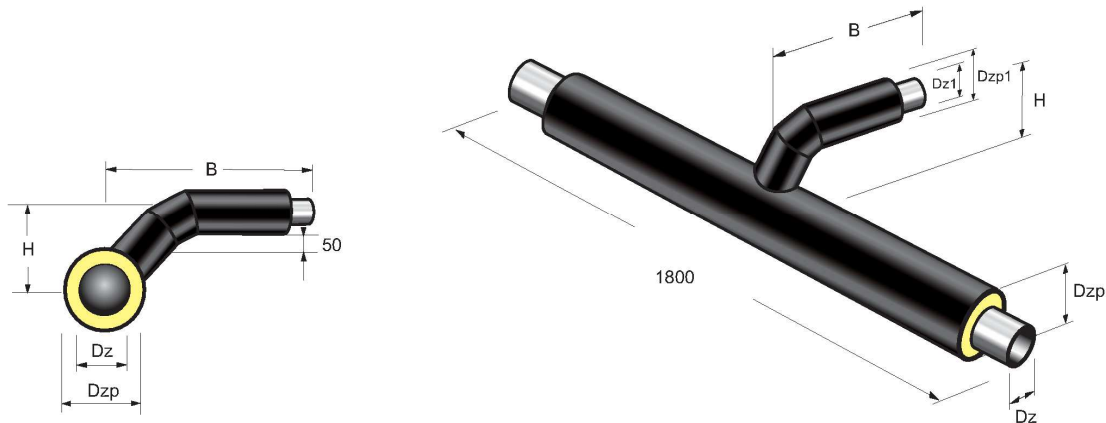


Table 6

Straight Section			Vertical section		H	B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1			
mm	mm	mm	mm	mm	mm	mm	
20	26,9	90	26,9	90	140	700	TW2-20/20
25	33,7	90	26,9	90	140	700	TW2-25/20
32	42,4	110	33,7	90	150	700	TW2-32/25
40	48,3	110	42,4	110	160	700	TW2-40/32
50	60,3	125	48,3	110	170	700	TW2-50/40
65	76,1	140	60,3	125	185	900	TW2-65/50
80	88,9	160	76,1	140	200	900	TW2-80/65
100	114,3	200	88,9	160	230	900	TW2-100/80
125	139,7	225	114,3	200	265	900	TW2-125/100
150	168,3	250	139,7	225	285	900	TW2-150/125
200	219,1	315	168,3	250	335	900	TW2-200/150
250	273,0	400	219,1	315	410	1100	TW2-250/200
300	323,9	450	273,0	400	475	1100	TW2-300/250
350	355,6	500	323,9	450	525	1300	TW2-350/300
400	406,4	560	355,6	500	580	1300	TW2-400/350
450	457,0	630	406,4	560	645	1500	TW2-450/400
500	508,0	710	457,0	630	720	1500	TW2-500/450
600	610,0	800	508,0	710	805	1700	TW2-600/500

- Note:**
1. Tees are fabricated in a free selection of diameters
 2. They can also be fabricated as reducing tees in any diameters
 3. The H dimension changes along with branching off pipe diameter
 4. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.6 Strainer Tee

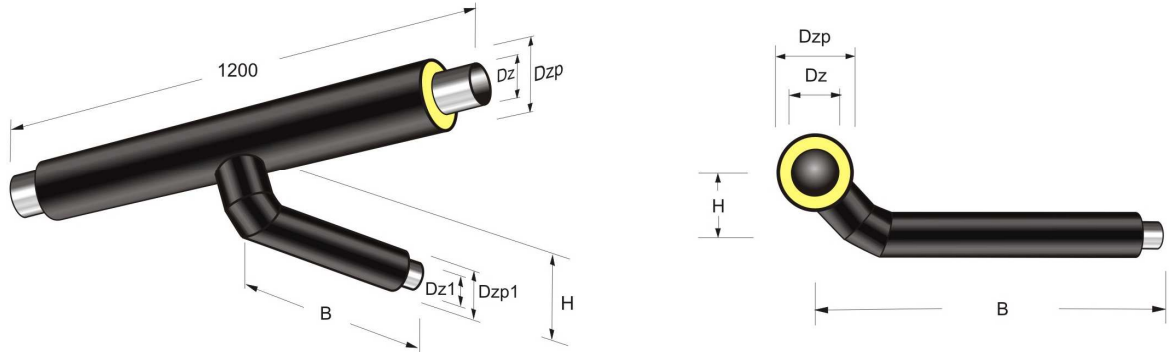
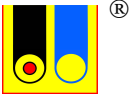


Table 7

Straight Section			Vertical section		H	B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1			
mm	mm	mm	mm	mm	mm	mm	
25	33,7	90	33,7	90	140	900	TO-25/25
32	42,4	110	33,7	90	150	900	TO-32/25
40	48,3	110	33,7	90	150	900	TO-40/25
50	60,3	125	33,7	90	158	900	TO-50/25
65	76,1	140	48,3	110	175	900	TO-65/40
80	88,9	160	48,3	110	185	1200	TO-80/40
100	114,3	200	48,3	110	205	1200	TO-100/40
125	139,7	225	48,3	110	218	1200	TO-125/40
150	168,3	250	48,3	110	230	1200	TO-150/40
200	219,1	315	60,3	125	270	1200	TO-200/50
250	273,0	400	60,3	125	313	1200	TO-250/50
300	323,9	450	60,3	125	340	1200	TO-300/50

- Note:**
1. Tees are fabricated in a free selection of diameters
 2. They can also be fabricated as reducing tees in any diameters
 3. The H dimension changes along with branching off pipe diameter
 4. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.7 Strainer Tee- Mk. 2

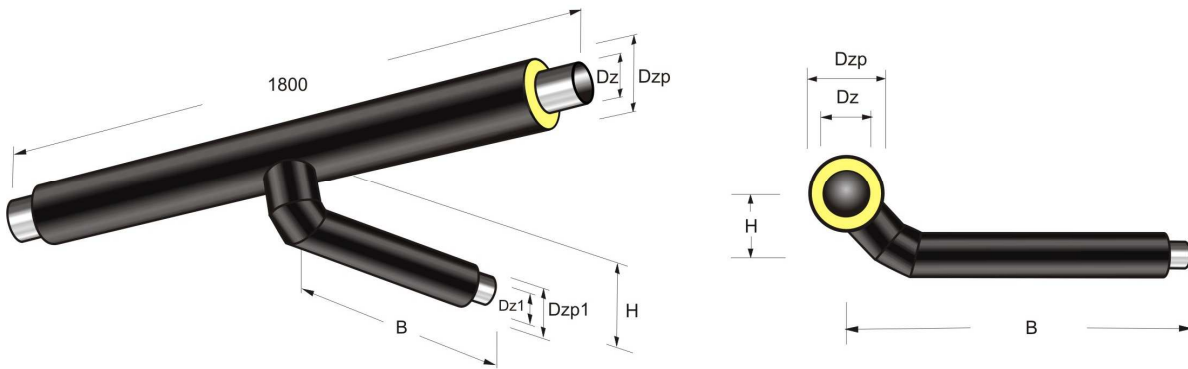


Table 8

Straight Section			Vertical section		H	B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1			
mm	mm	mm	mm	mm	mm	mm	
25	33,7	90	33,7	90	140	900	TO2-25/25
32	42,4	110	33,7	90	150	900	TO2-32/25
40	48,3	110	33,7	90	150	900	TO2-40/25
50	60,3	125	33,7	90	158	900	TO2-50/25
65	76,1	140	48,3	110	175	900	TO2-65/40
80	88,9	160	48,3	110	185	1200	TO2-80/40
100	114,3	200	48,3	110	205	1200	TO2-100/40
125	139,7	225	48,3	110	218	1200	TO2-125/40
150	168,3	250	48,3	110	230	1200	TO2-150/40
200	219,1	315	60,3	125	270	1200	TO2-200/50
250	273,0	400	60,3	125	313	1200	TO2-250/50
300	323,9	450	60,3	125	340	1200	TO2-300/50
350	355,6	500	88,9	160	380	1200	TO2-350/80
400	406,4	560	88,9	160	410	1200	TO2-400/80
450	457,0	630	114,3	200	465	1200	TO2-450/100
500	508,0	710	114,3	200	505	1200	TO2-500/100
600	610,0	800	114,3	200	550	1200	TO2-600/100

- Note:**
1. Tees are fabricated in a free selection of diameters
 2. They can also be fabricated as reducing tees in any diameters
 3. The H dimension changes along with branching off pipe diameter
 4. Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.



6.8 Vent Tee

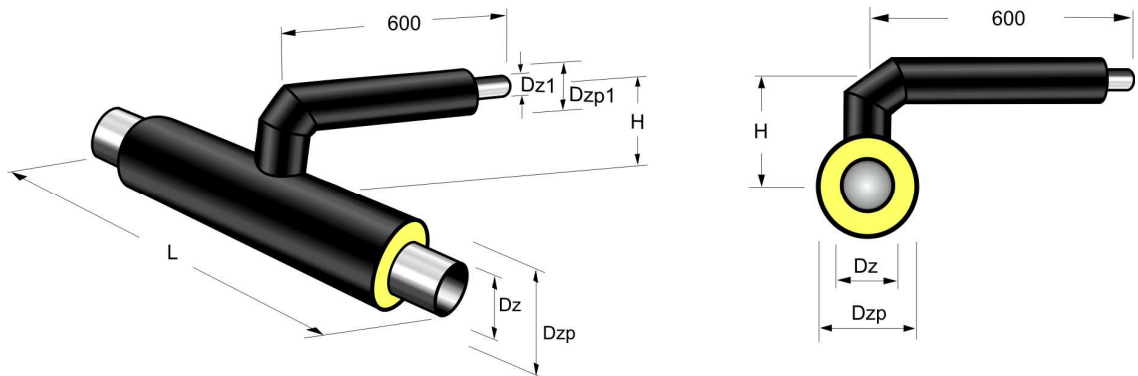
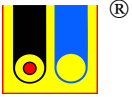


Table 9

Straight Section			Vertical section		L	H	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1			
mm	mm	mm	mm	mm	mm	mm	
65	76,1	140	33,7	90	900	210	TD-65
80	88,9	160	33,7	90	900	220	TD-80
100	114,3	200	33,7	90	900	240	TD-100
125	139,7	225	33,7	90	900	250	TD-125
150	168,3	250	33,7	90	900	260	TD-150
200	219,1	315	33,7	90	1200	300	TD-200
250	273,0	400	33,7	90	1200	340	TD-250
300	323,9	450	33,7	90	1500	360	TD-300

- Note:**
1. Tees are fabricated in a free selection of diameters
 2. They can also be fabricated as reducing tees in any diameters
 3. The H dimension changes along with branching off pipe diameter
 4. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.9 Vent Tee - Mk. 2

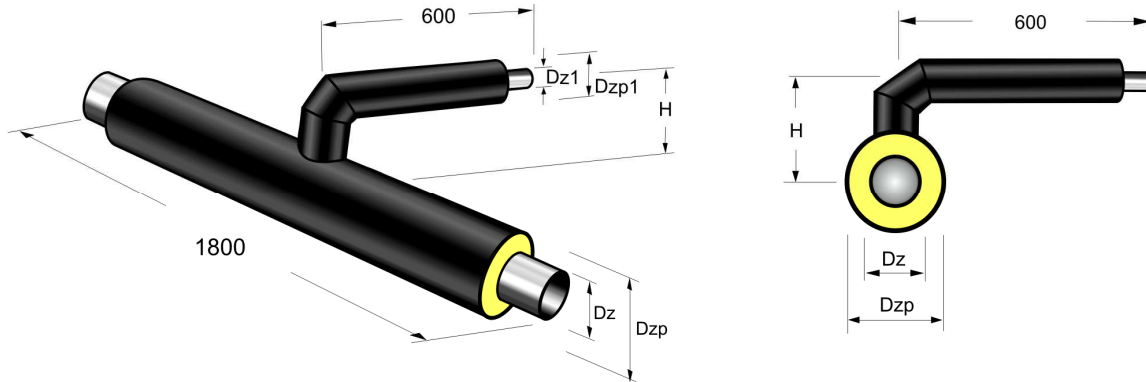


Table 10

Straight Section			Vertical section		H	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter		
DN	Dz	Dzp	Dz1	Dzp1		
mm	mm	mm	mm	mm	mm	
65	76,1	140	33,7	90	210	TD2-65
80	88,9	160	33,7	90	220	TD2-80
100	114,3	200	33,7	90	240	TD2-100
125	139,7	225	33,7	90	250	TD2-125
150	168,3	250	33,7	90	260	TD2-150
200	219,1	315	33,7	90	300	TD2-200
250	273,0	400	33,7	90	340	TD2-250
300	323,9	450	33,7	90	360	TD2-300
350	355,6	500	48,3	110	400	TD2-350
400	406,4	560	48,3	110	430	TD2-400
450	457,0	630	48,3	110	495	TD2-450
500	508,0	710	48,3	110	540	TD2-500
600	610,0	800	48,3	110	550	TD2-600

- Note:**
1. Tees are fabricated in a free selection of diameters.
 2. The H dimension changes along with branching off pipe diameter.
 3. They can also be fabricated as reducing tees in any diameter.
 4. Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.



6.10 Parallel Tee

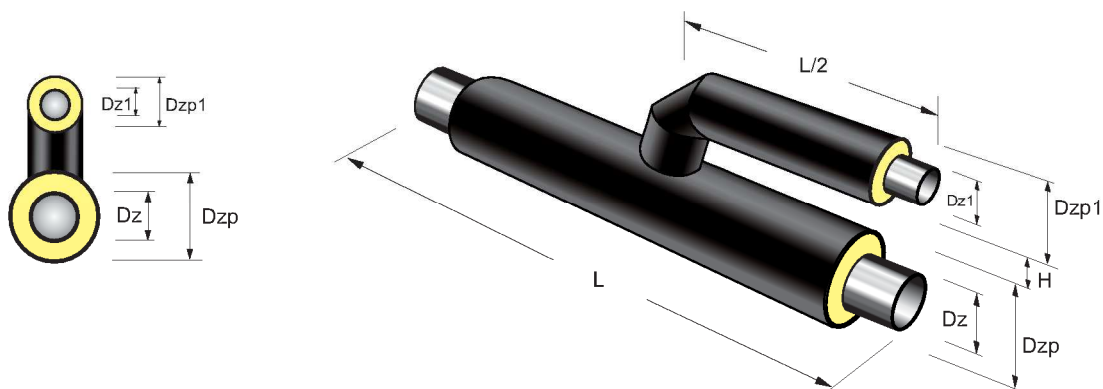
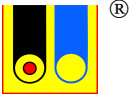


Table 11

Straight Section			Vertical section		H	L	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1			
mm	mm	mm	mm	mm	mm	mm	
20	26,9	90	26,9	90	100	900	TR-20/20
25	33,7	90	26,9	90	100	900	TR-25/20
32	42,4	110	33,7	90	100	900	TR-32/25
40	48,3	110	42,4	110	100	900	TR-40/32
50	60,3	125	48,3	110	100	900	TR-50/40
65	76,1	140	60,3	125	120	1200	TR-65/50
80	88,9	160	76,1	140	120	1200	TR-80/65
100	114,3	200	88,9	160	120	1200	TR-100/80
125	139,7	225	114,3	200	150	1200	TR-125/100
150	168,3	250	139,7	225	150	1200	TR-150/125
200	219,1	315	168,3	250	200	1500	TR-200/150
250	273,0	400	219,1	315	200	1500	TR-250/200
300	323,9	450	273,0	400	250	1800	TR-300/250

Note:

1. Tees are fabricated in a free selection of diameter.
2. The H dimension changes along with branching off pipe diameter.
3. They can also be fabricated as reducing tees in any diameters.
4. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.
5. In tees with a pull-out collar in steel pipe and on polyethylene, the "H" dimension is increased by the height of the pull-out collar.



6.11 Flat Tee

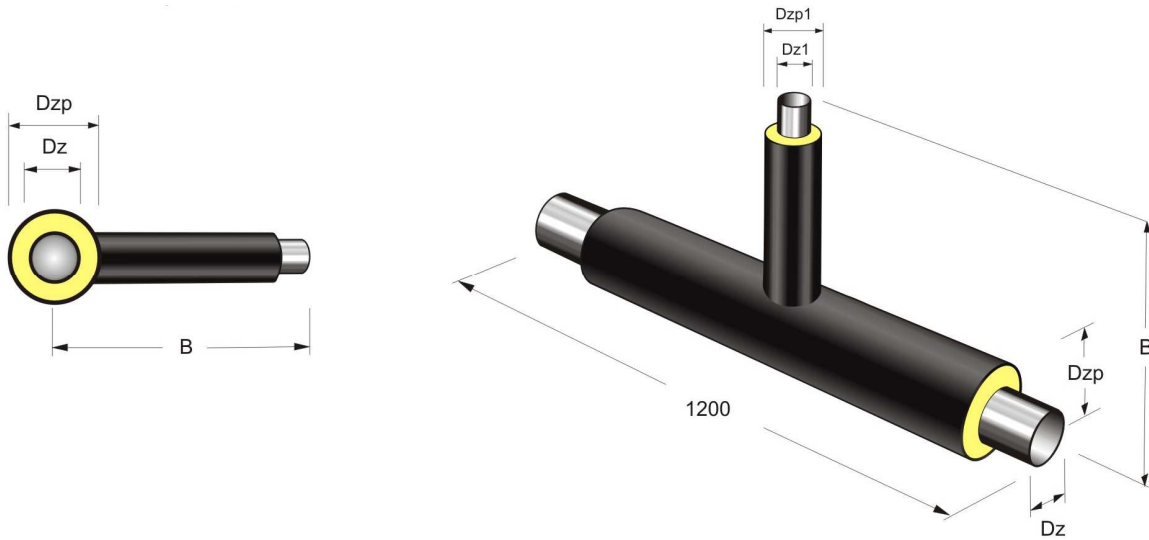


Table 12

Straight Section			Vertical section		B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter		
DN	Dz	Dzp	Dz1	Dzp1		
mm	mm	mm	mm	mm	mm	
20	26,9	90	26,9	90	600	TP-20/20
25	33,7	90	26,9	90	600	TP-25/20
32	42,4	110	33,7	90	600	TP-32/25
40	48,3	110	42,4	110	600	TP-40/32
50	60,3	125	48,3	110	600	TP-50/40
65	76,1	140	60,3	125	600	TP-65/50
80	88,9	160	76,1	140	600	TP-80/65
100	114,3	200	88,9	160	600	TP-100/80
125	139,7	225	114,3	200	700	TP-125/100
150	168,3	250	139,7	225	700	TP-150/125
200	219,1	315	168,3	250	700	TP-200/150
250	273,0	400	219,1	315	900	TP-250/200
300	323,9	450	273,0	400	900	TP-300/250

Note:

1. Tees are fabricated in a free selection of diameters.
2. They can also be fabricated as reducing tees in any diameters.
3. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.



6.12 Flat Tee Mk.2

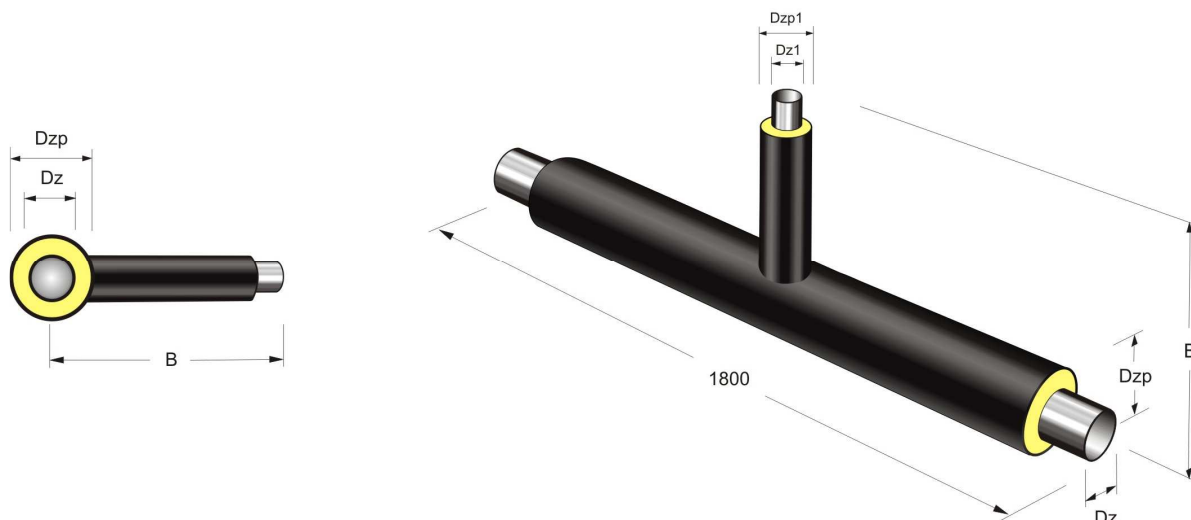
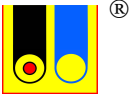


Table 13

Straight Section			Vertical section		B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter		
DN	Dz	Dzp	Dz1	Dzp1		
mm	mm	mm	mm	mm	mm	
20	26,9	90	26,9	90	600	TP2-20/20
25	33,7	90	26,9	90	600	TP2-25/20
32	42,4	110	33,7	90	600	TP2-32/25
40	48,3	110	42,4	110	600	TP2-40/32
50	60,3	125	48,3	110	600	TP2-50/40
65	76,1	140	60,3	125	600	TP2-65/50
80	88,9	160	76,1	140	600	TP2-80/65
100	114,3	200	88,9	160	600	TP2-100/80
125	139,7	225	114,3	200	700	TP2-125/100
150	168,3	250	139,7	225	700	TP2-150/125
200	219,1	315	168,3	250	700	TP2-200/150
250	273,0	400	219,1	315	900	TP2-250/200
300	323,9	450	273,0	400	900	TP2-300/250
350	355,6	500	323,9	450	900	TP2-350/300
400	406,4	560	355,6	500	900	TP2-400/350
450	457,0	630	406,4	560	1100	TP2-450/400
500	508,0	710	457,0	630	1100	TP2-500/450
600	610,0	800	508,0	710	1100	TP2-600/500

- Note:**
1. Tees are fabricated in a free selection of diameters.
 2. They can also be fabricated as reducing tees in any diameters.
 3. Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.



6.13 Elevated Tee for DAR-FLEX system

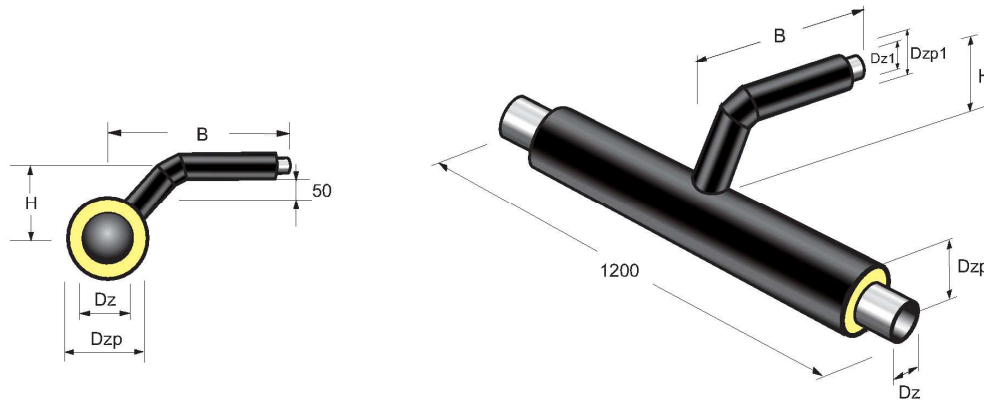
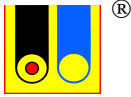


Table 14

Straight Section			Vertical section		H	B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1	mm	mm	
mm	mm	mm	mm	mm	mm	mm	
20	26,9	90	20	75(90)	140	700	TW/DF-20/20
25	33,7	90	20	75(90)	140	700	TW/DF-25/20
25	33,7	90	25	75(90)	140	700	TW/DF-25/25
25	33,7	90	28	75(90)	140	700	TW/DF-25/28
32	42,4	110	20	75(90)	150	700	TW/DF-32/20
32	42,4	110	25	75(90)	150	700	TW/DF-32/25
32	42,4	110	28	75(90)	150	700	TW/DF-32/28
40	48,3	110	20	75(90)	160	700	TW/DF-40/20
40	48,3	110	25	75(90)	160	700	TW/DF-40/25
40	48,3	110	28	75(90)	160	700	TW/DF-40/28
50	60,3	125	20	75(90)	170	700	TW/DF-50/20
50	60,3	125	25	75(90)	170	700	TW/DF-50/25
50	60,3	125	28	75(90)	170	700	TW/DF-50/28
65	76,1	140	20	75(90)	185	700	TW/DF-65/20
65	76,1	140	25	75(90)	185	700	TW/DF-65/25
65	76,1	140	28	75(90)	185	700	TW/DF-65/28
80	88,9	160	20	75(90)	200	700	TW/DF-80/20
80	88,9	160	25	75(90)	200	700	TW/DF-80/25
80	88,9	160	28	75(90)	200	700	TW/DF-80/25
100	114,3	200	20	75(90)	230	700	TW/DF-100/20
100	114,3	200	25	75(90)	230	700	TW/DF-100/25
100	114,3	200	28	75(90)	230	700	TW/DF-100/28
125	139,7	225	20	75(90)	265	700	TW/DF-125/20
125	139,7	225	25	75(90)	265	700	TW/DF-125/25
125	139,7	225	28	75(90)	265	700	TW/DF-125/28
150	168,3	250	20	75(90)	285	700	TW/DF-150/20
150	168,3	250	25	75(90)	285	700	TW/DF-150/25
150	168,3	250	28	75(90)	285	700	TW/DF-150/28

Note: 1. If DAR-FLEX pipes are fabricated in PLUS insulation then jacket pipe diameter is Dzp1=90 mm
 2. Tees are fabricated in a free selection of diameters



6.13 Parallel Tee for DAR-FLEX system

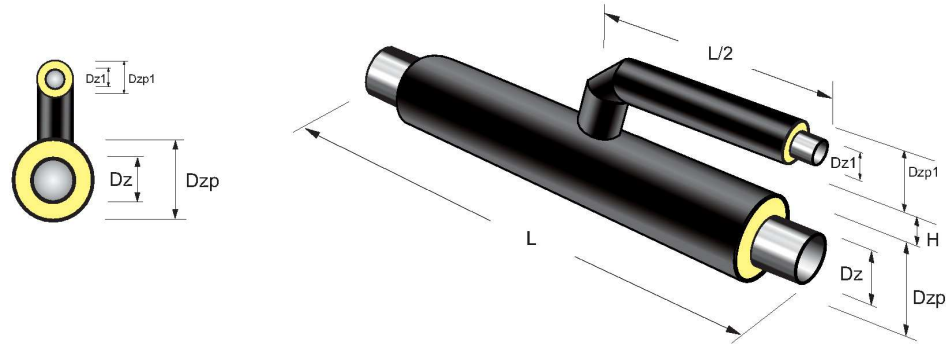
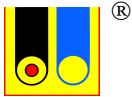


Table 15

Straight Section			Vertical section		H	B	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp	Dz1	Dzp1	mm	mm	
mm	mm	mm	mm	mm	mm	mm	
20	26,9	90	20	75(90)	100	900	TR/DF-20/20
25	33,7	90	20	75(90)	100	900	TR/DF-25/20
25	33,7	90	25	75(90)	100	900	TR/DF-25/25
25	33,7	90	28	75(90)	100	900	TR/DF-25/28
32	42,4	110	20	75(90)	100	900	TR/DF-32/20
32	42,4	110	25	75(90)	100	900	TR/DF-32/25
32	42,4	110	28	75(90)	100	900	TR/DF-32/28
40	48,3	110	20	75(90)	100	900	TR/DF-40/20
40	48,3	110	25	75(90)	100	900	TR/DF-40/25
40	48,3	110	28	75(90)	100	900	TR/DF-40/28
50	60,3	125	20	75(90)	100	900	TR/DF-50/20
50	60,3	125	25	75(90)	100	900	TR/DF-50/25
50	60,3	125	28	75(90)	100	900	TR/DF-50/28
65	76,1	140	20	75(90)	120	900	TR/DF-65/20
65	76,1	140	25	75(90)	120	900	TR/DF-65/25
65	76,1	140	28	75(90)	120	900	TR/DF-65/28
80	88,9	160	20	75(90)	120	900	TR/DF-80/20
80	88,9	160	25	75(90)	120	900	TR/DF-80/25
80	88,9	160	28	75(90)	120	900	TR/DF-80/25
100	114,3	200	20	75(90)	120	900	TR/DF-100/20
100	114,3	200	25	75(90)	120	900	TR/DF-100/25
100	114,3	200	28	75(90)	120	900	TR/DF-100/28
125	139,7	225	20	75(90)	150	900	TR/DF-125/20
125	139,7	225	25	75(90)	150	900	TR/DF-125/25
125	139,7	225	28	75(90)	150	900	TR/DF-125/28
150	168,3	250	20	75(90)	150	900	TR/DF-150/20
150	168,3	250	25	75(90)	150	900	TR/DF-150/25
150	168,3	250	28	75(90)	150	900	TR/DF-150/28

Note: 1. If DAR-FLEX pipes are fabricated in PLUS insulation then jacket pipe diameter is Dz_{p1}=90 mm
 2. Tees are fabricated in a free selection of diameters



6.15 Reducing pipe

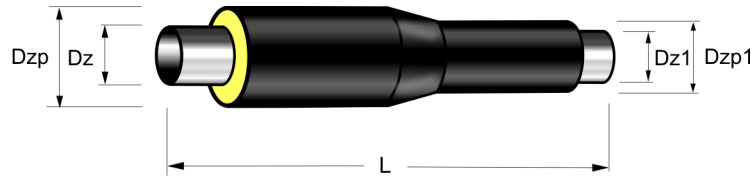


Table 16

Nominal diameter	Straight segment		Reduced segment		Lenght	Catalogue Reference number
	Dz	Dzp	Dz1	Dzp1		
DN/DN1	mm	mm	mm	mm	mm	
25/20	33,7	90	26,9	90	1000	Z-25/20
32/20	42,4	110	26,9	90	1000	Z-32/20
32/25	42,4	110	33,7	90	1000	Z-32/25
40/25	48,3	110	33,7	90	1000	Z-40/25
40/32	48,3	110	42,4	110	1000	Z-40/32
50/32	60,3	125	42,4	110	1000	Z-50/32
50/40	60,3	125	48,3	110	1000	Z-50/40
65/40	76,1	140	48,3	110	1000	Z-65/40
65/50	76,1	140	60,3	125	1000	Z-65/50
80/50	88,9	160	60,3	125	1000	Z-80/50
80/65	88,9	160	76,1	140	1000	Z-80/65
100/65	114,3	200	76,1	140	1000	Z-100/65
100/80	114,3	200	88,9	160	1000	Z-100/80
125/80	139,7	225	88,9	160	1000	Z-125/80
125/100	139,7	225	114,3	200	1000	Z-125/100
150/100	168,3	250	114,3	200	1000	Z-150/100
150/125	168,3	250	139,7	225	1000	Z-150/125
200/125	219,1	315	139,7	225	1200	Z-200/125
200/150	219,1	315	168,3	250	1200	Z-200/150
250/150	273,0	400	168,3	250	1200	Z-250/150
250/200	273,0	400	219,1	315	1200	Z-250/200
300/200	323,9	450	219,1	315	1200	Z-300/200
300/250	323,9	450	273,0	400	1200	Z-300/250
350/250	355,6	500	273,0	400	1200	Z-350/250
350/300	355,6	500	323,9	450	1200	Z-350/300
400/300	406,4	560	323,9	450	1200	Z-400/300
400/350	406,4	560	355,6	500	1200	Z-400/350
450/350	457,0	630	355,6	500	1200	Z-450/350
450/400	457,0	630	406,4	560	1200	Z-450/400
500/400	508,0	710	406,4	560	1200	Z-500/400
500/450	508,0	710	457,0	630	1200	Z-500/450
600/450	610,0	800	457,0	630	1200	Z-600/450
600/500	610,0	800	508,0	710	1200	Z-600/500

Note:

1. Reducing pipes are fabricated in a free selection of diameters
2. Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.

6.16 Transition Fittings

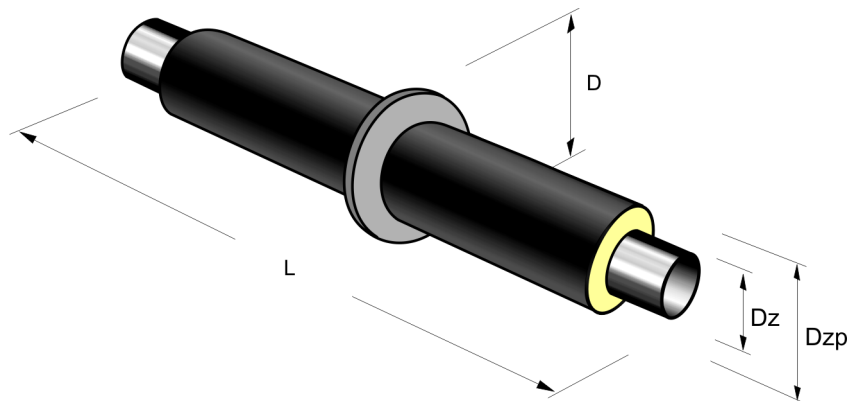
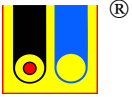


Table 17

Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Length	External flange diameter	Catalogue Reference number
DN	Dz	Dzp	L	D	
mm	mm	mm	mm	mm	
20	26,9	90	2000	140	PS-20
25	33,7	90	2000	140	PS-25
32	42,4	110	2000	140	PS-32
40	48,3	110	2000	140	PS-40
50	60,3	125	2000	170	PS-50
65	76,1	140	2000	200	PS-65
80	88,9	160	2000	220	PS-80
100	114,3	200	2500	260	PS-100
125	139,7	225	2500	300	PS-125
150	168,3	250	2500	320	PS-150
200	219,1	315	2500	400	PS-200
250	273,0	400	2500	500	PS-250
300	323,9	450	2500	560	PS-300

Note:

1. Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.
2. Fixed point concrete block diameters are specified in the Manual "Static and Designed Calculations", see p. 30.



6.17 Wall Mounted Fixed Point

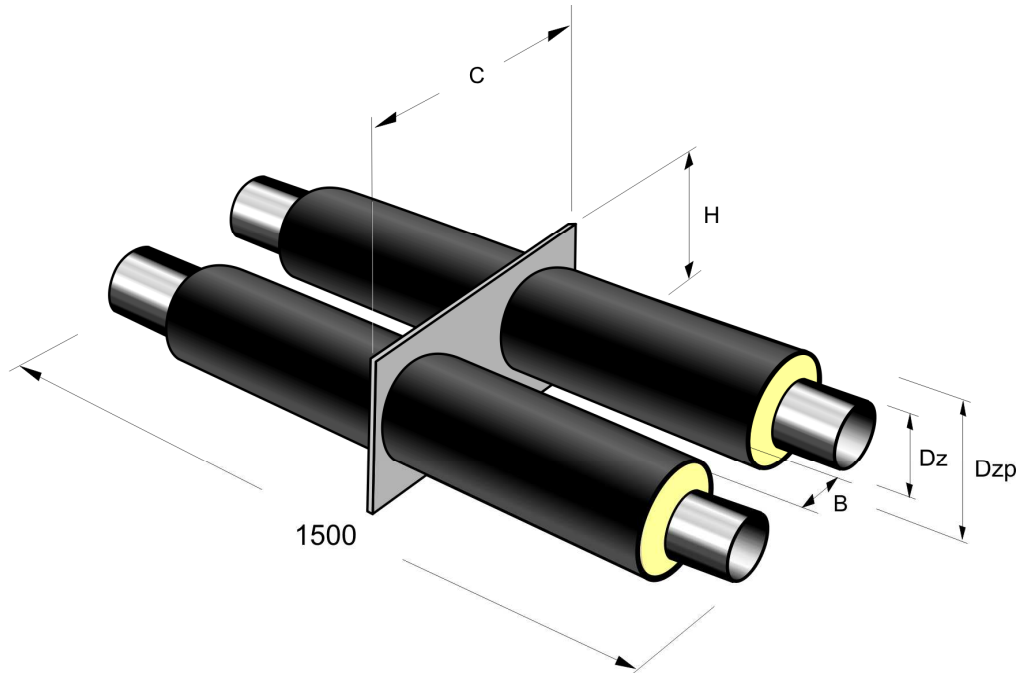


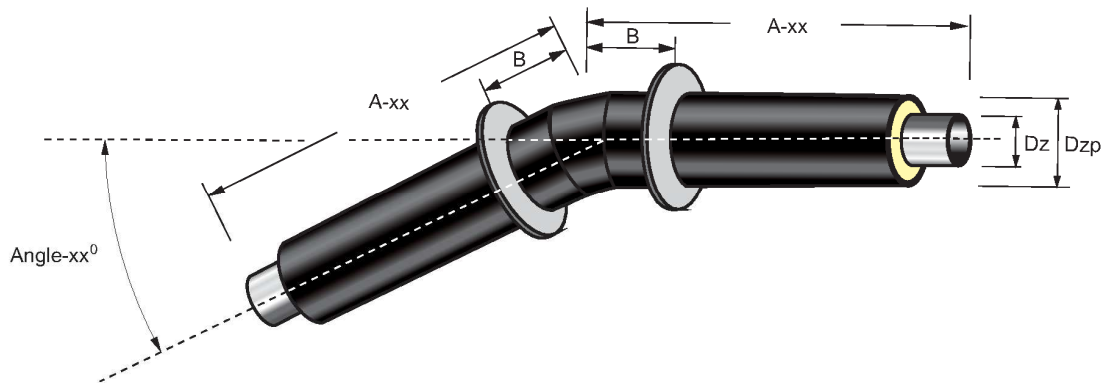
Table 18

Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	H	B	c	Catalogue Reference number
DN	Dz	Dzp				
mm	mm	mm	mm	mm	mm	
20	26,9	90	110	150	350	PSW-20
25	33,7	90	110	150	350	PSW-25
32	42,4	110	130	150	390	PSW-32
40	48,3	110	130	150	390	PSW-40
50	60,3	125	145	150	420	PSW-50
65	76,1	140	160	150	450	PSW-65
80	88,9	160	180	150	490	PSW-80
100	114,3	200	220	150	570	PSW-100
125	139,7	225	245	150	620	PSW-125
150	168,3	250	270	150	670	PSW-150
200	219,1	315	335	150	800	PSW-200
250	273,0	400	440	200	1010	PSW-250
300	323,9	450	490	200	1140	PSW-300

Note: Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.
 This sheet also applies to fixed points marked with the "PSS" symbol.



6.18 Angle fixed point xx°



XX° means any angle specified by the customer (when placing an order) - standard 15° or 30°

Bend radius:
 Mechanical bending for:
 DN 20÷80 3 × Dz
 DN 100÷300 2,5 × Dz

With "Hamburg" elbows for:.
 DN 350÷1000 1,5 × Dz

Table 19

Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Length	Diameter	Distance	Catalogue Reference number
DN	Dz	Dzp	A-xx	D	B	
mm	mm	mm	mm	mm	mm	
20	26,9	90	1000	140	230	PSK-20/xx
25	33,7	90	1000	140	230	PSK-25/xx
32	42,4	110	1000	140	230	PSK-32/xx
40	48,3	110	1000	140	240	PSK-40/xx
50	60,3	125	1000	170	250	PSK-50/xx
65	76,1	140	1000	200	260	PSK-65/xx
80	88,9	160	1500	220	270	PSK -80/xx
100	114,3	200	1500	260	270	PSK-100/xx
125	139,7	225	1500	300	270	PSK-125/xx
150	168,3	250	1500	320	270	PSK-150/xx
200	219,1	315	1500	400	380	PSK-200/xx
250	273,0	400	1500	500	400	PSK-250/xx
300	323,9	450	2000	560	420	PSK-300/xx

Note: Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.

6.19 Single bellow longitudinal compensator operating under a nominal pressure of 1.6 MPa

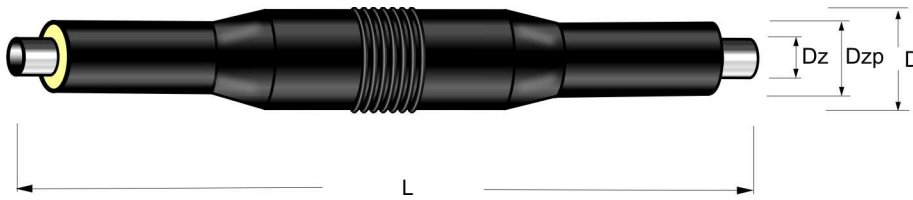


Table 20

Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Diameter	Length	Compensation increment	Catalogue Reference number
DN	Dz	Dzp	D	L	ΔL_k	
mm	mm	mm	mm	mm	mm	
40	48,3	110	160	2000	100	KP-40-100/1,6
50	60,3	125	200	2000	100	KP-50-100/1,6
65	76,1	140	200	2000	100	KP-65-100/1,6
80	88,9	160	225	2000	100	KP-80-100/1,6
80	88,9	160	225	2000	150	KP-80-150/1,6
100	114,3	200	250	2500	125	KP-100-125/1,6
100	114,3	200	250	2500	155	KP-100-155/1,6
125	139,7	225	315	2500	125	KP-125-125/1,6
125	139,7	225	315	2500	160	KP-125-160/1,6
150	168,3	250	400	2500	125	KP-150-125/1,6
150	168,3	250	400	2500	165	KP-150-165/1,6
200	219,1	315	450	2500	125	KP-200-125/1,6
200	219,1	315	450	2500	170	KP-200-170/1,6
250	273,0	400	500	2500	125	KP-250-125/1,6
250	273,0	400	500	2500	170	KP-250-170/1,6
300	323,9	450	560	2500	125	KP-300-125/1,6
300	323,9	450	560	2500	190	KP-300-190/1,6
350	355,6	500	630	3000	125	KP-350-125/1,6
350	355,6	500	630	3000	190	KP-350-190/1,6
400	406,4	560	710	3000	125	KP-400-125/1,6
400	406,4	560	710	3000	200	KP-400-200/1,6
450	457,0	630	710	3000	125	KP-450-125/1,6
450	457,0	630	710	3000	200	KP-450-200/1,6
500	508,0	710	800	3000	125	KP-500-125/1,6
500	508,0	710	800	3000	200	KP-500-200/1,6
600	610,0	800	900	3000	125	KP-600-125/1,6
600	610,0	800	900	3000	200	KP-600-200/1,6

Note: Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.



6.20 Single bellow longitudinal compensator operating under a nominal pressure of 2.5 MPa

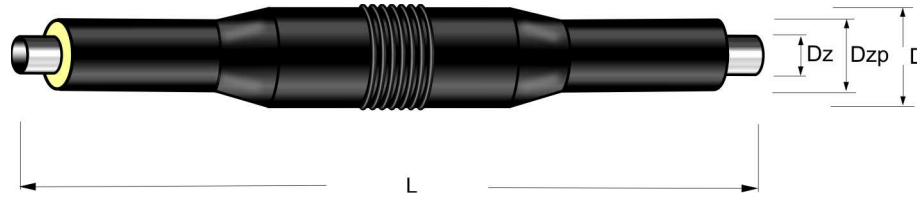


Table 21

Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter	Diameter	Length	Compensation increment	Catalogue Reference number
DN	Dz	Dzp	D	L	ΔL_k	
mm	mm	mm	mm	mm	mm	
80	88,9	160	225	2000	90*	KP-80-90/2,5
100	114,3	200	250	2500	90*	KP-100-90/2,5
125	139,7	225	315	2500	90*	KP-125-90/2,5
150	168,3	250	315	2500	90*	KP-150-90/2,5
200	219,1	315	450	2500	90*	KP-200-90/2,5
250	273,0	400	500	2500	90*	KP-250-90/2,5
300	323,9	450	560	2500	90*	KP-300-90/2,5
350	355,6	500	630	3000	90*	KP-350-90/2,5
400	406,4	560	710	3000	90*	KP-400-90/2,5
450	457,0	560	710	3000	90*	KP-450-90/2,5
500	508,0	630	800	3000	90*	KP-500-90/2,5
600	610,0	800	900	3000	90*	KP-600-90/2,5

Note: Elements with diameters above DN 600 are manufactured according to geometric dimensions agreed with the customer.

* Compensators can also be made with a compensation increment of 180 mm.

7 Preinsulated Steel Fittings- Valves

7.1 Shutoff Ball Valve

A preinsulated shutoff ball valve is supplied together with its fittings, which comprise: a wrench to open and shutoff the valve, a street box and a jacket pipe connecting the spindle and street box

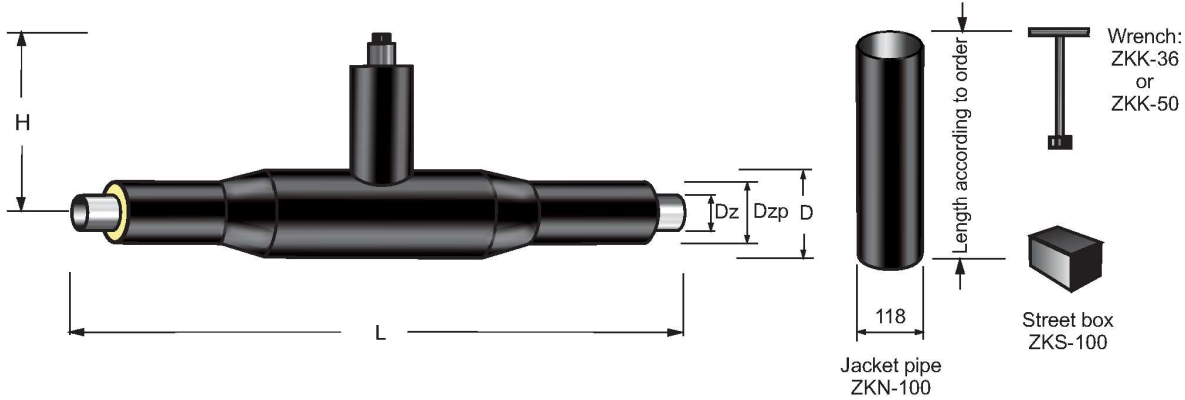
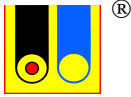


Table 22

Straight pipe			D	H	L	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter				
DN	Dz	Dzp				
mm	mm	mm				
20	26,9	90	110	380	1200	ZK-20
25	33,7	90	110	382	1200	ZK-25
32	42,4	110	110	386	1200	ZK-32
40	48,3	110	125	400	1200	ZK-40
50	60,3	125	140	406	1200	ZK-50
65	76,1	140	160	415	1200	ZK-65
80	88,9	160	200	425	1200	ZK-80
100	114,3	200	225	449	1500	ZK-100
125	139,7	225	250	454	1500	ZK-125
150	168,3	250	315	475	1500	ZK-150
200	219,1	315	400	515	1800	ZK-200
250	273,0	400	450	557	1800	ZK-250
300	323,9	450	560	610	1800	ZK-300

Note: As standard, cut-off valves with reduced flow are produced, for a working pressure of min. 1.6 Mpa
 At the Customer's request, valves with other parameters indicated in the order are produced (e.g. full-flow valves, for a working pressure of 2.5 MPa, etc.)
 Elements with diameters above DN 300 are produced according to geometric dimensions agreed with the Customer.
 The table provides the minimum dimension H, which may vary depending on the type of cut-off valve used (e.g. reduced flow, full-flow, etc.) and depending on the supplier of the steel valve and the Customer's requirements.
 For diameters from DN20 to DN80, the cut-off valves are supplied complete with a ZKN casing pipe, a ZKS street box and a ZKK wrench. From DN100, valves are supplied complete with a ZKK wrench, for installation in concrete ring wells with a minimum diameter of 600 mm.



7.2 Vent ball valve

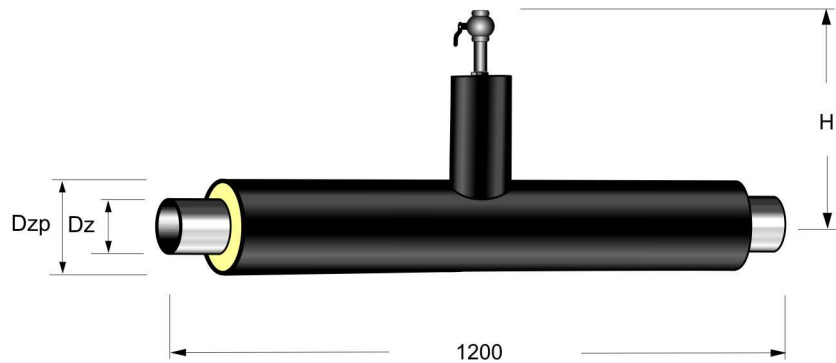
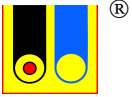


Table 23

Straight pipe			Diameter of vent valve	H	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
25	33,7	90	33,7	384	ZD-25
32	42,4	110	33,7	388	ZD-32
40	48,3	110	33,7	403	ZD-40
50	60,3	125	33,7	410	ZD-50
65	76,1	140	33,7	414	ZD-65
80	88,9	160	33,7	427	ZD-80
100	114,3	200	33,7	450	ZD-100
125	139,7	225	33,7	455	ZD-125
150	168,3	250	33,7	457	ZD-150
200	219,1	315	33,7	515	ZD-200
250	273,0	400	33,7	560	ZD-250
300	323,9	450	33,7	756	ZD-300

Note: Stainless steel vent valves with a threaded end.
 Elements with diameters above DN 300 are produced according to geometric dimensions agreed with the Customer.



7.3 Strain Ball Valve

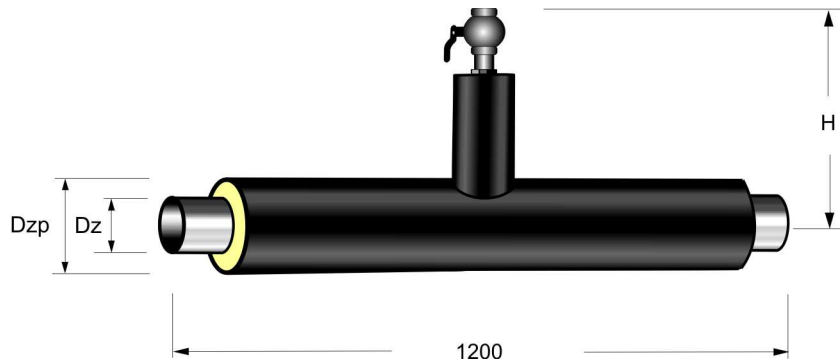


Table 24

Straight pipe			Diameter of strain valve	H	Catalogue Reference number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp			
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
40	48,3	110	48,3	403	ZO-40
50	60,3	125	48,3	410	ZO-50
65	76,1	140	48,3	414	ZO-65
80	88,9	160	48,3	427	ZO-80
100	114,3	200	48,3	450	ZO-100
125	139,7	225	48,3	455	ZO-125
150	168,3	250	48,3	457	ZO-150
200	219,1	315	60,3	515	ZO-200
250	273,0	400	60,3	560	ZO-250
300	323,9	450	60,3	756	ZO-300

Note: Stainless steel vent valves with a threaded end.
 Elements with diameters above DN 300 are produced according to geometric dimensions agreed with the Customer.



7.4 Shutoff ball valve and vent valve assembly

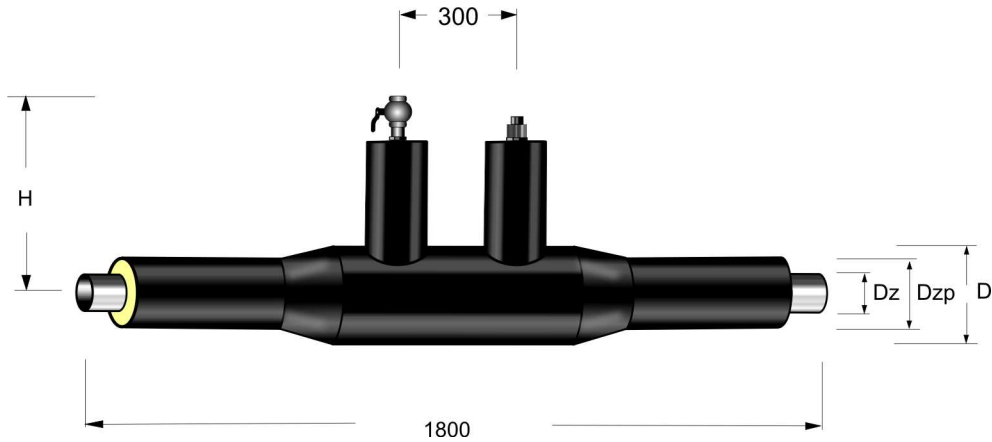


Table 25

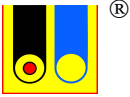
Straight pipe			D	H	Catalogue Reference Number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm	mm	mm	
32	42,4	110	110	388	ZKD-32
40	48,3	110	125	403	ZKD-40
50	60,3	125	140	410	ZKD-50
65	76,1	140	160	414	ZKD-65
80	88,9	160	200	427	ZKD-80
100	114,3	200	225	450	ZKD-100
125	139,7	225	250	455	ZKD-125
150	168,3	250	315	457	ZKD-150
200	219,1	315	400	515	ZKD-200
250	273,0	400	450	560	ZKD-250
300	323,9	450	560	756	ZKD-300

Vent valve diameter::

For pipe of nominal diameters up to 300 mm 33,7 mm

For pipe of nominal diameters above 300 mm 48,3 mm

Note: Vent valve made of stainless steel with a threaded end.
 Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.
 As standard, cut-off valves with reduced flow are produced, for a working pressure of min. 1.6 MPa.
 At the customer's request, valves with other parameters indicated in the order are manufactured (e.g. full-flow valves, for a working pressure of 2.5 MPa, etc.).
 The table provides the minimum dimension H, which may vary depending on the type of cut-off valve used (e.g. reduced flow, full-flow, etc.) and depending on the supplier of the steel valve and the customer's requirements.



7.5 Single strain valve shutoff ball valve

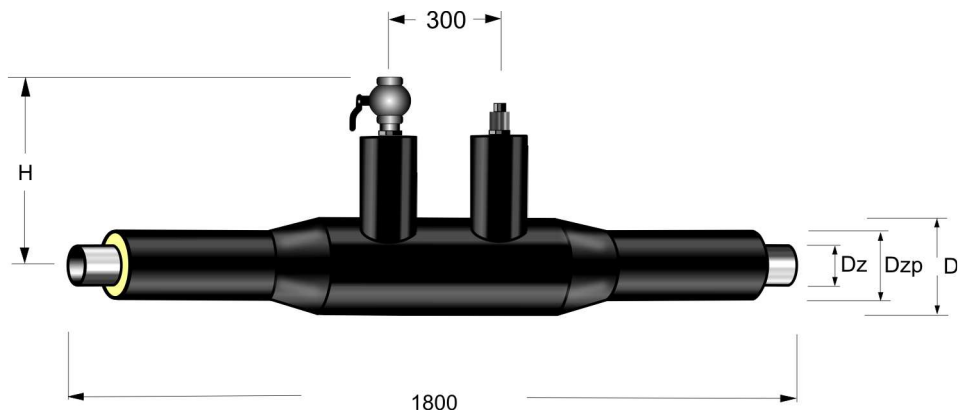


Table 26

Straight pipe			D	H	Catalogue Reference Number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
40	48,3	110	125	400	ZKO-40
50	60,3	125	140	406	ZKO-50
65	76,1	140	160	415	ZKO-65
80	88,9	160	200	425	ZKO-80
100	114,3	200	225	449	ZKO-100
125	139,7	225	250	454	ZKO-125
150	168,3	250	315	475	ZKO-150
200	219,1	315	400	515	ZKO-200
250	273,0	400	450	557	ZKO-250
300	323,9	450	560	610	ZKO-300

Strain valve diameter:

For pipe	up to DN 150 mm	48,3 mm
	from DN 200 to DN 300 mm	60,3 mm
	from DN 350 to DN 400 mm	88,9 mm
	above DN 400 mm	114,3 mm

Note: Strain valve made of stainless steel with a threaded end.
Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.
As standard, cut-off valves with reduced flow are produced, for a working pressure of min. 1.6 MPa.
At the customer's request, valves with other parameters indicated in the order are manufactured (e.g. full-flow valves, for a working pressure of 2.5 MPa, etc.).
The table provides the minimum dimension H, which may vary depending on the type of cut-off valve used (e.g. reduced flow, full-flow, etc.) and depending on the supplier of the steel valve and the customer's requirements.



7.6 Strain and vent shutoff ball valve

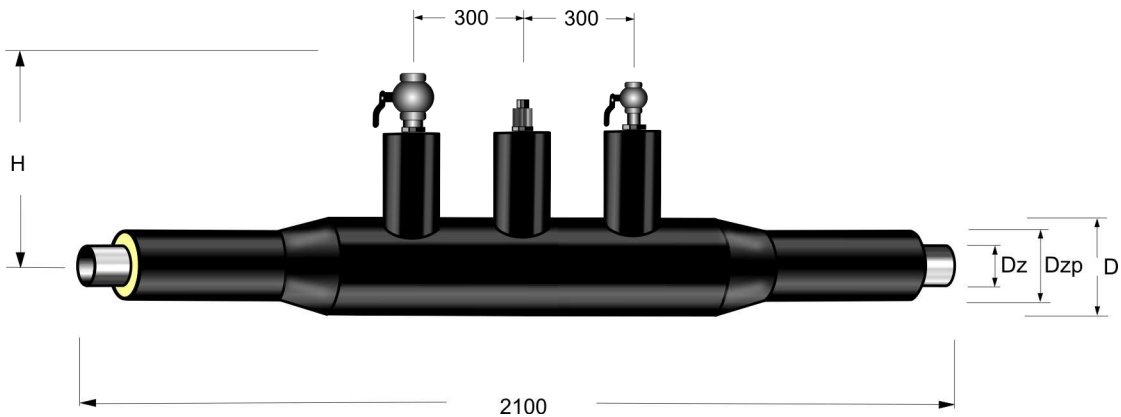


Table 27

Straight pipe			D	H	Catalogue Reference Number
Nominal diameter	Carrier pipe external diameter	Jacket pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
40	48,3	110	125	400	ZKOD-40
50	60,3	125	140	406	ZKOD-50
65	76,1	140	160	415	ZKOD-65
80	88,9	160	200	425	ZKOD-80
100	114,3	200	225	449	ZKOD-100
125	139,7	225	250	454	ZKOD-125
150	168,3	250	315	475	ZKOD-150
200	219,1	315	400	515	ZKOD-200
250	273,0	400	450	557	ZKOD-250
300	323,9	450	560	610	ZKOD-300

Valve diameter:

For pipe of nominal diameter:

up to DN 150 mm

from DN 200 to DN 300 mm

from DN 350 to DN 400 mm

above DN 400 mm

Strain / Vent

33,7 mm / 48,3 mm

33,7 mm / 60,3 mm

48,3 mm / 88,9 mm

48,3 mm / 114,3 mm

Note: Vent/strain valve made of stainless steel with a threaded end.

Elements with diameters above DN 300 are manufactured according to geometric dimensions agreed with the customer.

As standard, cut-off valves with reduced flow are produced, for a working pressure of min. 1.6 MPa.

At the customer's request, valves with other parameters indicated in the order are manufactured (e.g. full-flow valves, for a working pressure of 2.5 MPa, etc.).

The table provides the minimum dimension H, which may vary depending on the type of cut-off valve used (e.g. reduced flow, full-flow, etc.) and depending on the supplier of the steel valve and the customer's requirements.



8 Coupling Unit

8.1 Common coupling N

(HPDE sleeve sealed with heat shrinkable tape).

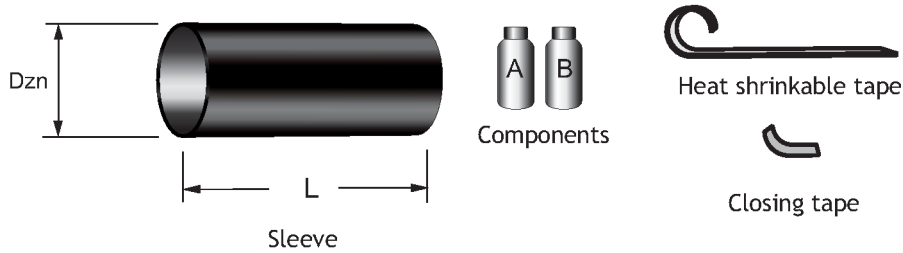


Table 28

Nominal diameter	Carrier pipe external diameter	Sleeve external diameter	Length	Components		Heat shrinkable tape	Closing tape	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	g	g	cm	cm	
mm	mm	mm	mm	g	g	cm	cm	
20	90	100	600	100	169	83	30	N-20/100
25	90	100	600	85	143	83	30	N-25/100
32	110	121	600	126	212	95	30	N-32/120
40	110	121	600	120	201	95	30	N-40/120
50	125	136	600	147	247	105	30	N-50/135
65	140	153	600	170	285	114	30	N-65/150
80	160	174	600	218	366	129	30	N-80/173
100	200	216	600	331	557	155	30	N-100/214
125	225	243	600	384	645	171	30	N-125/240
150	250	269	600	423	711	187	30	N-150/265
200	315	338	600	636	1068	233	45	N-200/333
250	400	428	700	1402	2357	288	45	N-250/420
300	450	472	700	1607	2701	320	45	N-300/472

Table 28a

Insulation PLUS

DN	Dzp	Dzn	L	A	B	Heat shrinkable tape	Closing tape	Catalogue Reference Number
mm	mm	mm	mm	g	g	cm	cm	
20	110	121	600	154	259	95	30	N-20/120
25	110	121	600	134	225	95	30	N-25/120
32	125	136	600	169	284	105	30	N-32/135
40	125	136	600	163	273	105	30	N-40/135
50	140	153	600	195	328	114	30	N-50/150
65	160	174	600	243	408	129	30	N-65/173
80	200	216	600	393	661	155	30	N-80/214
100	225	243	600	461	775	171	30	N-100/240
125	250	269	600	528	888	187	30	N-125/265
150	315	338	600	871	1463	233	45	N-150/333
200	355	380	600	1376	2313	288	45	N-200/380
250	450	472	700	2087	3509	320	45	N-250/472

Note: at the customer's request, the N-type connector sets can be delivered with heat shrinkable bands according to catalog no. 8.2.1

Oval - not tolerated.

* The table shows the minimum outer diameters of the sleeves.



8.2 Heat shrinkable couplings

8.2.1 Heat shrinkable coupling NT

(HPDE sleeve sealed with heat shrinkable band)

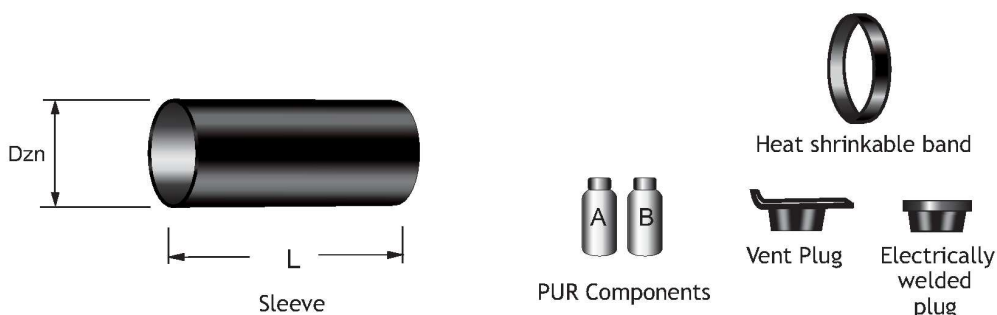


Table 29

Nominal diameter	Carrier pipe external diameter	Sleeve external diameter	Length	Components		Heat shrinkable tape	Vent plug and electrically welded plug	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	g	g	szt	kpl	
20	90	107	600	100	169	2	2	NT-20/107
25	90	107	600	97	163	2	2	NT-25/107
32	110	129	600	145	243	2	2	NT-32/129
40	110	129	600	140	236	2	2	NT-40/129
50	125	143	600	163	274	2	2	NT-50/143
65	140	156	600	196	330	2	2	NT-65/156
80	160	178	600	241	405	2	2	NT-80/178
100	200	224	600	373	627	2	2	NT-100/224
125	225	255	600	425	714	2	2	NT-125/255
150	250	278	600	447	752	2	2	NT-150/278
200	315	341	600	706	1186	2	2	NT-200/341
250	400	430	700	1402	2356	2	2	NT-250/430
300	450	480	700	1596	2683	2	2	NT-300/480

Table 29a

Insulation **PLUS**

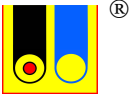
DN	Dzp	Dzn	L	A	B	Heat shrinkable tape	Vent plug and electrically welded plug	Catalogue Reference Number
mm	mm	mm	mm	g	g	szt	kpl	
20	110	129	600	154	259	2	2	NT-20/129
25	110	129	600	151	253	2	2	NT-25/129
32	125	143	600	179	300	2	2	NT-32/143
40	125	143	600	174	292	2	2	NT-40/143
50	140	156	600	215	361	2	2	NT-50/156
65	160	178	600	259	436	2	2	NT-65/178
80	200	224	600	417	702	2	2	NT-80/224
100	225	255	600	480	807	2	2	NT-100/255
125	250	278	600	525	883	2	2	NT-125/278
150	315	341	600	884	1486	2	2	NT-150/341
200	355	383	600	1340	2253	2	2	NT-200/383
250	450	480	700	1948	3275	2	2	NT-250/480

Note: At the customer's request, the sets of NT connectors can also be delivered with heat-shrinkable and closing tape according to catalog card no. 8.1

Oval - not tolerated.

* The table shows the minimum outer diameters of the sleeves.

We also manufacture larger sleeve diameters than those given in the tables above.



8.2.2 Radiation crosslinked heat shrinkable coupling - NTX+M

(Heat shrinkable PeXc sleeve)

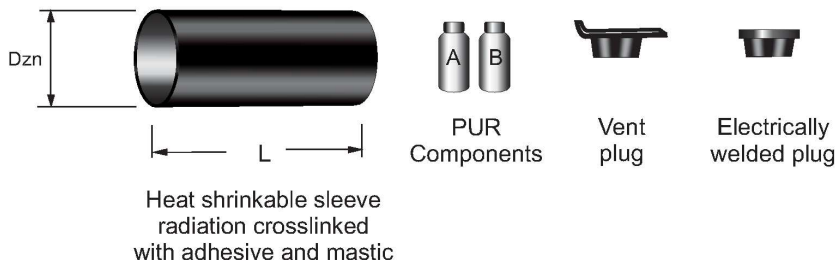


Table 30

Nominal diameter	Carrier pipe external diameter	Sleeve external diameter	Length	Components		Vent plug and electrically welded plug	Catalogue Reference Number
				A	B		
DN	Dzp	Dzn	L	g	g	kpl	
mm	mm	mm	mm	g	g	kpl	
20	90	107	600	100	169	2	NTX+M-20/107
25	90	107	600	97	163	2	NTX+M-25/107
32	110	129	600	145	243	2	NTX+M-32/129
40	110	129	600	140	236	2	NTX+M-40/129
50	125	143	600	163	274	2	NTX+M-50/143
65	140	156	600	196	330	2	NTX+M-65/156
80	160	178	600	241	405	2	NTX+M-80/178
100	200	224	600	373	627	2	NTX+M-100/224
125	225	255	600	425	714	2	NTX+M-125/255
150	250	278	600	447	752	2	NTX+M-150/278
200	315	341	600	706	1186	2	NTX+M-200/341
250	400	430	700	1402	2356	2	NTX+M-250/430
300	450	480	700	1596	2683	2	NTX+M-300/480

Table 30a

Insulation **PLUS**

DN	Dzp	Dzn	L	A	B	Vent plug and electrically welded plug	Catalogue Reference Number
mm	mm	mm	mm	g	g	kpl	
20	90	107	600	101	169	2	NTX+M-20/107
25	110	129	600	151	253	2	NTX+M-25/129
32	125	143	600	179	300	2	NTX+M-32/143
40	125	143	600	174	292	2	NTX+M-40/143
50	140	156	600	215	361	2	NTX+M-50/156
65	160	178	600	259	436	2	NTX+M-65/178
80	200	224	600	417	702	2	NTX+M-80/224
100	225	255	600	480	807	2	NTX+M-100/255
125	250	278	600	525	883	2	NTX+M-125/278
150	315	341	600	884	1486	2	NTX+M-150/341
200	355	383	600	1340	2253	2	NTX+M-200/383
250	450	480	700	1948	3275	2	NTX+M-250/480

- Note:**
1. The number of components for dimensions above DN300 is agreed individually with the customer.
 2. The sleeve is produced with glue and mastic.
 3. The length tolerance L of the radiation cross-linked heat shrinkable sleeve is $+^{10}/_{-20}$ mm
 4. Oval - not tolerated.
 5. At the customer's request, the heat shrink sleeve can be supplied with two factory-made venting and filling holes for PUR foam, with a place prepared for welding plugs
- The table shows the minimum outer diameters of the sleeves.
 We also manufacture larger sleeve diameters than those given in the tables above.



8.2.3 Heat shrinkable radiation crosslinked joint, NTX-II type

(Heat-shrinkable PE-Xc sleeve with two factory-made mounting holes with a place prepared for welding the plug)

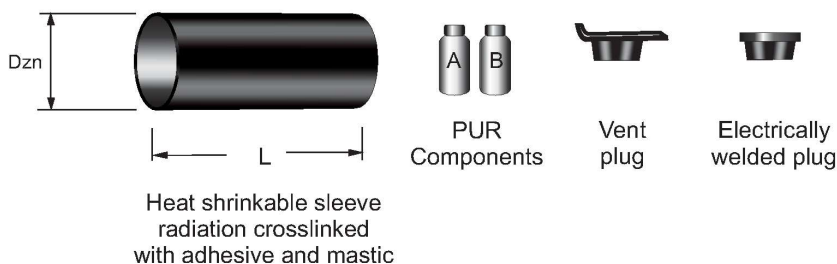


Table 31

Nominal diameter	Carrier pipe external diameter	Sleeve external diameter	Length	Components		Vent plug and electric ally welded plug	Catalogue Reference Number
				A	B		
DN	Dzp	Dzn	L	g	g	kpl	
mm	mm	mm	mm	g	g	kpl	
20	90	107	600/700	100	169	2	NTX-II-20/107
25	90	107	600/700	97	163	2	NTX-II-25/107
32	110	129	600/700	145	243	2	NTX-II-32/129
40	110	129	600/700	140	236	2	NTX-II-40/129
50	125	143	600/700	163	274	2	NTX-II-50/143
65	140	156	600/700	196	330	2	NTX-II-65/156
80	160	178	600/700	241	405	2	NTX-II-80/178
100	200	224	600/700	373	627	2	NTX-II-100/224
125	225	255	600/700	425	714	2	NTX-II-125/255
150	250	278	600/700	447	752	2	NTX-II-150/278
200	315	341	600/700	706	1186	2	NTX-II-200/341
250	400	430	700/600	1402	2356	2	NTX-II-250/430
300	450	480	700/600	1596	2683	2	NTX-II-300/480

Table 31a

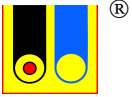
Insulation **PLUS**

DN	Dzp	Dzn	L	A	B	Vent plug and electric ally welded plug	Catalogue Reference Number
mm	mm	mm	mm	g	g	kpl	
20	110	129	600/700	154	259	2	NTX-II-20/129
25	110	129	600/700	151	253	2	NTX-II-25/129
32	125	143	600/700	179	300	2	NTX-II-32/143
40	125	143	600/700	174	292	2	NTX-II-40/143
50	140	156	600/700	215	361	2	NTX-II-50/156
65	160	178	600/700	259	436	2	NTX-II-65/178
80	200	224	600/700	417	702	2	NTX-II-80/224
100	225	255	600/700	480	807	2	NTX-II-100/255
125	250	278	600/700	525	883	2	NTX-II-125/278
150	315	341	600/700	884	1486	2	NTX-II-150/341
200	355	383	600/700	1340	2253	2	NTX-II-200/383
250	450	480	700/600	1948	3275	2	NTX-II-250/480

- Note:**
1. The number of components for dimensions above DN300 is agreed individually with the customer.
 2. The sleeve is produced with glue and matic.
 3. The length tolerance L of the radiation cross-linked heat shrinkable sleeve is $^{+10}/_{-20}$ mm.
 4. Oval - not tolerated.
 5. Hole diameter - 24 mm

The table shows the minimum outer diameters of the sleeves.

We also manufacture larger sleeve diameters than those given in the tables above.



8.2.4 Dry heat shrinkable coupling NTS

(HDPE heat shrinkable sleeve, PUR lag, heat shrinkable band)

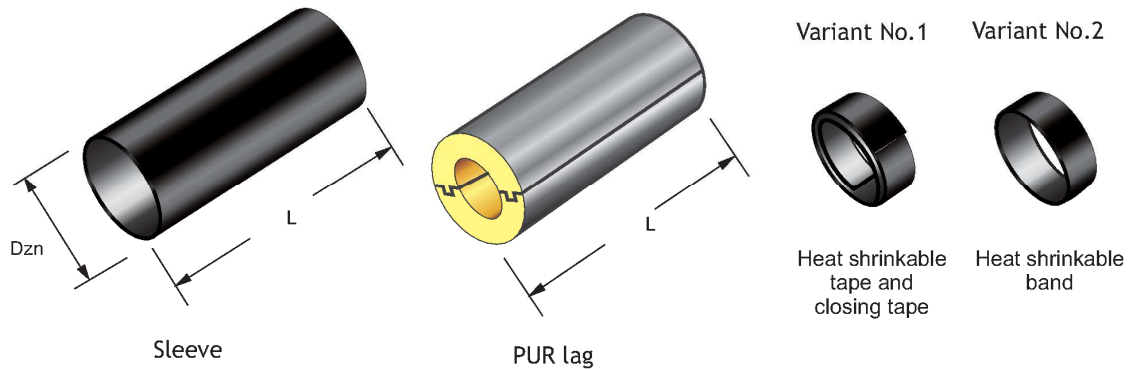
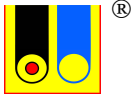


Table 32

Pipe unit		Sleeve		Coupling parts				Catalogue Reference Number
Nominal diameter	Jacket pipe external diameter	External diameter	Length	PUR lag	Variant 1		Variant 2	
					Heat shrinkable tape	Closing tape	Heat shrinkable band	
DN	Dzp	Dzn	L	L				
mm	mm	mm	mm	mm	cm	szt	szt	
20	90	107	600	350	45	2	2	NTS-20/107
25	90	107	600	350	45	2	2	NTS-25/107
32	110	129	600	350	50	2	2	NTS-32/129
40	110	129	600	350	50	2	2	NTS-40/129
50	125	143	600	350	55	2	2	NTS-50/143
65	140	156	600	350	60	2	2	NTS-65/156
80	160	178	600	350	65	2	2	NTS-80/178
100	200	224	600	350	80	2	2	NTS-100/224
125	225	255	600	350	90	2	2	NTS-125/255
150	250	278	600	350	95	2	2	NTS-150/278
200	315	341	600	350	120	2	2	NTS-200/341
250	400	430	700	450	145	2	2	NTS-250/430
300	450	480	700	450	160	2	2	NTS-300/480

The table shows the minimum outer diameters of the sleeves.
 Oval - not tolerated.



8.2.5 Heat shrinkable bend coupling - NSRK (Heat shrinkable bend sleeve)

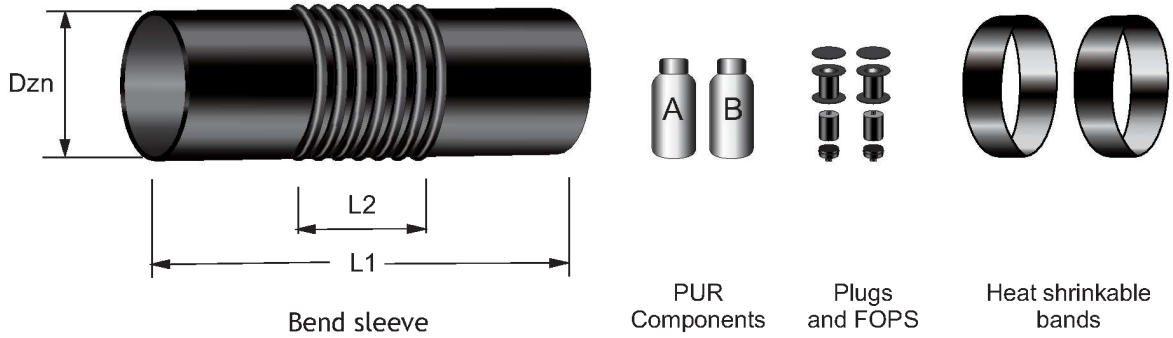


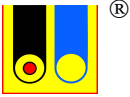
Table 33

Nominal diameter	Jacket pipe external diameter	External diameter	Length of bend sleeve		PUR components		Centring element	Heat shrinkable band	Plugs and FOPS	Catalogue Reference Number
			L1	L2	A	B				
DN	Dzp	Dzn	mm	mm	g	g	szt	szt	kpl	
25	90	103	980	560	212	356	1	2	1	NSRK-25/103
32	110	125	980	560	268	451	1	2	1	NSRK-32/125
40	110	125	980	560	259	435	1	2	1	NSRK-40/125
50	125	140	1050	630	340	572	1	2	1	NSRK-50/140
65	140	156	1050	630	425	714	1	2	1	NSRK-65/156
80	160	177	1050	630	526	885	1	2	1	NSRK-80/177
100	200	218	1120	700	876	1473	1	2	1	NSRK-100/218
125	225	244	1220	800	1122	1885	1	2	1	NSRK-125/244
150	250	269	1340	920	1475	2479	1	2	1	NSRK-150/269

The table shows the minimum outer diameters of the sleeves.

The length L1 given in the table is an example and depends on the manufacturer of the elbow sleeve.

The elbow joint does not include the steel elbow. Hamburg elbow must be ordered separately.



8.3 Electrically Welded Coupling

8.3.1 Electrically Welded Coupling - close type

(HPDE sleeve sealed with heat shrinkable band)

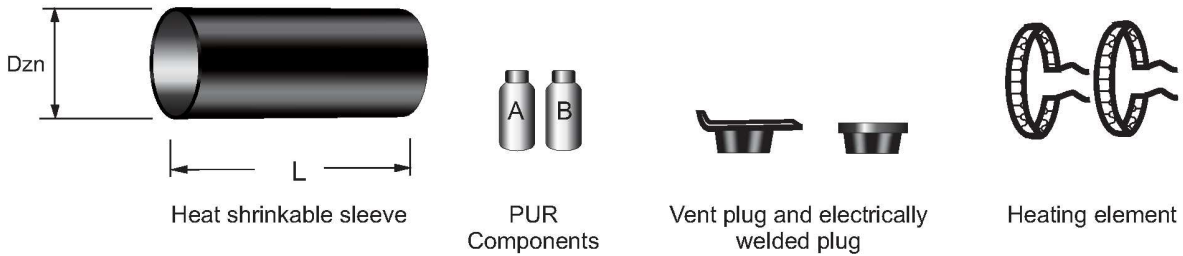


Table 34

Nominal diameter	Jacket pipe external diameter	Sleeve external diameter	Length	Components		Heating element	Vent plug and electrically welded plug	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	g	g	szt	kpl	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>g</i>	<i>g</i>	<i>szt</i>	<i>kpl</i>	
20	90	107	600	100	169	2	2	DT-20/107
25	90	107	600	97	163	2	2	DT-25/107
32	110	129	600	145	243	2	2	DT-32/129
40	110	129	600	140	236	2	2	DT-40/129
50	125	143	600	163	274	2	2	DT-50/143
65	140	156	600	196	330	2	2	DT-65/156
80	160	178	600	241	405	2	2	DT-80/178
100	200	224	600	373	627	2	2	DT-100/224
125	225	255	600	425	714	2	2	DT-125/255
150	250	278	600	447	752	2	2	DT-150/278
200	315	341	600	706	1186	2	2	DT-200/341
250	400	430	700	1402	2356	2	2	DT-250/430
300	450	480	700	1596	2683	2	2	DT-300/480
350	500	530	700	1925	3237	2	2	DT-350/530
400	560	590	700	2186	3674	2	2	DT-400/590
450	630	660	700	2926	4918	2	2	DT-450/660

* The table shows the minimum outer diameters of the sleeves.

Oval - not tolerated.

We also manufacture larger sleeve diameters than those given in the tables above.

Note: Only available with service of making the joint assembly by *ZPU Międzyrzecz Sp. z o. o.*



8.3.2 Butt Welded Coupling DX II - open type

(Standard insulation)

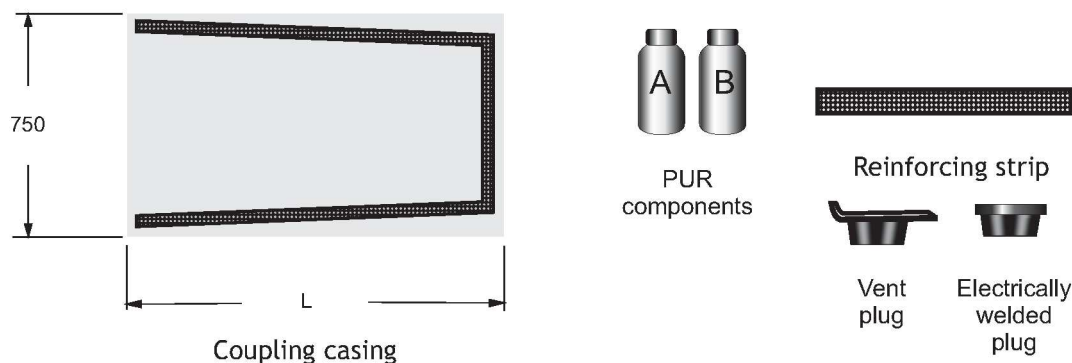


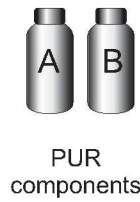
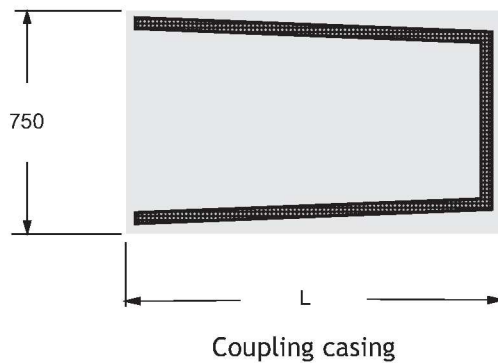
Table 35

Nominal diameter	Jacket pipe external diameter	Plate length	Components		Plug	Catalogue Reference Number
			A	B		
DN	Dzp	Dzn	g	g	szt	
mm	mm	mm				
32	110	535	105	177	2	DX II-110/750
40	110	535	100	169	2	DX II-110/750
50	125	583	125	210	2	DX II-125/750
65	140	630	144	242	2	DX II-140/750
80	160	690	185	311	2	DX II-160/750
100	200	820	268	450	2	DX II-200/750
125	225	900	314	528	2	DX II-225/750
150	250	990	353	593	2	DX II-250/750
200	315	1230	533	896	2	DX II-315/750
250	400	1500	1130	1900	2	DX II-400/750
300	450	1660	1319	2217	2	DX II-450/750
350	500	1820	1655	2783	2	DX II-500/750
400	560	2000	2007	3373	2	DX II-560/750
450	560	2000	1523	2560	2	DX II-560/750
500	630	2250	1995	3353	2	DX II-630/750
600	800	2870	3702	6223	2	DX II-800/750
700	900	3180	4302	7232	2	DX II-900/750
800	1000	3500	4903	8242	2	DX II-1000/750
900	1100	4128	5539	9310	2	DX II-1100/750
1000	1200	4756	6170	10371	2	DX II-1200/750

Note: Only available with service of making the joint assembly by **ZPU Międzyrzecz Sp. z o. o.**



(Insulation PLUS)



Reinforcing strip



Vent plug



Electrically welded plug

Table 35a

Insulation PLUS

Nominal diameter	Jacket pipe external diameter	Plate length	Components		Plus	Catalogue Reference Number
			A	B		
DN	Dzp	Dzn	g	g	szt	
mm	mm	mm				
25	110	535	111	186	2	DX II +110/750
32	125	583	141	236	2	DX II +125/750
40	125	583	136	229	2	DX II +125/750
50	140	630	162	273	2	DX II +140/750
65	160	693	203	341	2	DX II +160/750
80	200	820	312	525	2	DX II +200/750
100	225	900	370	622	2	DX II +225/750
125	250	990	428	720	2	DX II +250/750
150	315	1230	703	1181	2	DX II +315/750
200	400	1500	1108	1862	2	DX II +400/750
250	450	1660	1655	2782	2	DX II +450/750
300	500	1820	1894	3184	2	DX II +500/750
350	560	2000	2435	4094	2	DX II +560/750
400	630	2000	3024	5083	2	DX II +630/750
450	630	2250	2540	4270	2	DX II +630/750
500	710	2530	3316	5573	2	DX II +710/750
600	900	3180	5780	9716	2	DX II +900/750
700	1000	3500	6625	11136	2	DX II +1000/750
800	1100	3814	7470	12557	2	DX II +1100/750
900	1200	4128	8350	14036	2	DX II +1200/750
1000	1300	4442	9341	15693	2	DX II +1300/750

Note: Only available with service of making the joint assembly by **ZPU Międzyrzecz Sp. z o. o.**



9 Insulation and pipeline closing

9.1 Pipeline Closing - End Sleeve

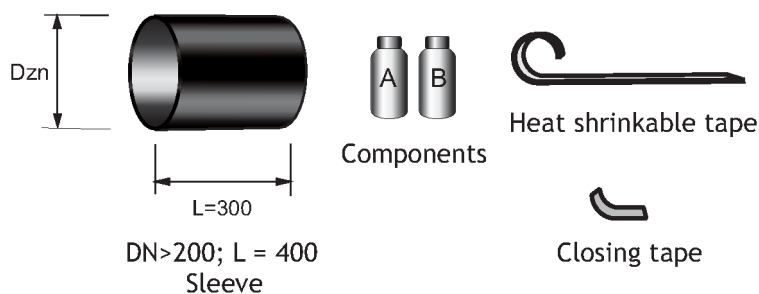


Table 36

Nominal diameter	Jacket pipe external diameter	Sleeve external diameter	Components		Heat shrinkable tape	Closing tape	Catalogue Reference Number
			A	B			
DN	Dzp	Dzn	g	g	cm	cm	
mm	mm	mm	g	g	cm	cm	
20	90	100	59	100	40	15	NK-20/100
25	90	100	56	94	40	15	NK-25/100
32	110	121	83	140	47	15	NK-32/120
40	110	121	79	133	47	15	NK-40/120
50	125	136	97	163	52	15	NK-50/135
65	140	153	112	188	56	15	NK-65/150
80	160	174	144	241	64	15	NK-80/173
100	200	216	219	368	76	15	NK-100/214
125	225	243	253	426	86	15	NK-125/240
150	250	269	279	470	94	15	NK-150/265
200	315	338	420	705	115	22	NK-200/333
250	400	429	1234	2074	145	22	NK-250/420
300	450	472	1414	2377	161	22	NK-300/472

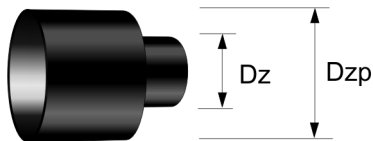
Table 36a

Insulation *PLUS*

DN	Dzp	Dzn	A	B	Heat shrinkable tape	Closing tape	Catalogue Reference Number
mm	mm	mm	g	g	cm	cm	
20	110	121	91	153	47	15	NK-20/120
25	110	121	88	149	47	15	NK-25/120
32	125	136	111	187	52	15	NK-32/135
40	125	136	107	180	52	15	NK-40/135
50	140	153	129	217	56	15	NK-50/150
65	160	174	160	269	64	15	NK-65/173
80	200	216	259	436	76	15	NK-80/214
100	225	243	304	511	86	15	NK-100/240
125	250	269	349	586	94	15	NK-125/265
150	315	338	575	966	115	22	NK-150/333
200	355	380	908	1527	145	22	NK-200/380
250	450	472	1837	3088	161	22	NK-250/472

9.2 End Cap - heat shrinkable sleeve

Table 37



Jacket pipe external diameter	Catalogue Reference Number
Dzp	
90	E-90
110	E-110
125	E-125
140	E-140
160	E-160
200	E-200
225	E-225
250	E-250
315	E-315
400	E-400
450	E-450
500	E-500
560	E-560
630	E-630
710	E-710
800	E-800

9.3 Warning tape

To be placed above a pipeline. Supplied in coils in 100 m multiple lengths. Carries a wording “WARNING! HEAT TRANSMITTING PIPE” and a logo

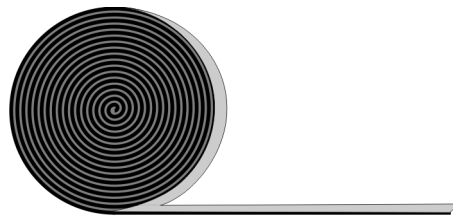


Table 38

	Colour	Width [mm]	Catalogue Reference Number
Warning tape	yellow	150	T-150

10 Wall transition

11.1 Rubber ring

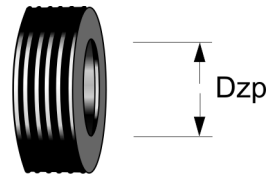


Table 39

Jacket pipe external diameter	Catalogue reference number
D_{zp}	
90	P-90
110	P-110
125	P-125
140	P-140
160	P-160
200	P-200
225	P-225
250	P-250
315	P-315
400	P-400
450	P-450
500	P-500
560	P-560
630	P-630
710	P-710
800	P-800

11.2 Branch-off protective tube - joint adapter

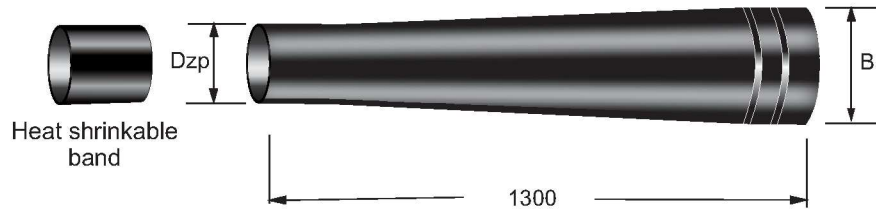
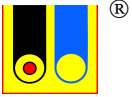


Table 40

Jacket pipe	Dimension	Catalogue reference number
D_{zp}	B	
<i>mm</i>	<i>mm</i>	
90	185	A-90
110	195	A-110
125	220	A-125
140	250	A-140
160	280	A-160



11 Mains Branching Off

11.1 Cold inset

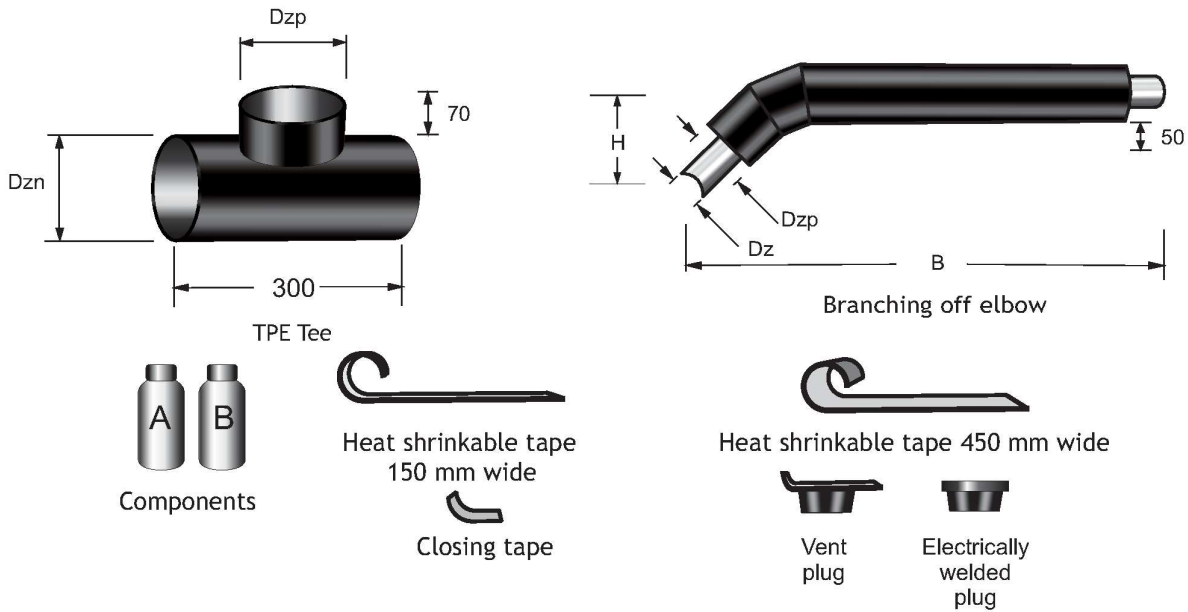


Table 41

Main pipe		Branching off		Branching off elbow		TPE tee		Catalogue Reference number
Nominal diameter	Jacket pipe external diameter	Nominal diameter	Jacket pipe external diameter	H	B	Mains external diameter	Branching off external diameter	
DN <i>mm</i>	Dzp <i>mm</i>	DN <i>mm</i>	Dzp <i>mm</i>	<i>mm</i>	<i>mm</i>	Dzn <i>mm</i>	Dzp <i>mm</i>	
40	110	25	90	160	900	125	125	TPE-40/25
50	125	32	110	168	900	140	140	TPE-50/32
65	140	40	110	183	1200	160	140	TPE-65/40
80	160	50	125	200	1200	200	160	TPE-80/50
100	200	65	140	220	1200	225	180	TPE-100/65

Note: TPE tees are fabricated to accommodate any mains diameter and branching off pipe diameter up to DN 200.
 The TPE tee and branch elbow must be ordered as separate items.



11.2 Hot inset

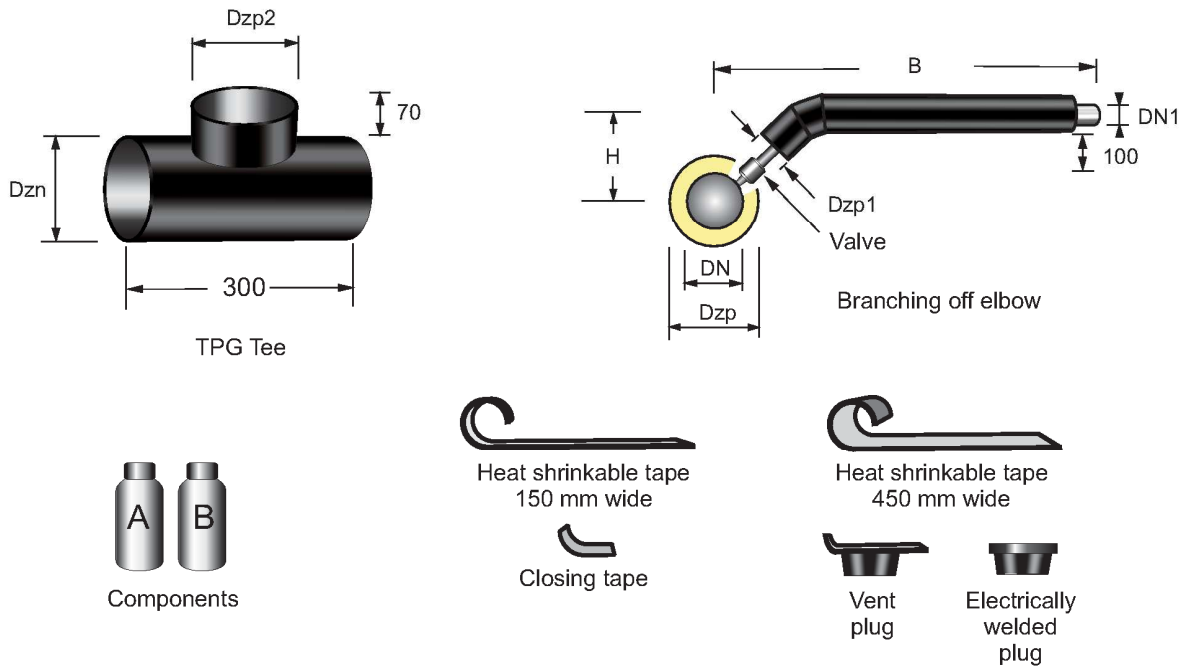
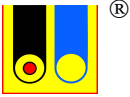


Table 42

Main pipe		Branching off		Branching off elbow		TPG tee		Catalogue Reference number
Nominal diameter	Jacket pipe external diameter	Nominal diameter	Jacket pipe external diameter	H	B	Mains external diameter	Branching off external diameter	
DN	Dzp	DN	Dzp1			Dzn	Dzp2	
mm	mm	mm	mm	mm	mm	mm	mm	
40	110	25	90	280	900	125	125	TPG-40/25
50	125	32	110	310	900	140	140	TPG-50/32
65	140	40	110	340	1200	160	140	TPG-65/40
80	160	50	125	360	1200	200	160	TPG-80/50
100	200	65	140	380	1200	225	180	TPG-100/65
125	225	80	160	400	1200	250	200	TPG-125/80
150	250	100	200	400	1200	315	250	TPG-150/100

Note: TPE tees are fabricated to accommodate any mains diameter and branching off pipe diameter up to DN 150.
 TPE, hot tapping valve and branch elbow must be ordered as separate items.



12 Expansion Cushions.

Expansion cushions:

- soft type - PUR
- hard type - PE

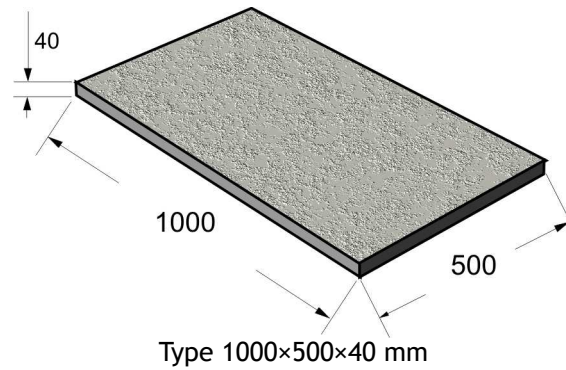
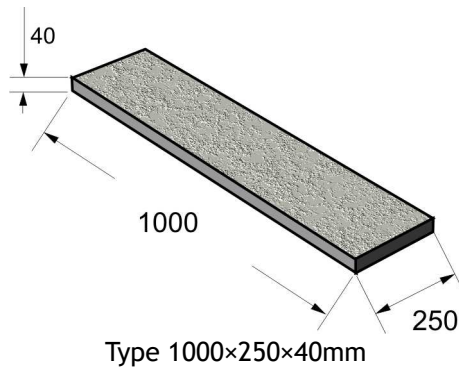


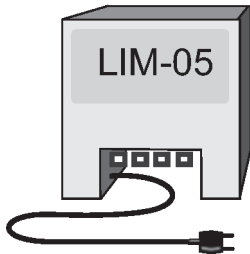
Table 43

Nominal diameter	Jacket pipe external diameter	Expansion cushions dimension			Expansion cushions type
		Lengths	Width	Thickness	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
20	90	1000	250	40	1000x250x40
25	90	1000	250	40	1000x250x40
32	110	1000	250	40	1000x250x40
40	110	1000	250	40	1000x250x40
50	125	1000	250	40	1000x250x40
65	140	1000	250	40	1000x250x40
80	160	1000	250	40	1000x250x40
100	200	1000	250	40	1000x250x40
125	225	1000	500	40	1000x500x40
150	250	1000	500	40	1000x500x40
200	315	1000	500	40	1000x500x40
250	400	1000	500	40	1000x500x40
300	450	1000	500	40	1000x500x40

Note: Expansion cushions for preinsulated pipes with diameters DN 300 mm must be the type 1000x500x40 mm. Their quantity will be calculated individually depending on casing pipe diameter. At the stage of submitting an inquiry or order, the type and dimensions of the expansion cushions should be specified.

13 Leak detection system

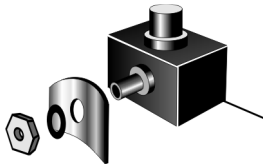
1. Measuring device



Dimension [mm]			Catalogue Reference number
Lenght	Thickness	Height	
235	143	262	LIM-05

2. Leak detection system components

Universal Connection Box



Dimension [mm]			Catalogue Reference number
Lenght	Thickness	Height	
35	35	50	UPP-1

Locating device resetting terminal

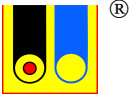


Dimension [mm]		Catalogue Reference number
Diameter	Lenght	
18	40	KZL

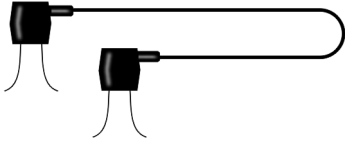
Locating device connecting coaxial cable



Dimension [mm]		Catalogue Reference number
Diameter	Lenght	
7	1000	K-1
7	2000	K-2
7	3000	K-3
7	4000	K-4
7	5000	K-5

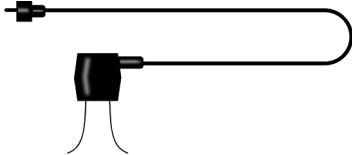


Pulse device jumper cable



Dimension [mm]		Catalogue Reference number
Diameter	Lenght	
7	5000	KPS-5

Pulse device connecting cable



Dimension [mm]		Catalogue Reference number
Diameter	Lenght	
7	5000	KP-5

Clamp - to connect coupling assembly



Clamp

Dimension [mm]		Catalogue Reference number
Diameter	Lenght	
4	15	S-4



14 Commercial information

Producer and seller:

Zakład Produkcyjno Usługowy
Międzyrzecz
POLSKIE RURY PREIZOLOWANE Sp. z o. o.,
ul. Zakaszewskiego 4
66-300 Międzyrzecz,

www.zpum.pl

zpu@zpum.pl

Phones :

Secretary: +48 95 741 25 26, 742 00 93, 742 33 00

Domestic Trade Department: +48 95 742 33 43, 742 33 31

Foreign Trade Department: +48 95 742 33 55, 742 33 38

Technical Department: +48 95 742 33 18

Purchase Department: +48 95 742 33 11, 742 33 46

Quality Department: +48 95 742 33 22

Warehouse Department: +48 95 742 33 28

Fax. +48 95 742 33 01, 742 33 02