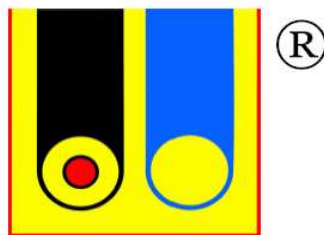


PN-EN 15698-1
ITB Technical Approval
AT-15-7772/2008+ Annex no.1
Validity term: September 30, 2013
Issued by the Building Research
Institute in Warsaw



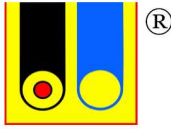
System ZPU Międzyrzecz Sp. z o.o.
Preinsulated Pipe System
To Be Used In Buried
Thermal Utilities

PRODUCT CATALOGUE
DOUBLE PREINSULATED PIPES

Zakład Produkcyjno Usługowy
Międzyrzecz
POLSKIE RURY PREIZOLOWANE Sp. z o. o.,
66-300 Międzyrzecz, ul. Zakaszewskiego 4
Tel. +48 95 741 25 26, 742 33 00, 742 00 93
Fax. +48 95 742 18 36, 742 33 01
Version: July 2013

Table of contents

1.	General Information on Application of System ZPU Międzyrzecz Sp. z o.o. Double Preinsulated Pipes and Fittings.....	3
2.	Properties of Materials Used in Double Preinsulated Pipes and Fittings by System ZPU Międzyrzecz Sp. z o.o.	3
3.	Pipe Insulation Moisture Detection System.....	4
4.	General Principles of Laying Double Preinsulated Pipe in Soil.....	4
5.	Cross-sections of Jacket and Carrier Pipes.....	5
6.	Quality Assurance System.....	5
7.	Information on Other Products.....	6
8.	Preinsulated Pipes.....	7
8.1	Straight Preinsulated Pipes.....	7
9.	Line up of Preinsulated Fittings.....	8
9.1	90° Elbow	8
9.2	75° Elbow	9
9.3	60° Elbow	10
9.4	45° Elbow	11
9.5	30° Elbow	12
9.6	15° Elbow	13
9.7	Vertical Elbow	14
9.8.	Preinsulated Elevated Tee	15
9.9.	Flat preinsulated Tee	16
9.10	Double reducer	17
9.11	Wye transition fitting.....	18
9.12	Double Anchor Point.....	19
10.	Preinsulated Steel Fittings and Fixtures.....	20
10.1	Double Cut-off Valve.....	20
10.2	Vent Ball Valve	21
10.3	Double Strain Ball Valve.....	22
10.4	Double Cut-off Valve with Vent Ball Valve	23
10.5	Double Cut-off Valve with Strain Ball Valve.....	24
10.6	Double Cut-off Valve with Vent and Strain Ball Valves.....	25
11.	Coupling Unit.....	26
11.1	Common Coupling	26
11.2	Common Coupling	27
11.3	Heat shrinkable coupling fusion welded.....	28
11.4	PeX Crosslinked heat shrinkable coupling	29
11.5	Fusion welded DX coupling.....	30
12.	Insulation and Pipeline Closing	31
12.1	Pipeline Closing – End Sleeve.....	31
12.2	End Cap – Heat Shrinkable Sleeve	32
13.	Warning Tape	32
14.	Rubber Ring.....	33
15.	Technical Information	34
16.	Trade Information	34



1. General Information on Application of System ZPU Międzyrzecz Sp. z o.o. Double Preinsulated Pipes and Fittings

Double preinsulated pipes and fittings by *System ZPU Międzyrzecz Sp. z o.o.* are to be used in the construction of thermal distribution low parameter networks, whose function is to transmit a heating medium from its source up to the reception point. Double preinsulated pipes and fittings are resistant to the medium of a constant working temperature of up to 152°C.

The function of double preinsulated pipes and fittings manufactured by *System ZPU Międzyrzecz Sp. z o.o.* is to transmit a heating medium, characterised low working parameters, hot water or other media used in the construction industry and in industry.

Double preinsulated pipes and fittings by *System ZPU Międzyrzecz Sp. z o.o.* are built from two steel pipes placed inside a single casing pipe made of hard polyethylene of high density (PEHD) and a layer of thermal insulation (standard or standard plus), made of rigid polyurethane foam (PUR) filling up the space between the pipes. *System ZPU Międzyrzecz Sp. z o.o.* preinsulated pipes, are manufactured within the nominal diameters of DN 2×20 to DN 2×200 mm, in standard lengths of 6 or 12 m. *System ZPU Międzyrzecz Sp. z o.o.* preinsulated pipes are 6 m long. The ends of double preinsulated pipes and fittings are not insulated over a length of 150mm^{+10mm}. Distance tolerance between feed and return carrier pipes measured at pipe ends ± 1 mm, while measured at any point inside the double pipe system is ±2 mm.

System ZPU Międzyrzecz Sp. z o.o. double preinsulated pipes and fittings meet the requirements set out by standards: AT-15-7772/2008 + Appendix No. 1, PN-EN 15698-1, PN-EN 253, PN-EN- 448, PN-EN 488, PN-EN- 489, PN-EN 13941, PN-EN 14419.

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

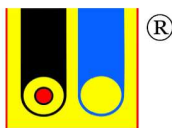
CARRIER PIPE

Carrier pipe is a certified steel seamless pipe manufactured in compliance with DIN-1629, steel grade St 37.0, or PN-EN 10216-2+A2 with steel grade P235GH, PN-EN 10216-1/A1 with steel grade P235TR1 and P235TR2 or certified seamed steel pipe in compliance with DIN-1626, steel St 37.0, as per PN-EN 10217-2/A1 and PN-EN 10217-5/A2 from steel P235GH, PN-EN 10217-1/A1 with steel grade P235TR1 and P235TR2.

upper yield stress	235 MPa;
tensile strength	360÷500 MPa;
density	7850 kg/m ³ ;
guaranteed tightness	5 MPa

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 one cleanliness.

Pipe ends are bevelled and ready to be welded.



THERMAL (HEAT) INSULATION

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

		cyclopentane
thermal conductivity coefficient λ	w/mK	max. 0.029
minimal density	kg/m ³	60.00
radial compression strength	MPa	min. 0.30
thermal resistance	°C	152.00

CASING PIPE

Casing pipe is made in compliance with standard **PN-EN 253** from hard density polyethylene (PEHD):

density	950 kg/m ³
yield stress	min. 19 MPa;
ultimation at rupture	at least 350%;
expected life	at least 50 years

The external surface of polyethylene pipe is activated by induced electrons.

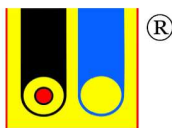
3. Pipe Insulation Moisture Detection System

System ZPU Międzyrzecz Sp. z o.o. double preinsulated pipes and fittings can be equipped with any system detecting PUR insulation moisture, that is a pulse system (Nordic), or a resistance system (Brandes), or an HDW system or any system chosen by the customer. Such a system comprises wires embedded in the insulation layer. The system signals moisture spots in any place of the pipeline.

4. General Principles of Laying Double Preinsulated Pipe in Soil

Double preinsulated pipes and fittings are laid directly in ground, in a vertical configuration of the carrier pipes, in narrow trenches on a sand subgrade at least 10 cm thick. Prior to welding steel carrier pipes, in each common joint or a heat shrinkable one, a sleeve has to be pulled on, which will protect the joint heat insulation. Once the pipes have been welded and leak tested, a heat insulation layer has to be placed and the joints have to be sealed.

A completed preinsulated pipeline is then subject to technical takeover and acceptance, and then is backfilled with sand up to 10 cm above the upper pipe surface. Both the subgrade and backfilling layers have to be compacted, so that the line is placed in uniform conditions. Once the backfilling layer has been stabilised, the remaining part is replenished with virgin soil. A minimal thickness of the covering layer is 40 cm.



5. Cross-sections of Jacket and Carrier Pipes

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

DN	D _{ext}	Steel Carrier Pipe		PEHD Jacket Pipe		PEHD Jacket Pipe	
		R-35	St-37.0	Standard insulation		Insulation Plus	
		g	g	D _{ext}	gp	D _{ext}	gp
mm	mm	mm	mm	mm	mm	mm	mm
2×20	26.9	2.6	2.9	125	3.0	140	3.0
2×25	33.7	2.6	2.9	140	3.0	160	3.0
2×32	42.4	2.6	2.9	160	3.0	180	3.0
2×40	48.3	2.6	2.9	160	3.0	180	3.0
2×50	60.3	2.9	3.2	200	3.2	225	3.4
2×65	76.1	2.9	3.2	225	3.4	250	3.6
2×80	88.9	3.2	3.6	250	3.6	280	3.9
2×100	114.3	3.6	4.0	315	4.1	355	4.5
2×125	139.7	3.6	4.0	400	4.8	450	5.2
2×150	168.3	4.0	4.5	450	5.2	500	5.6
2×200	219.1	4.5	6.3	560	6.0	630	6.6

DN – steel pipe nominal diameter; D_{ext} – external diameter, gp – wall thickness

Recommended diameters of preinsulated jacket pipes and fittings are given on further pages of the catalogue.

Tables show pipe and fitting geometric dimensions up to a diameter of DN 600.

Geometric dimensions of products exceeding nominal diameters of DN 600 are ordered individually.

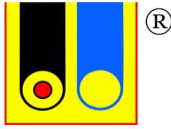
Specifications of preinsulated products should state carrier pipe steel grade (St-37.0, and P235GH seamless or seamed), type of thermal insulation, type of moisture detection embedded system or its lack, and for pipes their length and quote symbols used throughout the catalogue.

6. Quality Assurance System

System ZPU Międzyrzecz Sp. z o.o. preinsulated materials and products manufactured are presently compliant with the Integrated Quality Management System *Environment, compliant with Polish standard PN-ISO-9001:2009 and PN-EN ISO 14001:2005 – **Certificate No JS-124/4/2010** issued by the Polish Centre for Research and Certification (Polskie Centrum Badań i Certyfikacji), Warsaw.

The quality management and environment management system covers: design, development, manufacturing, supplies, service and installation of *System ZPU Międzyrzecz Sp. z o.o.* preinsulated pipes and fittings with due attention paid to environmental regulations.

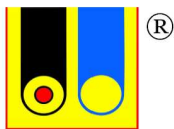
We have been awarded a certificate by the international organisation associating preinsulated product customers Euroheat & Power, Sweden No. 01/05, which confirms the compliance and quality of our products with the requirements set out by standards EN 253, EN 448 and Euroheat & Power guidelines.



7. Information on Other Products

ZPU Międzyrzecz Sp. z o.o. also supplies:

- polyethylene pipes grade PE 100 – navy blue, to be used in water mains, in diameters between \varnothing 25 and \varnothing 1200 mm, in the following diameter ranges: SDR 7.4; SDR 9, SDR 11, SDR 13.6, SDR 17, SDR 21, SDR 26, SDR 33 and SDR 41; supplied as straight units 12.5 m long (for diameters between 75 and 1200 mm), and coiled in lengths up to 200 m (for diameters between 25 and 110 mm), or in any other length as agreed with the customer;
- polyethylene pipes grade PE 100 – black, to be used in pressure sewer systems, in diameters between \varnothing 32 and \varnothing 1200 mm, in the following diameter ranges: SDR 7.4; SDR 9, SDR 11, SDR 13.6, SDR 17, SDR 21, SDR 26, SDR 33 and SDR 41; supplied as straight units 12 m long (for diameters between 75 and 1200 mm), and coiled in lengths up to 200 m (for diameters between 32 and 110 mm), or in any other length as agreed with the customer;
- polyethylene culvert pipes in diameters between \varnothing 50 and \varnothing 1200 mm, supplied in straight units 12 m long or any other lengths as agreed with the customer;
- preinsulated flex units to be used in hot water buried utilities with PEX carrier pipes;
- PE jacket pipes in diameters between \varnothing 75 and \varnothing 1200 mm;
- sleeves in diameters between 83 and 472 mm;
- heat shrinkable sleeves and crosslinked heat shrinkable sleeves and fusion welded DX couplings (to set up a coupling unit thermal insulation);
- preinsulated pipes featuring polyethylene carrier pipe (non-alloyed or alloyed) (diameters agreed with the customer);
- preinsulated pipes featuring single steel carrier pipe (non-alloyed or alloyed)
- preinsulated corrugated pipes (as per SPIRO catalogue);
- preinsulated pipes to be used in water steam pipelines;
- preinsulated flexible system DAR-FLEX for buried heat district pipelines with carrier steel pipe \varnothing 20, 25 and 28 mm.



8. Preinsulated Pipes

8.1 Straight Preinsulated Pipes

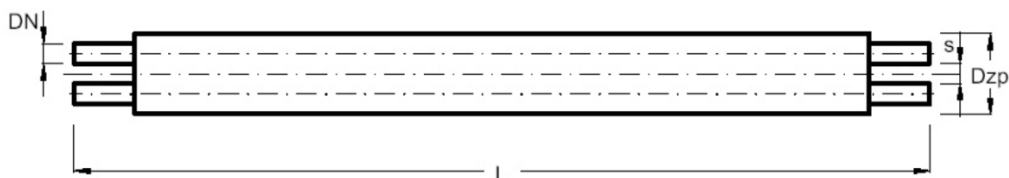
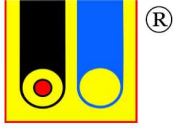


Table 1

Steel Carrier Pipe		Casing Pipe	Length	Pipe Spacing	Catalogue Reference Number
Nominal Di- ameter	External Di- ameter	External Di- ameter			
DN	Dz	Dzp	L		
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>m</i>		
2×20	26.9	125	6,12	19	II-R20+20/125
2×25	33.7	140	6,12	19	II-R25+25/140
2×32	42.4	160	6,12	19	II-R32+32/160
2×40	48.3	160	6,12	19	II-R40+40/160
2×50	60.3	200	6,12	20	II-R50+50/200
2×65	76.1	225	6,12	20	II-R65+65/225
2×80	88.9	250	6,12	25	II-R80+80/250
2×100	114.3	315	6,12	25	II-R100+100/315
2×125	139.7	400	6,12	30	II-R125+125/400
2×150	168.3	450	6,12	40	II-R150+150/450
2×200	219.1	560	6,12	45	II-R200+200/560

Note: When ordering specify steel grade (reference number P235GH, P235TR1, P235TR2).



9. Line up of Preinsulated Fittings

9.1 90° Elbow

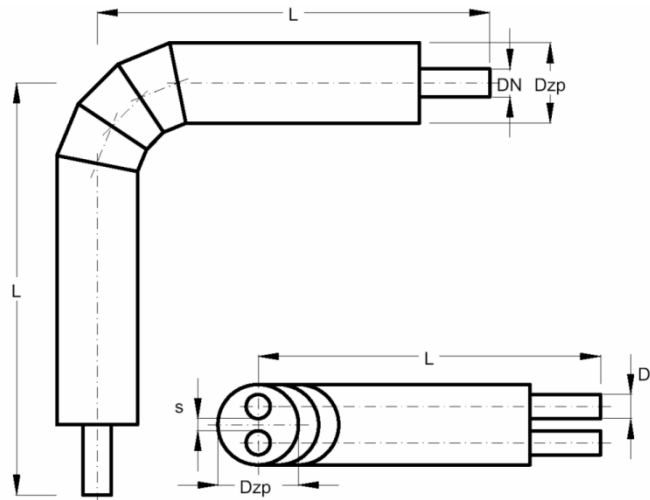


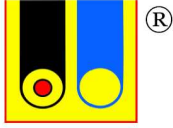
Table 2

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/90
2×25	33.7	140	1000	II-K25+25/90
2×32	42.4	160	1000	II-K32+32/90
2×40	48.3	160	1000	II-K40+40/90
2×50	60.3	200	1000	II-K50+50/90
2×65	76.1	225	1000	II-K65+65/90
2×80	88.9	250	1000	II-K80+80/90
2×100	114.3	315	1000	II-K100+100/90
2×125	139.7	400	1000	II-K125+125/90
2×150	168.3	450	1000	II-K150+150/90
2×200	219.1	560	1000	II-K200+200/90

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.2 75° Elbow

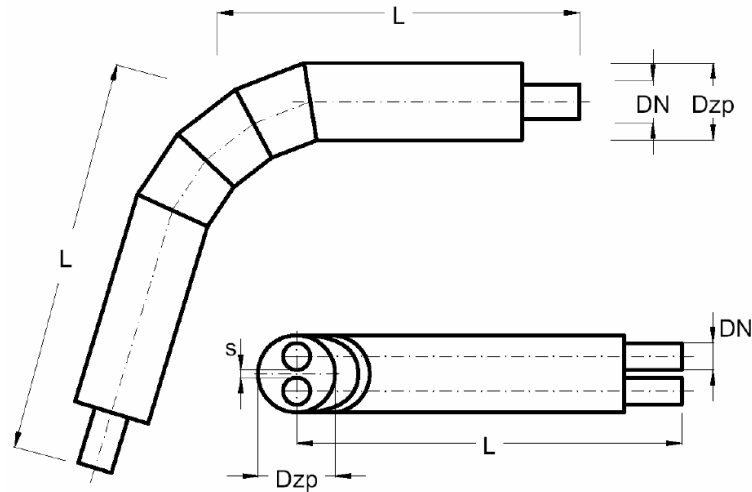


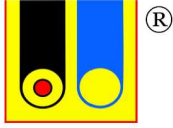
Table 3

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/75
2×25	33.7	140	1000	II-K25+25/75
2×32	42.4	160	1000	II-K32+32/75
2×40	48.3	160	1000	II-K40+40/75
2×50	60.3	200	1000	II-K50+50/75
2×65	76.1	225	1000	II-K65+65/75
2×80	88.9	250	1000	II-K80+80/75
2×100	114.3	315	1000	II-K100+100/75
2×125	139.7	400	1000	II-K125+125/75
2×150	168.3	450	1000	II-K150+150/75
2×200	219.1	560	1000	II-K200+200/75

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.3 60° Elbow

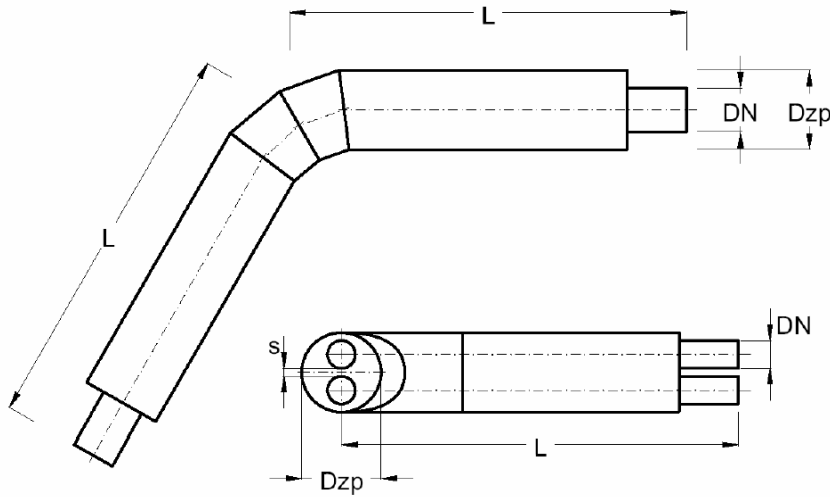


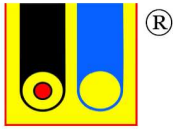
Table 4

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
mm	mm	mm	mm	
2×20	26.9	125	1000	II-K20+20/60
2×25	33.7	140	1000	II-K25+25/60
2×32	42.4	160	1000	II-K32+32/60
2×40	48.3	160	1000	II-K40+40/60
2×50	60.3	200	1000	II-K50+50/60
2×65	76.1	225	1000	II-K65+65/60
2×80	88.9	250	1000	II-K80+80/60
2×100	114.3	315	1000	II-K100+100/60
2×125	139.7	400	1000	II-K125+125/60
2×150	168.3	450	1000	II-K150+150/60
2×200	219.1	560	1000	II-K200+200/60

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.4 45° Elbow

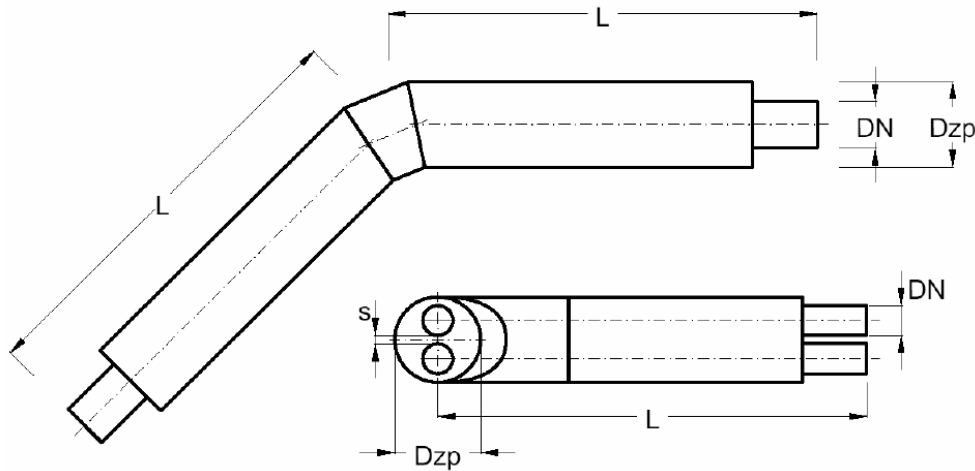


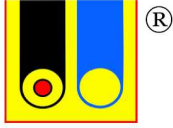
Table 5

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/45
2×25	33.7	140	1000	II-K25+25/45
2×32	42.4	160	1000	II-K32+32/45
2×40	48.3	160	1000	II-K40+40/45
2×50	60.3	200	1000	II-K50+50/45
2×65	76.1	225	1000	II-K65+65/45
2×80	88.9	250	1000	II-K80+80/45
2×100	114.3	315	1000	II-K100+100/45
2×125	139.7	400	1000	II-K125+125/45
2×150	168.3	450	1000	II-K150+150/45
2×200	219.1	560	1000	II-K200+200/45

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.5 30° Elbow

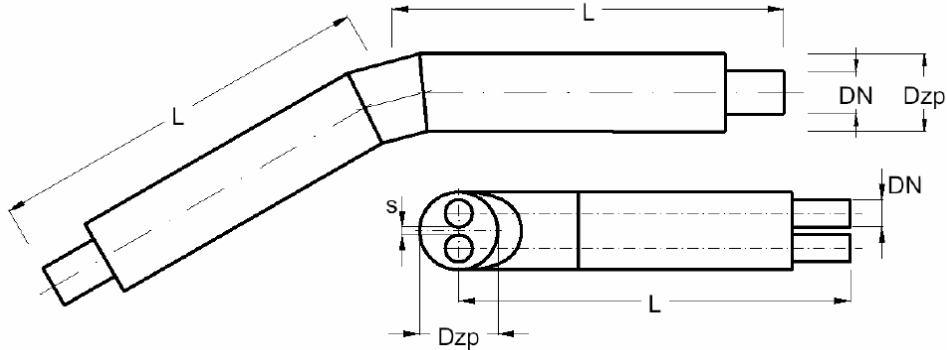


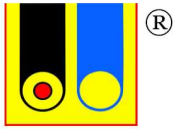
Table 6

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/30
2×25	33.7	140	1000	II-K25+25/30
2×32	42.4	160	1000	II-K32+32/30
2×40	48.3	160	1000	II-K40+40/30
2×50	60.3	200	1000	II-K50+50/30
2×65	76.1	225	1000	II-K65+65/30
2×80	88.9	250	1000	II-K80+80/30
2×100	114.3	315	1000	II-K100+100/30
2×125	139.7	400	1000	II-K125+125/30
2×150	168.3	450	1000	II-K150+150/30
2×200	219.1	560	1000	II-K200+200/30

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.6 15° Elbow

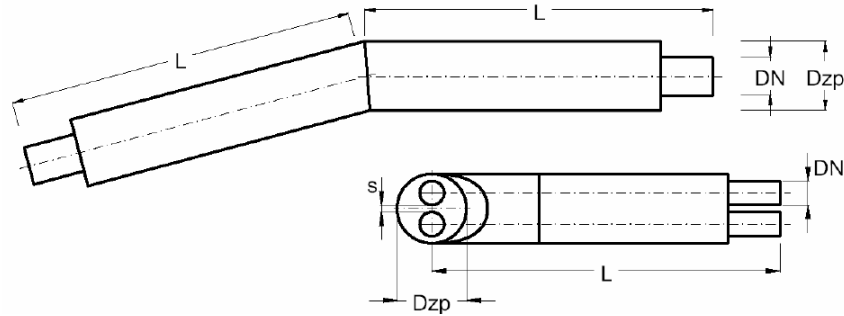


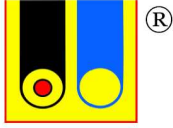
Table 7

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/15
2×25	33.7	140	1000	II-K25+25/15
2×32	42.4	160	1000	II-K32+32/15
2×40	48.3	160	1000	II-K40+40/15
2×50	60.3	200	1000	II-K50+50/15
2×65	76.1	225	1000	II-K65+65/15
2×80	88.9	250	1000	II-K80+80/15
2×100	114.3	315	1000	II-K100+100/15
2×125	139.7	400	1000	II-K125+125/15
2×150	168.3	450	1000	II-K150+150/15
2×200	219.1	560	1000	II-K200+200/15

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.7 Vertical Elbow

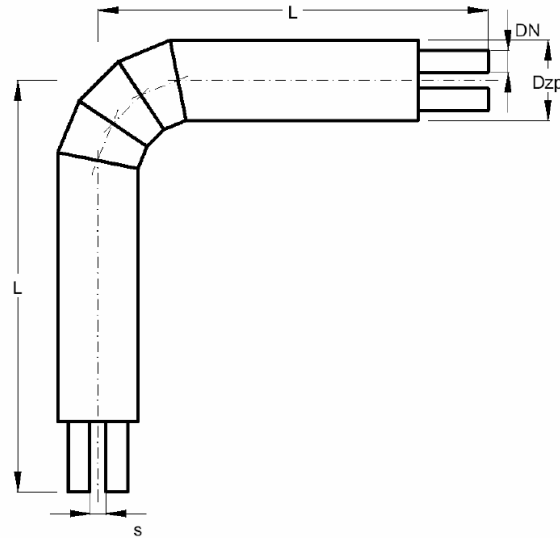


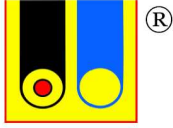
Table 8

Steel Carrier Pipe		Casing Pipe	Elbow Length	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		
DN	Dz	Dzp	A 90	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×20	26.9	125	1000	II-K20+20/P
2×25	33.7	140	1000	II-K25+25/P
2×32	42.4	160	1000	II-K32+32/P
2×40	48.3	160	1000	II-K40+40/P
2×50	60.3	200	1000	II-K50+50/P
2×65	76.1	225	1000	II-K65+65/P
2×80	88.9	250	1000	II-K80+80/P
2×100	114.3	315	1000	II-K100+100/P
2×125	139.7	400	1000	II-K125+125/P
2×150	168.3	450	1000	II-K150+150/P
2×200	219.1	560	1000	II-K200+200/P

Bend radius:

for diameters from DN 20 up to DN 40 – 3Dz

for diameters from DN 50 up to DN 200 – 2.5Dz



9.8. Preinsulated Elevated Tee

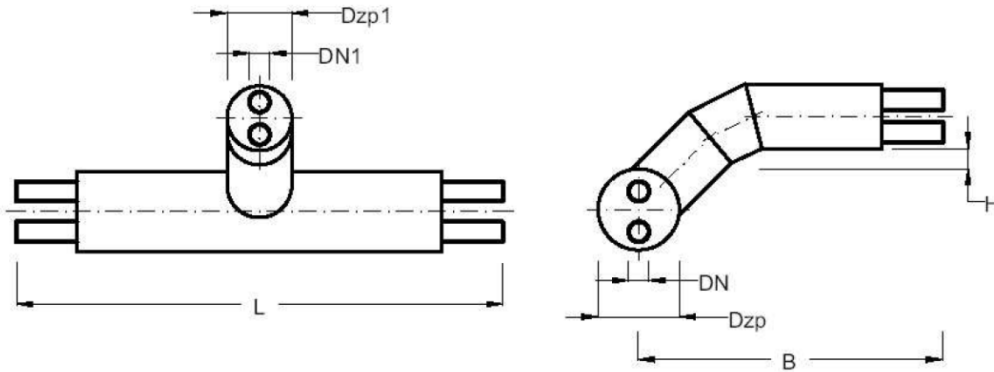
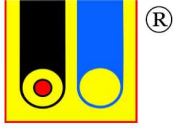


Table 9

Straight Section (pass)		Vertical Section (lateral)		Tee Length H	Dimension H	Dimension B	Catalogue Reference Number
Steel Pipe Nominal Diameter	Casing Pipe Diameter	Steel Pipe Nominal Diameter	Casing Pipe Diameter				
DN	Dzp	Dz1	Dzp1				
mm	mm	mm	mm				
2x20	125	2x20	125	1200	50	700	II-TW20/20
2x25	140	2x25	140	1200	50	700	II-TW25/25
2x32	160	2x32	160	1200	50	700	II-TW32/32
2x40	160	2x40	160	1200	50	700	II-TW40/40
2x50	200	2x50	200	1200	50	700	II-TW50/50
2x65	225	2x65	225	1200	50	900	II-TW65/65
2x80	250	2x80	250	1200	50	900	II-TW80/80
2x100	315	2x100	315	1200	50	900	II-TW100/100
2x125	400	2x125	400	1200	50	900	II-TW125/125
2x150	450	2x150	450	1200	50	900	II-TW150/150
2x200	560	2x200	560	1200	50	900	II-TW200/200



9.9. Flat preinsulated Tee

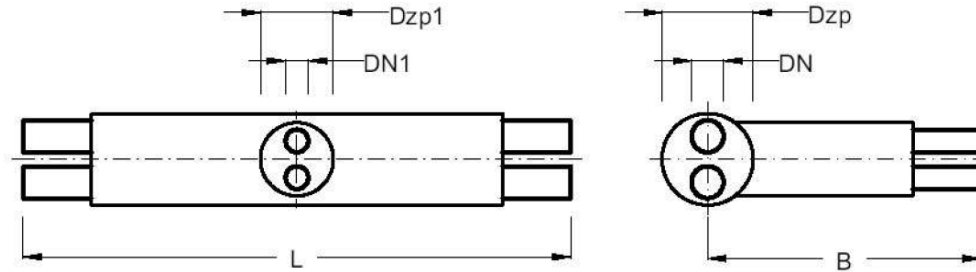
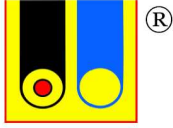


Table 10

Straight Section (pass)		Vertical Section (lateral)		Tee Length H	Dimension B	Catalogue Refer- ence Number
Steel Pipe Nominal Diame- ter	Casing Pipe Diameter	Steel Pipe Nominal Diame- ter	Casing Pipe Diameter			
DN	Dzp	Dz1	Dzp1	mm	mm	
mm	mm	mm	mm	mm	mm	
2x20	125	2x20	125	1200	700	II-TP20/20
2x25	140	2x25	140	1200	700	II-TP25/25
2x32	160	2x32	160	1200	700	II-TP32/32
2x40	160	2x40	160	1200	700	II-TP40/40
2x50	200	2x50	200	1200	700	II-TP50/50
2x65	225	2x65	225	1200	900	II-TP65/65
2x80	250	2x80	250	1200	900	II-TP80/80
2x100	315	2x100	315	1200	900	II-TP100/100
2x125	400	2x125	400	1200	900	II-TP125/125
2x150	450	2x150	450	1200	900	II-TP150/150
2x200	560	2x200	560	1200	900	II-TP200/200



9.10 Double reducer

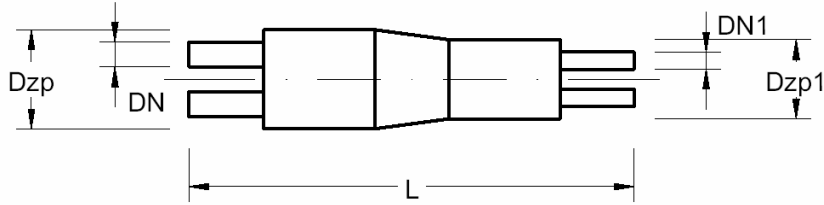
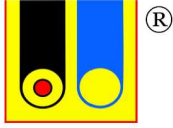


Table 11

Pass Pipe		Reducer		Reducer Length H	Catalogue Reference Number
Steel Pipe Nominal Diame- ter	Casing Pipe External Diame- ter	Steel Pipe Nominal Diame- ter	Casing Pipe External Diameter		
DN	Dzp	Dz1	Dzp1		
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	
2×25	140	2×20	125	1000	II-Z25/20
2×32	160	2×25	140	1000	II-Z32/25
2×40	160	2×32	160	1000	II-Z40/32
2×50	200	2×40	160	1000	II-Z50/40
2×65	225	2×50	200	1000	II-Z65/50
2×80	250	2×65	225	1000	II-Z80/65
2×100	315	2×80	250	1000	II-Z100/80
2×125	400	2×100	315	1000	II-Z125/100
2×150	450	2×125	400	1000	II-Z150/125
2×200	560	2×150	450	1000	II-Z200/150



9.11 Wye transition fitting

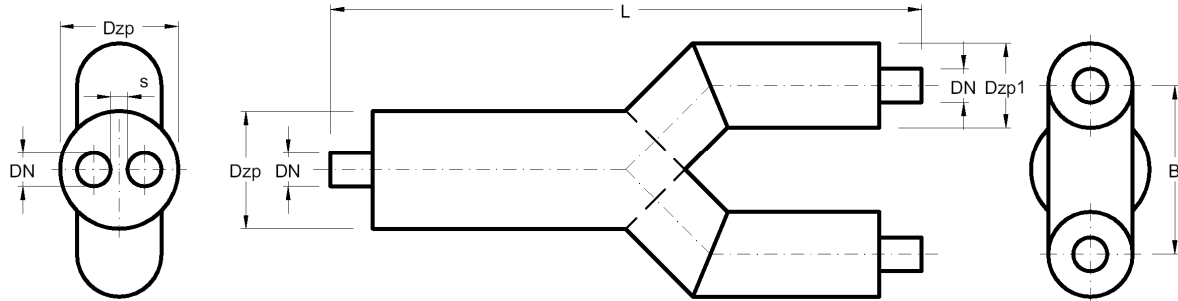
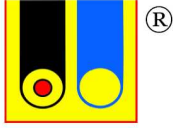


Table 12

Pass Pipe			Single Pipes			Length	Catalogue Reference Number
Steel Pipe Nominal Diameter	Casing Pipe Diameter	Spacing between Carrier Pipes	Steel Pipe Nominal Diameter	Casing Pipe External Diameter	Spacing between Pipes		
DN	Dzp	s	DN	Dzp1	B	L	
mm	mm		mm	mm		mm	
2×20	125	19	20	75	240	2000	KY-2×20/20
2×25	140	19	25	90	240	2000	KY-2×25/25
2×32	160	19	32	110	260	2000	KY-2×32/32
2×40	160	19	40	110	260	2000	KY-2×40/40
2×50	200	20	50	125	280	2000	KY-2×50/50
2×65	225	20	65	140	290	2000	KY-2×65/65
2×80	250	25	80	160	310	2000	KY-2×80/80
2×100	315	25	100	200	350	2000	KY-2×100/100
2×125	400	30	125	225	380	2000	KY-2×125/125
2×150	450	40	150	250	400	2000	KY-2×150/150
2×200	560	45	200	315	480	2000	KY-2×200/200



9.12 Double Anchor Point

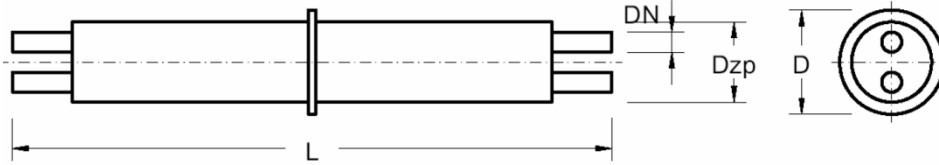
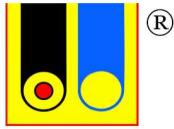


Table 13

Carrier Pipe Nominal Diameter	Spacing between Pipes	Casing Pipe Diameter	Ring Diameter	Length	Catalogue Refer- ence Number
DN	s	Dzp	D	L	
[mm]	[mm]	[mm]	[mm]	[mm]	
2×20	19	125	170	2000	II-PS20
2×25	19	140	200	2000	II-PS25
2×32	19	160	220	2000	II-PS32
2×40	19	160	220	2000	II-PS40
2×50	20	200	260	2000	II-PS50
2×65	20	225	300	2000	II-PS65
2×80	25	250	320	2000	II-PS80
2×100	25	315	400	2000	II-PS100
2×125	30	400	500	2000	II-PS125
2×150	40	450	560	2000	II-PS150
2×200	45	560	680	2000	II-PS200



10. Preinsulated Steel Fittings and Fixtures

10.1 Double Cut-off Valve

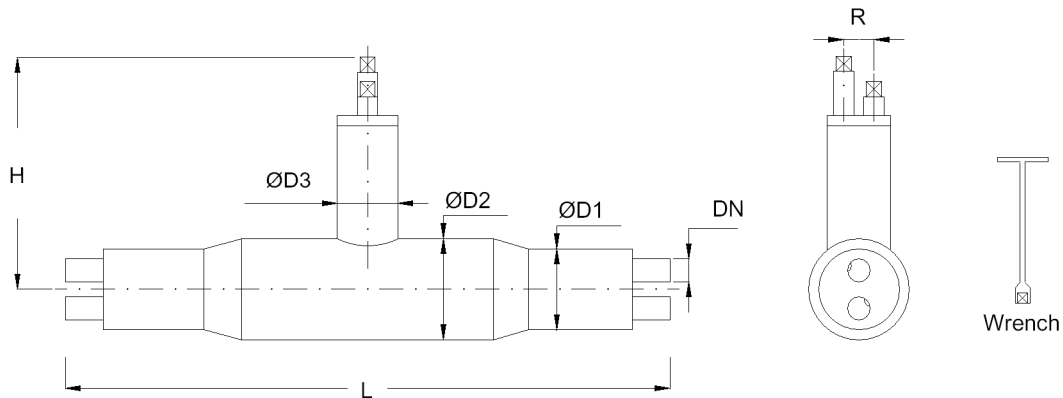
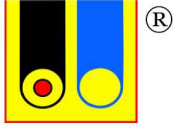


Table 14

Steel Carrier Pipe		Casing Pipe Diameter			Spacing between Pipes	Spacing between Valves	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter	D1	D2	D3	s	R	H	L	
DN	DZ	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2x20	26,9	125	140	110	19	50	505	1400	II-ZK20
2x25	33,7	140	140	110	19	50	505	1400	II-ZK25
2x32	42,4	160	200	140	19	65	495	1500	II-ZK32
2x40	48,3	160	200	160	19	80	505	1700	II-ZK40
2x50	60,3	200	225	160	20	80	525	1800	II-ZK50
2x65	76,1	225	250	200	20	105	530	1800	II-ZK65
2x80	88,9	250	315	225	25	120	545	1900	II-ZK80
2x100	114,3	315	400	250	25	140	570	2200	II-ZK100
2x125	139,7	400	450	250	30	155	600	2300	II-ZK125
2x150	168,3	450	500	400	40	200	625	2500	II-ZK150
2x200	219,1	560	630	400	45	230	670	2700	II-ZK200



10.2 Vent Ball Valve

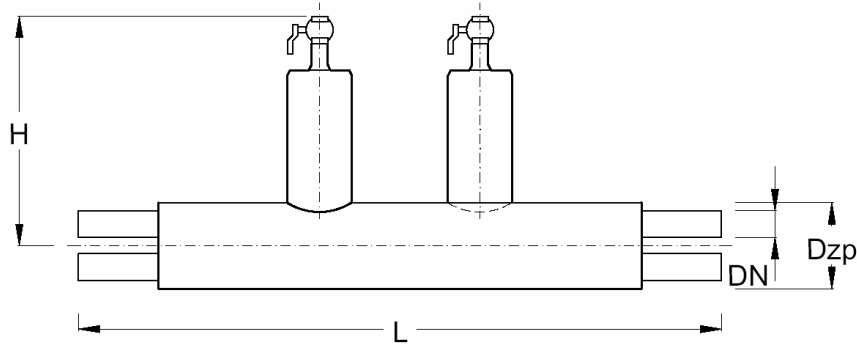
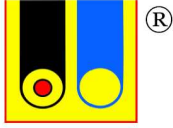


Table 15

Steel Carrier Pipe		Casing Pipe Diameter	Spacing between Pipes	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter					
DN	DZ	Dzp	s	B	L	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2×25	33.7	140	19	384	1200	II-ZD25
2×32	42.4	160	19	388	1200	II-ZD32
2×40	48.3	160	19	403	1200	II-ZD40
2×50	60.3	200	20	410	1200	II-ZD50
2×65	76.1	225	20	414	1200	II-ZD65
2×80	88.9	250	25	427	1200	II-ZD80
2×100	114.3	315	25	450	1500	II-ZD100
2×125	139.7	400	30	455	1500	II-ZD125
2×150	168.3	450	40	457	1500	II-ZD150
2×200	219.1	560	45	515	1500	II-ZD200



10.3 Double Strain Ball Valve

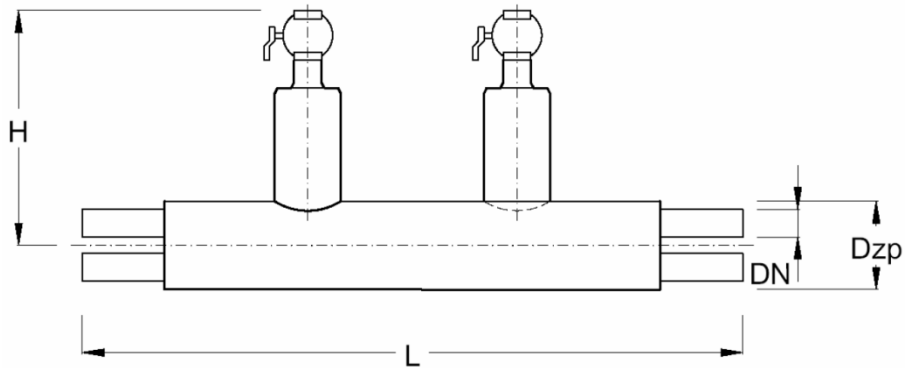
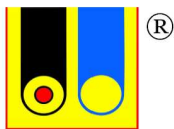


Table 16

Steel Carrier Pipe		Casing Pipe Diameter	Spacing between Pipes	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter					
DN	DZ	Dzp	s	B	L	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2×40	48.3	160	19	403	1200	II-ZO40
2×50	60.3	200	20	410	1200	II-ZO50
2×65	76.1	225	20	414	1200	II-ZO65
2×80	88.9	250	25	427	1200	II-ZO80
2×100	114.3	315	25	450	1500	II-ZO100
2×125	139.7	400	30	455	1500	II-ZO125
2×150	168.3	450	40	457	1500	II-ZO150
2×200	219.1	560	45	515	1500	II-ZO200



10.4 Double Cut-off Valve with Vent Ball Valve

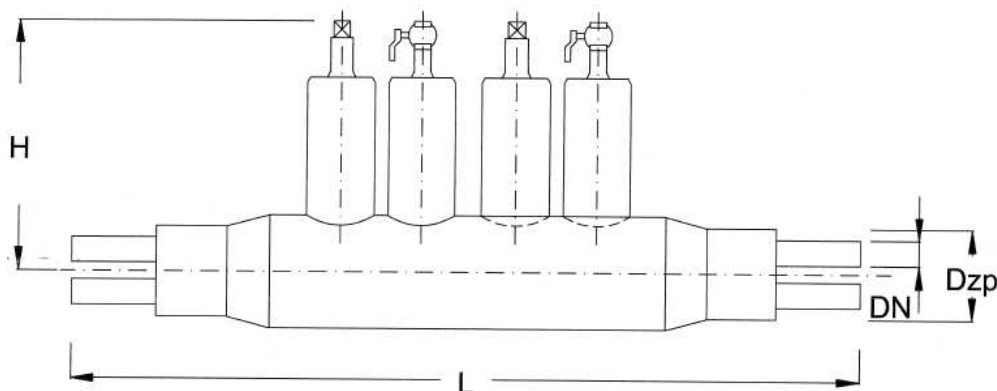
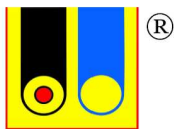


Table 17

Steel Carrier Pipe		Casing Pipe Diameter	Spacing between Pipes	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter					
DN	DZ	Dzp	s	H	L	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2x25	33,7	140	19	384	1800	II-ZKD25
2x32	42,4	160	19	388	1800	II-ZKD32
2x40	48,3	160	19	403	1800	II-ZKD40
2x50	60,3	200	20	410	1800	II-ZKD50
2x65	76,1	225	20	414	1800	II-ZKD65
2x80	88,9	250	25	427	1800	II-ZKD80
2x100	114,3	315	25	450	2100	II-ZKD100
2x125	139,7	400	30	455	2100	II-ZKD125
2x150	168,3	450	40	457	2100	II-ZKD150
2x200	219,1	560	45	515	2100	II-ZKD200



10.5 Double Cut-off Valve with Strain Ball Valve

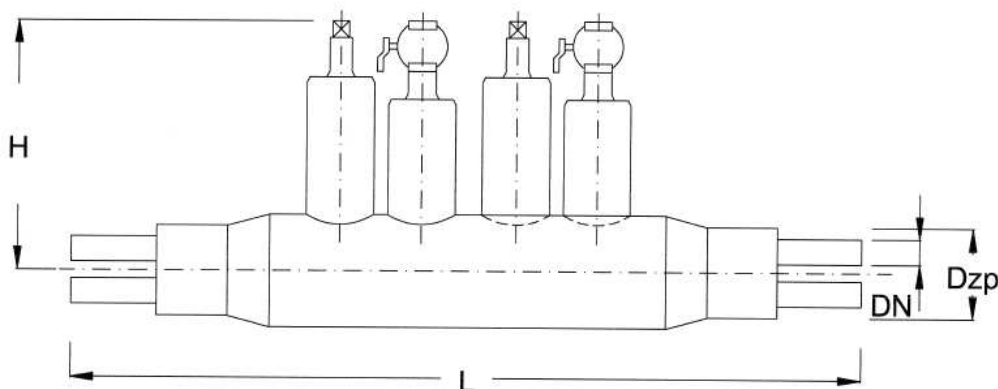
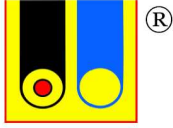


Table 18

Steel Carrier Pipe		Casing Pipe Diameter	Spacing between Pipes	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter					
DN	DZ	Dzp	s	H	L	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2x32	42,4	160	19	388	1800	II-ZKO32
2x40	48,3	160	19	403	1800	II-ZKO40
2x50	60,3	200	20	410	1800	II-ZKO50
2x65	76,1	225	20	414	1800	II-ZKO65
2x80	88,9	250	25	427	1800	II-ZKO80
2x100	114,3	315	25	450	2100	II-ZKO100
2x125	139,7	400	30	455	2100	II-ZKO125
2x150	168,3	450	40	457	2100	II-ZKO150
2x200	219,1	560	45	515	2100	II-ZKO200



10.6 Double Cut-off Valve with Vent and Strain Ball Valves

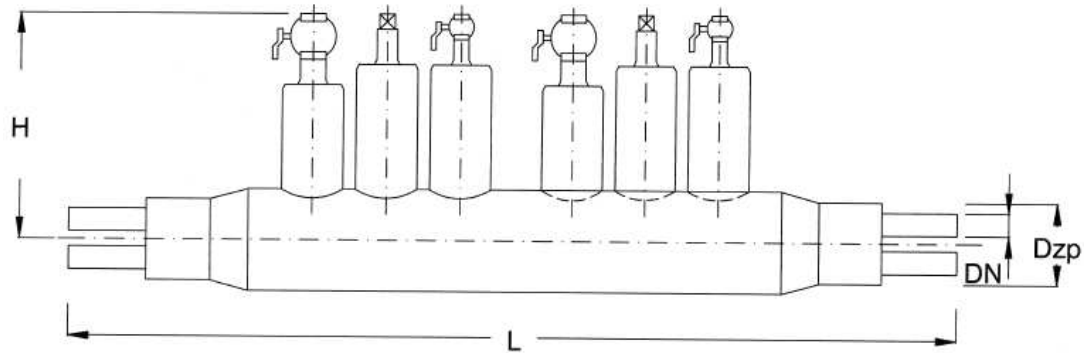
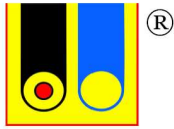


Table 19

Steel Carrier Pipe		Casing Pipe Diameter	Spacing between Pipes	Height	Length	Catalogue Reference Number
Nominal Diameter	External Diameter					
DN	DZ	Dzp	s	H	L	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
2x40	48,3	160	19	403	2400	II-ZKOD40
2x50	60,3	200	20	410	2400	II-ZKOD50
2x65	76,1	225	20	414	2400	II-ZKOD65
2x80	88,9	250	25	427	2400	II-ZKOD80
2x100	114,3	315	25	450	2700	II-ZKOD100
2x125	139,7	400	30	455	2700	II-ZKOD125
2x150	168,3	450	40	457	2700	II-ZKOD150
2x200	219,1	560	45	515	2700	II-ZKOD200



11. Coupling Unit

11.1 Common Coupling

(HPDE sleeve sealed with heat shrinkable tape)

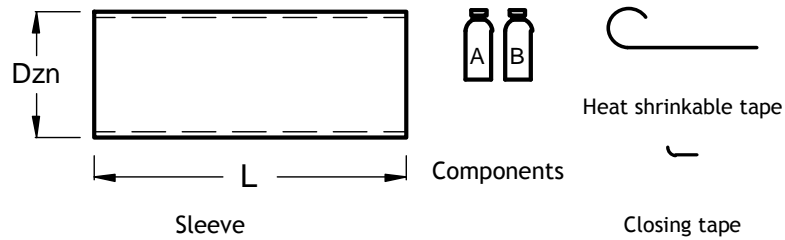
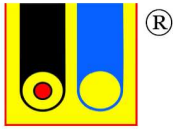


Table 20

Nominal Diameter	Casing Pipe External Diameter	Sleeve External Diameter	Length	Components		Heat Shrinkable Tape	Closing tape	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	A	B			
mm	mm	mm	mm	g	g	cm	cm	
2×20	125	136	600	121	198	105	30	II-N-20/136
2×25	140	153	600	149	244	114	30	II-N-25/153
2×32	160	174	600	192	313	129	30	II-N-32/174
2×40	160	174	600	181	296	129	30	II-N-40/174
2×50	200	216	600	156	254	155	30	II-N-50/216
2×65	225	243	600	344	561	171	30	II-N-65/243
2×80	250	269	600	412	672	187	30	II-N-80/269
2×100	315	338	600	649	1059	233	30	II-N-100/338
2×125	400	428	600	1083	1766	288	30	II-N-125/428
2×150	450	472	600	1305	2127	320	30	II-N-150/472



11.2 Common Coupling

(HPDE sleeve sealed with heat shrinkable tape)

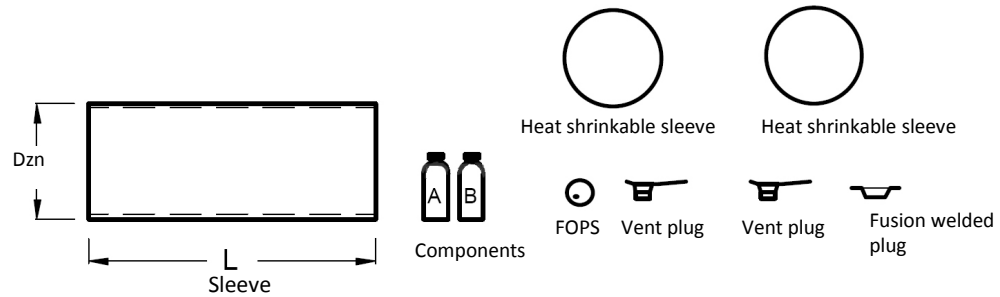
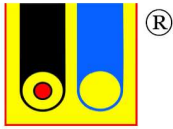


Table 21

Nominal Diameter	Casing Pipe External Diameter	Sleeve External Diameter	Length	Components		Heat Shrinkable Sleeve	Plug + FOPS	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	g	g	pc	set	
2×20	125	143	600	121	198	2	2	II-NT-20/143
2×25	140	156	600	149	244	2	2	II-NT-25/156
2×32	160	178	600	192	313	2	2	II-NT-32/178
2×40	160	178	600	181	296	2	2	II-NT-40/178
2×50	200	224	600	156	254	2	2	II-NT-50/224
2×65	225	255	600	344	561	2	2	II-NT-65/255
2×80	250	278	600	412	672	2	2	II-NT-80/278
2×100	315	341	600	649	1059	2	2	II-NT-100/341
2×125	400	430	600	1083	1766	2	2	II-NT-125/430
2×150	450	480	600	1305	2127	2	2	II-NT-150/480
2×200	560	590	600	1952	3182	2	2	II-NT-200/590



**11.3 Heat shrinkable coupling fusion welded
 (HPDE sleeve fusion welded)**

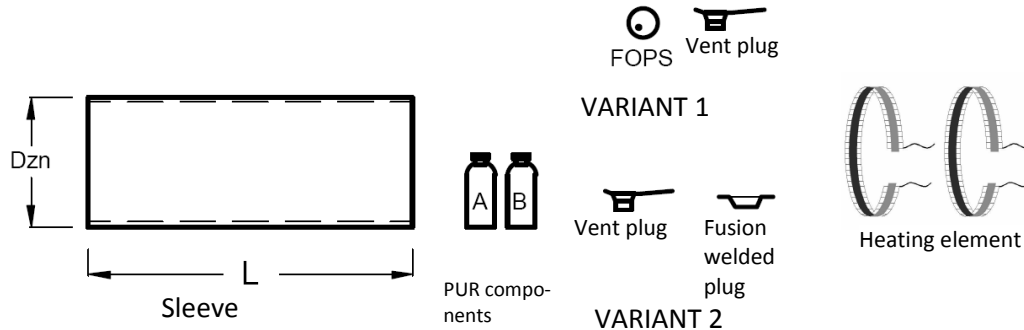
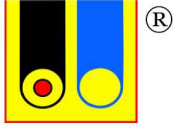


Table 22

Nominal Diameter	Casing Pipe External Diameter	Sleeve External Diameter	Length	Components		Heating Element	Variant 1 or Variant 2	Catalogue Reference Number
				A	B			
DN	Dzp	Dzn	L	A	B			
mm	mm	mm	mm	g	g	pc	set	
2×20	125	143	600	121	198	2	2	II-DT-20/143
2×25	140	156	600	149	244	2	2	II-DT-25/156
2×32	160	178	600	192	313	2	2	II-DT-32/178
2×40	160	178	600	181	296	2	2	II-DT-40/178
2×50	200	224	600	156	254	2	2	II-DT-50/224
2×65	225	255	600	344	561	2	2	II-DT-65/255
2×80	250	278	600	412	672	2	2	II-DT-80/278
2×100	315	341	600	649	1059	2	2	II-DT-100/341
2×125	400	430	600	1083	1766	2	2	II-DT-125/430
2×150	450	480	600	1305	2127	2	2	II-DT-150/480
2×200	560	590	600	1952	3182	2	2	II-DT-200/590



11.4 PeX Crosslinked heat shrinkable coupling
(Crosslinked HPDE sleeve)

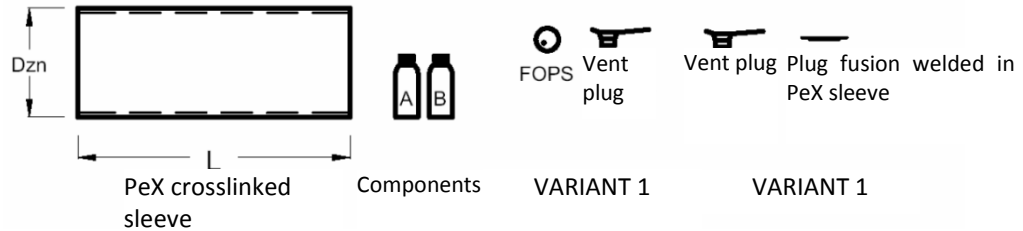
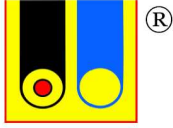


Table 23

Nominal Diameter	Casing Pipe External Diameter	Sleeve External Diameter	Length	Components		Variant 1 or Variant 2	Catalogue Reference Number
				A	B		
DN	Dzp	Dzn	L	g	g	set	
2x20	125	143	600	121	198	2	II-TS-20/143
2x25	140	156	600	149	244	2	II-TS-25/156
2x32	160	178	600	192	313	2	II-TS-32/178
2x40	160	178	600	181	296	2	II-TS-40/178
2x50	200	224	600	156	254	2	II-TS-50/224
2x65	225	255	600	344	561	2	II-TS-65/255
2x80	250	278	600	412	672	2	II-TS-80/250
2x100	315	341	600	649	1059	2	II-TS-100/341
2x125	400	430	600	1083	1766	2	II-TS-125/430
2x150	450	480	600	1305	2127	2	II-TS-150/480



11.5 Fusion welded DX coupling

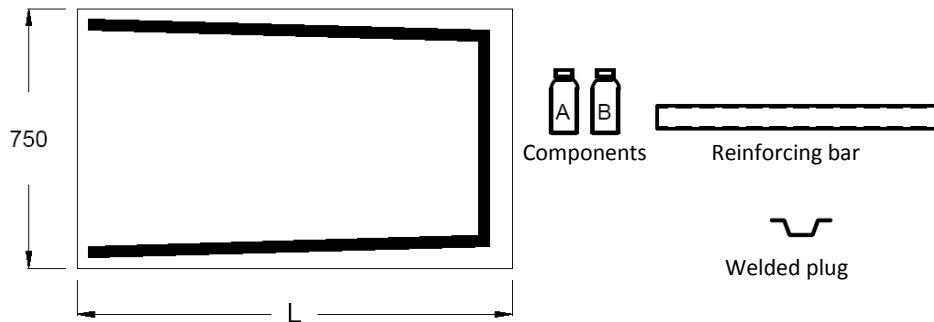
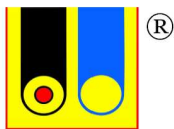


Table 24

Nominal Diameter	Casing Pipe External Diameter	Plate Length	Components		Plug	Catalogue Reference Number
			A	B		
DN	Dzp	L	A	B	pc	
mm	mm	mm	g	g		
2×32	160	690	192	313	2	II-DX-160/750
2×40	160	690	181	296	2	II-DX-160/750
2×50	200	820	156	254	2	II-DX-200/750
2×65	225	900	344	561	2	II-DX-225/750
2×80	250	990	412	672	2	II-DX-250/750
2×100	315	1230	649	1059	2	II-DX-315/750
2×125	400	1500	1083	1766	2	II-DX-400/750
2×150	450	1660	1305	2127	2	II-DX-450/750
2×200	560	2000	1952	3182	2	II-DX-560/750



12. Insulation and Pipeline Closing

12.1 Pipeline Closing – End Sleeve

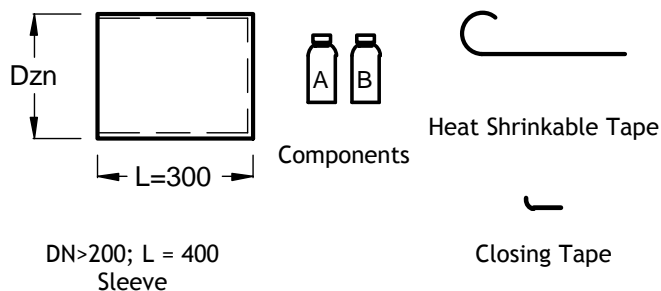
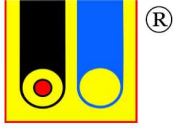


Table 25

Nominal Diameter	Casing Pipe External Diameter	Sleeve External Diameter	Components		Heating Element	Variant 1 or Variant 2	Catalogue Reference Number
			A	B			
DN	Dzp	Dzn	g	g	pc	set	
mm	mm	mm	g	g	pc	set	
2×20	125	143	61	99	52	15	II-NK-20/143
2×25	140	156	75	122	56	15	II-NK-25/156
2×32	160	178	96	157	64	15	II-NK-32/178
2×40	160	178	91	148	64	15	II-NK-40/178
2×50	200	224	78	127	76	15	II-NK-50/224
2×65	225	255	172	281	86	15	II-NK-65/255
2×80	250	278	206	336	94	15	II-NK-80/278
2×100	315	341	325	530	115	22	II-NK-100/341
2×125	400	430	542	883	145	22	II-NK-125/430
2×150	450	480	653	1064	161	22	II-NK-150/480
2×200	560	590	976	1591	196	30	II-NK-200/590



12.2 End Cap – Heat Shrinkable Sleeve

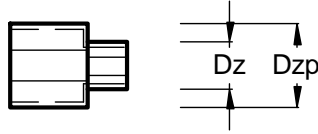


Table 26

Jacket Pipe Nominal Diameter	Catalogue Reference Number
125	E-125/2
140	E-140/2
160	E-160/2
200	E-200/2
225	E-225/2
250	E-250/2
315	E-315/2
400	E-400/2
450	E-450/2
500	E-500/2
520	E-520/2
560	E-560/2

13. Warning Tape

To be placed above a pipeline. Supplied in coils in 100 m multiple lengths. Carries a wording “**WARNING! HEAT TRANSMITING PIPE**” and a *ZPU Międzyrzecz Sp. z o. o.* logo.

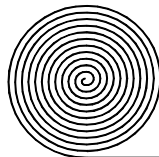
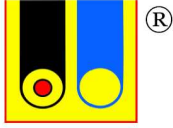


Table 27

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



14. Rubber Ring

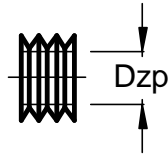
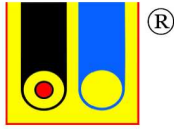


Table 28

Jacket Pipe Nominal Diameter	Catalogue Reference Number
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
520	P-520
560	P-560



15. Technical Information

The application of preinsulated pipe and fittings has been specified in general above, whilst details referring to design, execution and takeover of networks are presented in:

1. Guidelines Static and Design Calculations
ZPU Międzyrzecz Sp. z o. o. System
2. Manual Detection of Pipe Leaks Connection of Pulse Monitoring System in Thermal Utilities
ZPU Międzyrzecz Sp. z o. o. System
3. Manual Manual of Execution and take Over
ZPU Międzyrzecz Sp. z o. o. System
4. Manual Joint Unit Assembly Insulation and Sealing
ZPU Międzyrzecz Sp. z o. o. System
5. Manual Manual of Steel Pipe Welding
ZPU Międzyrzecz Sp. z o. o. System
6. Manual Steel Pipe Connection Welding Quality Inspection
ZPU Międzyrzecz Sp. z o. o. System
7. Manual DX Joints electrically welded
ZPU Międzyrzecz Sp. z o. o. System
8. Manual DT Type Heat Shrinkable Joints Electrically Welded
ZPU Międzyrzecz Sp. z o. o. System

Note: We convert free of charge heat system specifications so that they could meet the requirements of the *ZPU Międzyrzecz Sp. z o. o. System* technology solutions.

16. Trade Information

Manufacturer and Seller:

ZAKŁAD PRODUKCYJNO USŁUGOWY
Międzyrzecz
POLSKIE RURY PREIZOLOWANE Sp. z o. o.,
ul. Zakaszewskiego 4
66-300 Międzyrzecz,

Phones:

Fax +095 742 33 01, 742 33 02

Secretary: +095 742 33 00, 742 00 93, 741 25 26,

Trade Service: +095 742 33 23, 742 33 38

Supplies: +095 742 33 56, 742 33 46

e-mail: zpu@zpum.pl www.zpum.pl

When placing orders please specify carrier pipe steel grade (St 37.0, or P235GH), type of heat insulation, type of polyurethane embedded moisture detection system or its lack, and for pipes specify their length and quote Catalogue Reference Number. If products are to be made-to-order, dimensions have to be agreed separately.