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ZPU MIĘDZYRZECZ Sp. z o.o. PREINSULATED PIPE SYSTEM TYPE SPIRO

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TABLE OF CONTENTS

1.	GENERAL INFORMATION ON APPLICATION OF ZPU MIĘDZYRZECZ SP. Z O.O. PREINSULATED TUBES AND FITTINGS - TYPE SPIRO	1
2.	PROPERTIES OF MATERIALS USED IN PREINSULATED PIPES AND FITTINGS BY ZPU MIĘDZYRZECZ SP. Z O.O. SYSTEM - TYPE SPIRO	1
3	PIPELINE LEAKAGE DETECTION SYSTEM	2
4	GENERAL PRINCIPLES OF CONSTRUCTING PREINSULATED OVERHEAD PIPELINES.	2
5	QUALITY ASSURANCE SYSTEM	2
6	CROSS-SECTION OF JACKET AND CARRIER PIPES - TYPE SPIRO	3
7.	SPECIFICATION OF PREINSULATED PIPES - TYPE SPIRO	4
8	SPECIFICATION OF PREINSULATED FITTINGS - TYPE SPIRO	5
8.1	90° Elbow	5
8.2	60° Elbow	6
8.3	30° Elbow	7
8.4	Flat Tee	8
8.5	Elevated Tee.....	9
8.6	Parallel Tee.....	10
8.7	Strainer Tee	11
8.8	Vent Tee.....	12
8.9	Reducing Pipe	13
8.10	Fixed point	14
8.11	Shutoff Ball Valve.....	15
8.12	Vent ball valve	16
8.13	Drain ball valve	17
8.14	Shutoff ball valve and vent valve assembly.....	18
8.15	Shutoff ball valve and vent valve assembly.....	19
8.16	Drain and vent shutoff ball valve	20
8.17	Longitudinal compensator.....	21
8.17.1	Single bellow longitudinal compensator operating under a nominal pressure of 1,6 MPa.....	21
8.17.2	Single bellow longitudinal compensator operating under a nominal pressure of 2,5 MPa.....	22
8.18	Mains Cold Inset - SPIRO	23
9	FULCRUMS OF PIPELINE	24
9.1	Removable Sliding Support.....	24
9.2	Removable Roller Support.....	25

9.3 Removable Pipe Hanger 26

10 COUPLING UNIT 27

11 INSULATION AND PIPELINE CLOSING 28

11.1 Pipeline Closing - End Sleeve 28

12 ADDITIONAL INFORMATION 29

13 TRADE INFORMATION 29



1. General information on Application of ZPU Międzyrzecz Sp. z o.o. Preinsulated Tubes and Fittings - Type SPIRO

Preinsulated tubes and fittings by *ZPU Międzyrzecz Sp. z o. o. system* - type SPIRO are to be used:

- in construction of thermal distribution networks,
- in transmission of heating medium of a constant working temperature of 152⁰C at a working pressure of 2,5 Mpa.
- in transmission of hot water or other media used for process or construction purposes.

Preinsulated tubes and fittings by ZPU Międzyrzecz Sp. z o.o.- type SPIRO are composed of a steel line tube coaxial fitted in a casing pipe made of zinc coated sheet or aluminium sheet spiral screwed -SPIRO and a layer of thermal insulation, made of rigid polyurethane foam (PUR) filling up the space between the pipes.

The ends of preinsulated pipes and fittings by ZPU Międzyrzecz Sp. z o.o. - type SPIRO are not insulated over a length of 150 mm +20mm at diameters up to DN 200 and over the length of 200 mm +30mm for diameters DN 250 and more.

The suitability of the construction element referred to as ZPU Międzyrzecz Sp. z o.o. *Preinsulated Pipe, fittings, bellow adapters and steel fixtures of ZPU Międzyrzecz Sp. z o.o. SPIRO-type for ground utilities* is confirmed by National Technical Assessment ITB-KOT-2020/1505 edition 1, issued by the Building Research Institute ITB, Warsaw; expiring on 22 September 2025.

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

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 with steel grade P235TR1 and P235TR2.

If these pipes are to be used in the transmission of potable hot water, then seamless pipe is to be used, manufactured in compliance with steel grade St 37.0 in accordance with DIN 1629, for pipes from steel grade P235GH per PN-EN 10216-2, P235TR1/P235TR2 according to PN-EN 10216-1/A1 and galvanised in accordance with PE-EN 10240, PN-EN 1461, PN-EN 1179.

Properties of Carrier Pipe:

– 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) homogenously filling the space between the pipes over the total length and compliance with standard **PN-EN 253**.

- thermal conductivity coefficient	- W/mK	max. 0,029
- core density min,	- kg/m ³	min. 55
- radial compression strength	- MPa	min. 0,3
- thermal resistance	-°C	max 165 (depending on PUR system used)

CASING PIPE - TYPE SPIRO

The casing pipe is made of galvanized sheet metal according to PN-EN 10346 or of aluminum sheet metal according to PN-EN 485-4, PN-EN 485-2, PN-EN 485-1.

On the surface of galvanized sheet metal, as a result of the impact of atmospheric air and contact with moisture, natural discoloration or white spots, so-called "white rust", may appear. The white coating does not deteriorate the quality of the protective zinc layer in any way, it only affects its aesthetics. Discoloration of galvanized sheet metal as well as white coating on the surface are natural phenomena and as such are not subject to complaint.

More information can be obtained from the Technical Office of ZPU Międzyrzecz Sp. z o.o. by sending questions to zpu@zpum.pl.

3 Pipeline Leakage Detection System

Preinsulated pipes and fittings of the ZPU Międzyrzecz Sp. z o.o. system - type SPIRO can be equipped with a pipeline leak detection system. The installation consists of two or more (depending on the customer's requirements) pipes built into the thermal insulation layer. This system signals the moisture of the pipeline along its entire length.

4 General Principles of Constructing Preinsulated Overhead Pipelines.

Preinsulated pipes and fittings of the ZPU Międzyrzecz Sp. z o.o. system - type SPIRO, after fixing in sliding or roller supports, are placed on previously made support structures. In the case of suspending the pipeline, movable suspensions with tension rods should be used. Before welding the steel carrier pipes, a sleeve made of galvanized or aluminum sheet should be inserted onto the casing pipe at each joint. After welding the carrier pipes and performing tightness tests, thermal insulation and airtight sealing of the joints should be performed.

5 Quality Assurance System

The production, supply, installation and service of pre-insulated pipes and fittings ZPU Międzyrzecz Sp. z o.o. for above-ground heating networks is covered by an integrated Environmental Quality management system that meets the requirements of the PN - EN ISO 9001:2015-10, PN-ISO 45001:2018-06 and PN - EN ISO 14001:2015-09 standards. Confirmation of compliance with the requirements contained in the above standards is the granting by the Polish Center for Testing and Certification S.A. in Warsaw of the INTEGRATED MANAGEMENT SYSTEM CERTIFICATE No. JBS-244/3/2022 with a validity period until 01.12.2025.

Since May 23, 2007, we have had a certificate issued by the international organization dealing with heating matters Euroheat & Power from Sweden No. 01/05, which confirms the compliance and quality of our pre-insulated products with the requirements of EN 253, EN 448 and Euroheat & Power guidelines. We also have the CSTB QB -09-2280_V1 Certificate confirming compliance with the quality requirements for pre-insulated products.



6 Cross-section of Jacket and Carrier Pipes - type SPIRO

The production program of pre-insulated pipes and fittings ZPU Międzyrzecz Sp. z o.o. - type SPIRO, covers the following diameter range:

- carrier pipe up to DN 1000;
- casing pipe up to DN 1250;

The tables provide standard dimensions of the products. After consultation with the Customer (under justified conditions), pre-insulated products can be made in other dimensions.

Steel Carrier Pipe				Jacket Pipe TYPE SPIRO		Jacket Pipe TYPE SPIRO	
DN	Dz	seamless	welded	Standard insulation		Plus insulation	
		g	g	Dzs	min. gs	Dzs	min. gs
mm	mm	mm	mm	mm	mm	mm	mm
20	26,9	2,9	2,6	125 (100)**	0,6	125 (110)**	0,6
25	33,7	2,9	2,6	125 (100)**	0,6	125(110)**	0,6
32	42,4	2,9	2,6	125 (100,110)**	0,6	140 (125)**	0,6
40	48,3	2,9	2,6	125 (100,110)**	0,6	140 (125)**	0,6
50	60,3	3,2	2,9	125	0,6	140	0,6
65	76,1	3,2	2,9	140	0,6	160	0,6
80	88,9	3,6	3,2	160	0,6	200	0,6
100	114,3	4,0	3,6	200	0,6	224	0,6
125	139,7	4,0	3,6	224	0,6	250	0,6
150	168,3	4,5	4,0	250	0,6	315	0,6
200	219,1	6,3	4,5	315	0,6	400	0,8
250	273,0	7,1	5,0	400	0,8	450	0,8
300	323,9	7,1	5,6	450	0,8	500	0,8
350	355,6	8,0	5,6	500	0,8	560	0,8
400	406,4	8,8	6,3	560	0,8	630	0,8
450	457,0	10,0	6,3	560	0,8	630	0,8
500	508,0	11,0	6,3	630	0,8	710	1,0
600	610,0	-	7,1	800	1,0	-	-
700	711,0	-	8,0	900	1,0	-	-
800	813,0	-	8,8	1000	1,0	-	-
900	914,0	-	10,0	1120	1,0	-	-
1000	1016,0	-	11,0	1250	1,0	-	-

** possibility of implementation determined individually

- DN - steel pipe nominal diameter;
- Dz - steel pipe external diameter;
- Dzs - jacket pipe SPIRO external diameter;
- g ; gs - wall thickness;

The tables provide standard dimensions of products.

After consultation with the Customer (under justified conditions), pre-insulated products can be made in other dimensions.



7. Specification of Preinsulated Pipes - Type SPIRO

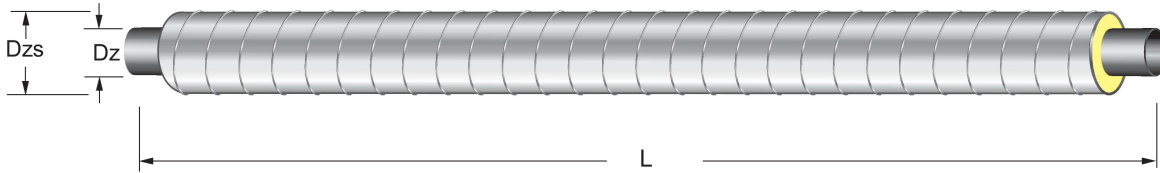


TABLE 1

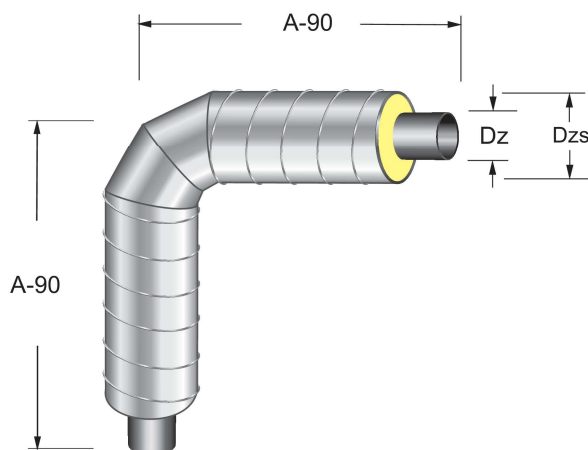
Steel Carrier Pipe		Jacket Pipe	Length	Weight		Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter		Seamless	Welded	
DN	Dz	Dzs	L	1m	1m	
mm	mm	mm	m	kg	kg	
20	26,9	125	6	4,6	4,4	RS - 20/125
25	33,7	125	6	5,1	4,8	RS - 25/125
32	42,4	125	6;12	5,6	5,3	RS - 32/125
40	48,3	125	6;12	6,0	5,7	RS - 40/125
50	60,3	125	6;12	7,2	6,8	RS - 50/125
65	76,1	140	6;12	8,8	8,3	RS - 65/140
80	88,9	160	6;12	11,2	10,3	RS - 80/160
100	114,3	200	6;12	15,7	14,6	RS - 100/200
125	139,7	224	6;12	18,8	17,5	RS - 125/224
150	168,3	250	6;12;16*	24,3	22,3	RS - 150/250
200	219,1	315	6;12;16*	42,9	33,6	RS - 200/315
250	273,0	400	6;12;16*	60,4	46,9	RS - 250/400
300	323,9	450	6;12;16*	71,3	59,8	RS - 300/450
350	355,6	500	6;12;16*	87,2	66,9	RS - 350/500
400	406,4	560	6;12;16*	107,7	83,6	RS - 400/560
450	457,0	560	6;12;16*	128,9	88,7	RS - 450/560
500	508,0	630	6;12;16*	160,4	103,5	RS - 500/630
600	610,0	800	6;12;16*	---	144,1	RS - 600/800
700	711,0	900	6;12;16*	---	182,6	RS - 700/900
800	813,0	1000	6;12;16*	---	223,6	RS - 800/1000
900	914,0	1120	6;12;16*	---	280,7	RS - 900/1120
1000	1016,0	1250	6;12;16*	---	341,5	RS - 1000/1250

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



8 Specification of Preinsulated Fittings - Type SPIRO

8.1 90° Elbow



Elbow bending radius:
 Machine bending for:
 DN 20÷80 $3 \times Dz$
 DN 100÷300 $2.5 \times Dz$
 With Hamburg elbows for:
 DN 350÷1000 $1.5 \times Dz$
 *other elbow bending radii are agreed
 individually with the Customer

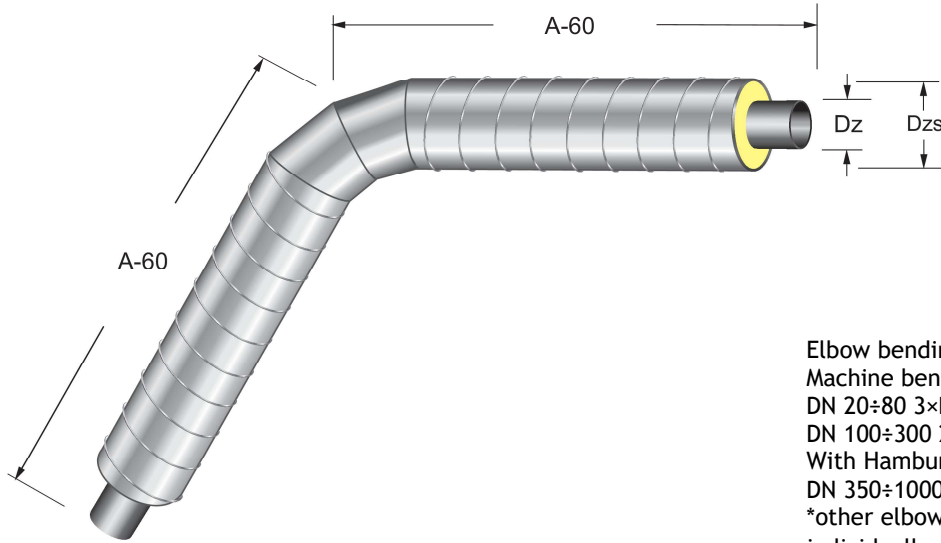
TABLE 2

Steel Arrier Pipe		Jacket Pipe	Dimension	Weight	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter			
DN	Dz	Dzs	A 90	1pcs	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>kg</i>	
20	26,9	125	1000	9,2	KS - 20/90
25	33,7	125	1000	10,2	KS - 25/90
32	42,4	125	1000	11,2	KS - 32/90
40	48,3	125	1000	12,0	KS - 40/90
50	60,3	125	1000	13,6	KS - 50/90
65	76,1	140	1000	16,6	KS - 65/90
80	88,9	160	1000	20,6	KS - 80/90
100	114,3	200	1000	29,2	KS - 100/90
125	139,7	224	1000	35,0	KS - 125/90
150	168,3	250	1000	44,6	KS - 150/90
200	219,1	315	1000	67,2	KS - 200/90
250	273,0	400	1200	112,6	KS - 250/90

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.2 60° Elbow



Elbow bending radius:
 Machine bending for:
 DN 20÷80 $3 \times Dz$
 DN 100÷300 $2.5 \times Dz$
 With Hamburg elbows for:
 DN 350÷1000 $1.5 \times Dz$
 *other elbow bending radii are agreed
 individually with the Customer

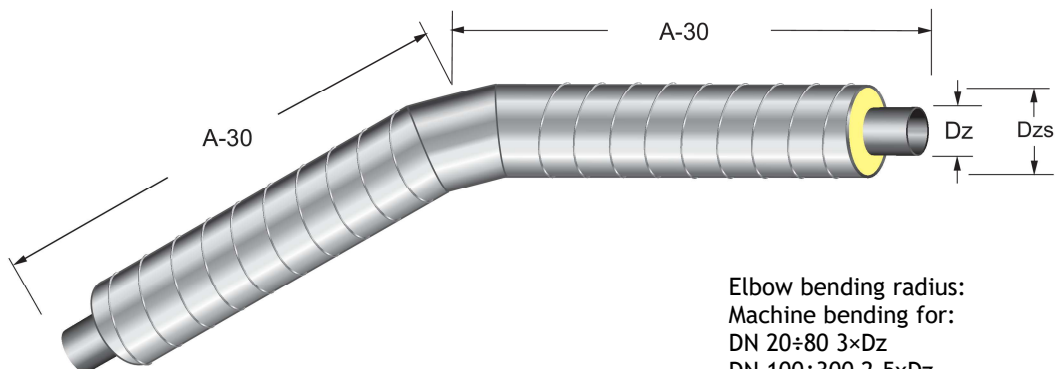
TABLE 3

Steel Carrier Pipe		Jacket Pipe	Dimension	Weight	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter			
DN	Dz	Dzs	A 60	1pcs	
mm	mm	mm	mm	kg	
20	26,9	125	1000	9,2	KS - 20/60
25	33,7	125	1000	10,2	KS - 25/60
32	42,4	125	1000	11,2	KS - 32/60
40	48,3	125	1000	12,0	KS - 40/60
50	60,3	125	1000	13,6	KS - 50/60
65	76,1	140	1000	16,6	KS - 65/60
80	88,9	160	1000	20,6	KS - 80/60
100	114,3	200	1000	29,2	KS - 100/60
125	139,7	224	1000	35,0	KS - 125/60
150	168,3	250	1000	44,6	KS - 150/60
200	219,1	315	1000	67,2	KS - 200/60
250	273,0	400	1200	112,6	KS - 250/60

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.3 30° Elbow



Elbow bending radius:
 Machine bending for:
 DN 20÷80 $3 \times Dz$
 DN 100÷300 $2.5 \times Dz$
 With Hamburg elbows for:
 DN 350÷1000 $1.5 \times Dz$
 *other elbow bending radii are agreed
 individually with the Customer

TABLE 4

Steel Carrier Pipe Steel Carrier Pipe		Jacket Pipe	Dimension	Weight	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter			
DN	Dz	Dzs	A 30	1pcs	
mm	mm	mm	mm	kg	
20	26,9	125	1000	9,2	KS - 20/30
25	33,7	125	1000	10,2	KS - 25/30
32	42,4	125	1000	11,2	KS - 32/30
40	48,3	125	1000	12,0	KS - 40/30
50	60,3	125	1000	13,6	KS - 50/30
65	76,1	140	1000	16,6	KS - 65/30
80	88,9	160	1000	20,6	KS - 80/30
100	114,3	200	1000	29,2	KS - 100/30
125	139,7	224	1000	35,0	KS - 125/30
150	168,3	250	1000	44,6	KS - 150/30
200	219,1	315	1000	67,2	KS - 200/30
250	273,0	400	1200	112,6	KS - 250/30

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.4 Flat Tee

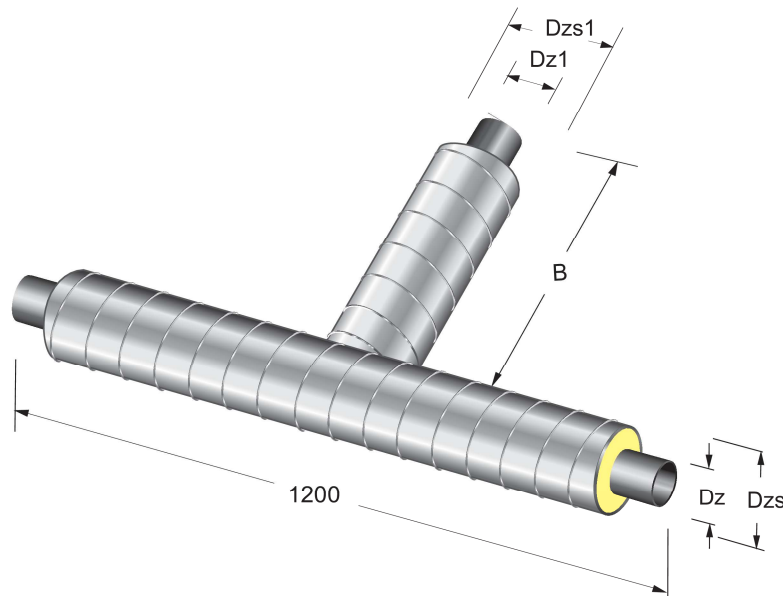


TABLE 5

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	Dzs	Dz1	Dzs1		
mm	mm	mm	mm	mm	mm	
20	26,9	125	26,9	125	600	TPSA - 20/20
25	33,7	125	26,9	125	600	TPSA - 25/20
32	42,4	125	33,7	125	600	TPSA - 32/25
40	48,3	125	42,4	125	600	TPSA - 40/32
50	60,3	125	48,3	125	600	TPSA - 50/40
65	76,1	140	60,3	125	600	TPSA - 65/50
80	88,9	160	76,1	140	600	TPSA - 80/65
100	114,3	200	88,9	160	600	TPSA - 100/80
125	139,7	224	114,3	200	900	TPSA - 125/100
150	168,3	250	139,7	224	900	TPSA - 150/100
200	219,1	315	168,3	250	900	TPSA - 200/150
250	273,0	400	219,1	315	1200	TPSA - 250/200

NOTE: Tees are manufactured in a free selection of diameters.
 Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.5 Elevated Tee

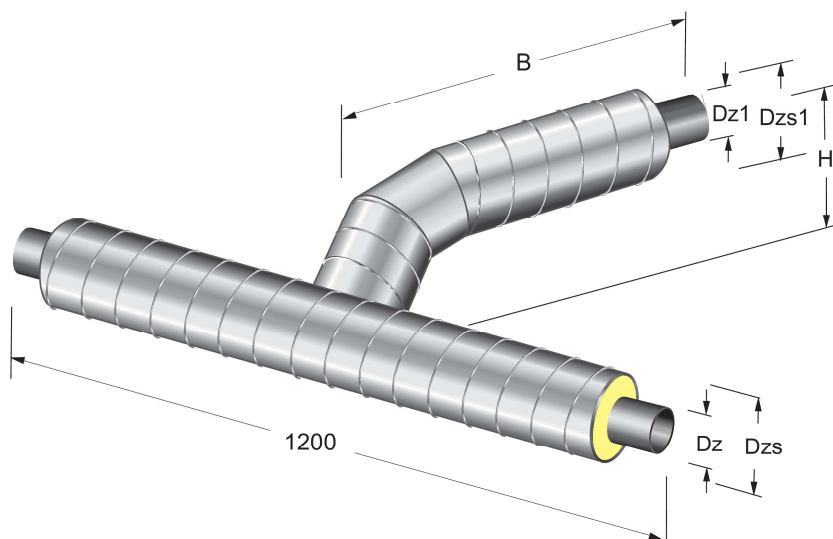


TABLE 6

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	Dzs	Dz1	Dzs1	mm	mm	
20	26,9	125	26,9	125	175	600	TWSA - 20/20
25	33,7	125	26,9	125	175	600	TWSA - 25/20
32	42,4	125	33,7	125	175	600	TWSA - 32/25
40	48,3	125	42,4	125	175	600	TWSA - 40/32
50	60,3	125	48,3	125	175	600	TWSA - 50/40
65	76,1	140	60,3	125	183	600	TWSA - 65/50
80	88,9	160	76,1	140	200	600	TWSA - 80/65
100	114,3	200	88,9	160	230	600	TWSA - 100/80
125	139,7	224	114,3	200	262	900	TWSA -125/100
150	168,3	250	139,7	224	287	900	TWSA -150/100
200	219,1	315	168,3	250	333	900	TWSA -200/150
250	273,0	400	219,1	315	408	1200	TWSA -250/200

NOTE: Tees are manufactured in a free selection of diameters.
 Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.6 Parallel Tee

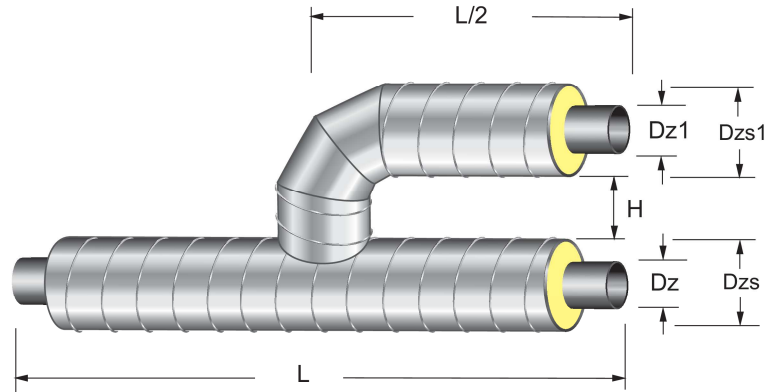


TABLE 7

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	Dzs	Dz1	Dzs1			
mm	mm	mm	mm	mm	mm	mm	
20	26,9	125	26,9	125	120	900	TRSA - 20/20
25	33,7	125	26,9	125	120	900	TRSA - 25/20
32	42,4	125	33,7	125	120	900	TRSA - 32/25
40	48,3	125	42,4	125	120	900	TRSA - 40/32
50	60,3	125	48,3	125	120	900	TRSA - 50/40
65	76,1	140	60,3	125	120	1200	TRSA - 65/50
80	88,9	160	76,1	140	120	1200	TRSA - 80/65
100	114,3	200	88,9	160	120	1200	TRSA - 100/80
125	139,7	224	114,3	200	150	1200	TRSA - 125/100
150	168,3	250	139,7	224	150	1200	TRSA - 150/100
200	219,1	315	168,3	250	200	1500	TRSA - 200/150
250	273,0	400	219,1	315	200	1500	TRSA - 250/200

NOTE: Tees are manufactured in a free selection of diameters.
 Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.7 Strainer Tee

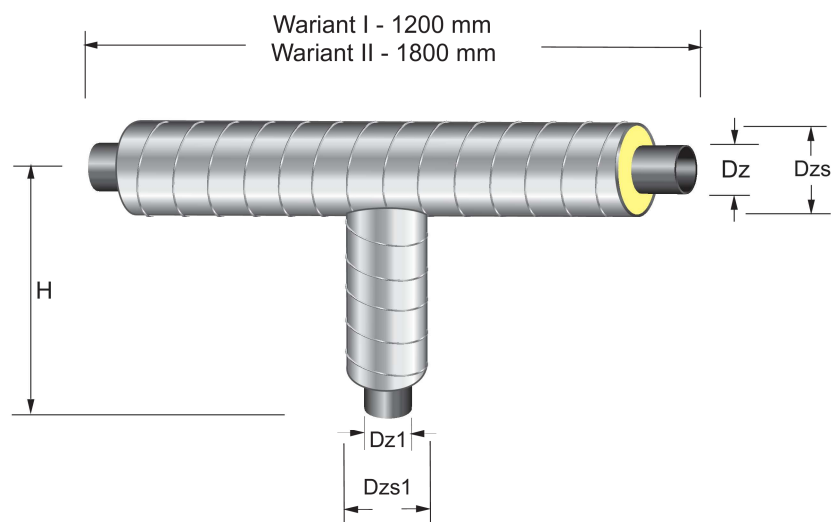


TABLE 8

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	Dzs	Dz1	Dzs1		
mm	mm	mm	mm	mm	mm	
25	33,7	125	33,7	125	440	TOSA - 25/25
32	42,4	125	33,7	125	440	TOSA - 32/25
40	48,3	125	33,7	125	440	TOSA - 40/25
			42,4	125		TOSA - 40/32
50	60,3	125	33,7	125	440	TOSA - 50/25
			42,4	125		TOSA - 50/32
65	76,1	140	42,4	125	440	TOSA - 65/32
			48,3	125		TOSA - 65/40
80	88,9	160	42,4	125	440	TOSA - 80/32
			48,3	125		TOSA - 80/40
100	114,3	200	48,3	125	460	TOSA -100/40
			60,3	125		TOSA -100/50
125	139,7	224	48,3	125	480	TOSA -125/40
			60,3	125		TOSA -125/50
150	168,3	250	48,3	125	480	TOSA -150/40
			60,3	125		TOSA -150/50
200	219,1	315	60,3	125	510	TOSA -200/50
			76,1	140		TOSA -200/65
250	273,0	400	60,3	125	550	TOSA -250/50
			76,1	140		TOSA -250/65

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.8 Vent Tee

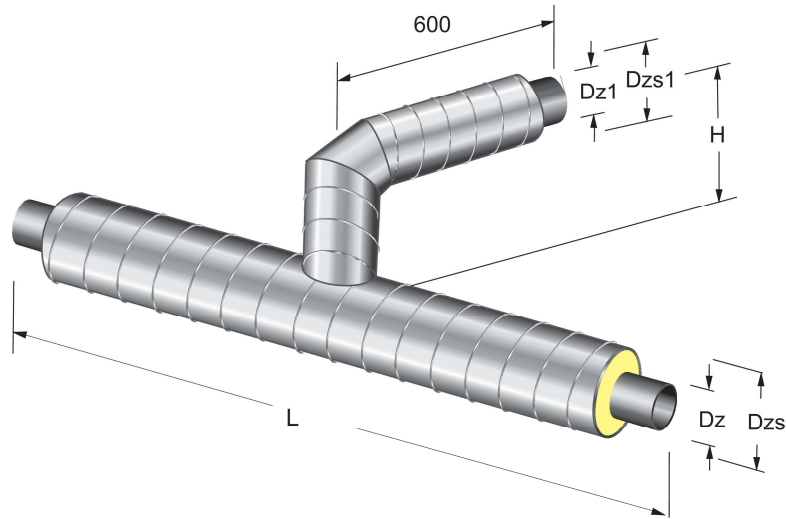


TABLE 9

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	Dzs	Dz1	Dzs1			
mm	mm	mm	mm	mm			
65	76,1	140	33,7	125	900	230	TDSA - 65
80	88,9	160	33,7	125	900	240	TDSA - 80
100	114,3	200	33,7	125	900	260	TDSA - 100
125	139,7	224	33,7	125	900	270	TDSA - 125
150	168,3	250	33,7	125	900	280	TDSA - 150
200	219,1	315	33,7	125	1200	310	TDSA - 200
250	273,0	400	33,7	125	1200	360	TDSA - 250

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.9 Reducing Pipe

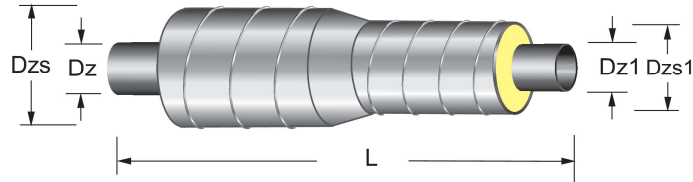


TABLE 10

Nominal Diameter DN/DN1	Straight Section		Reduced Segment		Length L	Catalogue Reference Number
	Dz	Dzs	Dz1	Dzs1		
mm	mm	mm	mm	mm	mm	
25/20	33,7	125	26,9	125	900	ZSA - 25/20
32/20	42,4	125	26,9	125	900	ZSA - 32/20
32/25	42,4	125	33,7	125	900	ZSA - 32/25
40/25	48,3	125	33,7	125	900	ZSA - 40/25
40/32	48,3	125	42,4	125	900	ZSA - 40/32
50/32	60,3	125	42,4	125	900	ZSA - 50/32
50/40	60,3	125	48,3	125	900	ZSA - 50/40
65/40	76,1	140	48,3	125	900	ZSA - 65/40
65/50	76,1	140	60,3	125	900	ZSA - 65/50
80/50	88,9	160	60,3	125	900	ZSA - 80/50
80/65	88,9	160	76,1	140	900	ZSA - 80/65
100/65	114,3	200	76,1	140	900	ZSA - 100/65
100/80	114,3	200	88,9	160	900	ZSA - 100/80
125/80	139,7	224	88,9	160	900	ZSA - 125/80
125/100	139,7	224	114,3	200	900	ZSA - 125/100
150/100	168,3	250	114,3	200	900	ZSA - 150/100
150/125	168,3	250	139,7	224	900	ZSA - 150/125
200/125	219,1	315	139,7	224	1200	ZSA - 200/125
200/150	219,1	315	168,3	250	1200	ZSA - 200/150
250/150	273,0	400	168,3	250	1200	ZSA - 250/150
250/200	273,0	400	219,1	315	1200	ZSA - 250/200

NOTE: Reducing pipes are manufactured in a free selection of diameters.
 Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.10 Fixed point

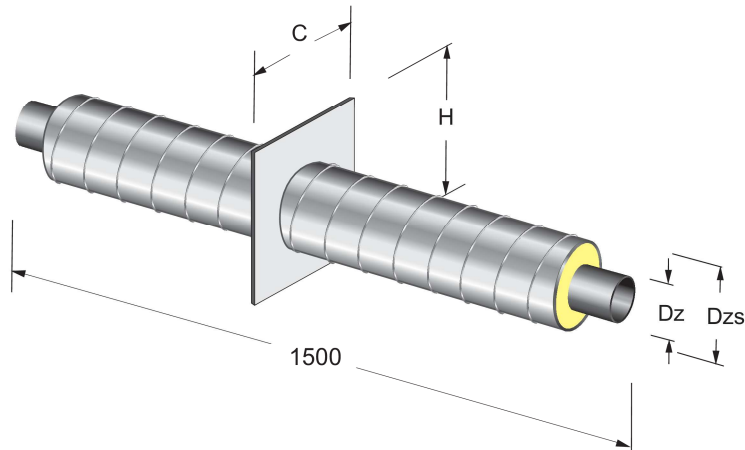


TABLE 11

Nominal Diameter	Carrier Pipe External Diameter	Jacket Pipe External Diameter	H	C	Catalogue Reference Number
DN	Dz	Dzs			
mm	mm	mm	mm	mm	
20	26,9	125	175	175	PSSS - 20
25	33,7	125	175	175	PSSS - 25
32	42,4	125	175	175	PSSS - 32
40	48,3	125	175	175	PSSS - 40
50	60,3	125	175	175	PSSS - 50
65	76,1	140	190	190	PSSS - 65
80	88,9	160	210	210	PSSS - 80
100	114,3	200	250	250	PSSS - 100
125	139,7	224	274	274	PSSS - 125
150	168,3	250	300	300	PSSS - 150
200	219,1	315	365	365	PSSS - 200
250	273,0	400	450	450	PSSS - 250

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.11 Shutoff Ball Valve

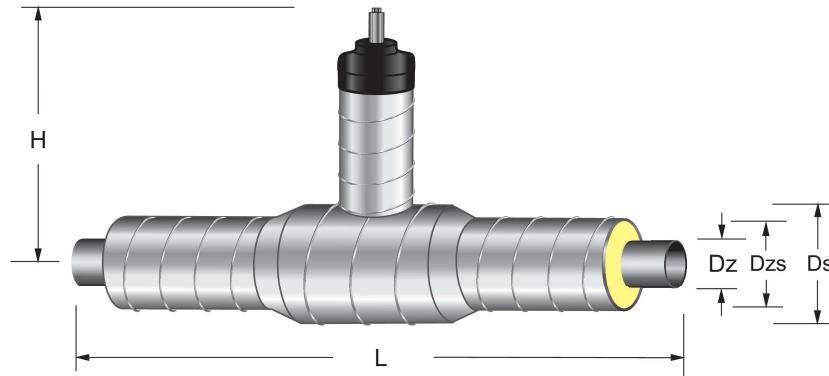


TABLE 12

Straight Section			Ds	H	L	Catalogue Reference Number
Nominal Diameter	Carrier Pipe External Diameter	Jacket Pipe External Diameter				
DN	Dz	Dzs				
mm	mm	mm				
20	26,9	125	125	480	1200	ZPSA - 20
25	33,7	125	125	480	1200	ZPSA - 25
32	42,4	125	125	485	1200	ZPSA - 32
40	48,3	125	140	495	1200	ZPSA - 40
50	60,3	125	140	500	1200	ZPSA - 50
65	76,1	140	160	505	1200	ZPSA - 65
80	88,9	160	200	515	1200	ZPSA - 80
100	114,3	200	224	525	1500	ZPSA - 100
125	139,7	224	250	545	1500	ZPSA - 125
150	168,3	250	315	565	1500	ZPSA - 150
200	219,1	315	400	585	1800	ZPSA - 200
250	273,0	400	450	560	1800	ZPSA - 250
- Wrench			- 36 mm - 50 mm			ZKK - 36 ZKK - 50

NOTE:

1. Elements with diameters above DN 250 are manufactured according to geometric dimensions agreed with the Customer.
2. Valve dimensions may change depending on the type, kind and choice of the manufacturer/supplier of the steel shut-off valve.



8.12 Vent ball valve

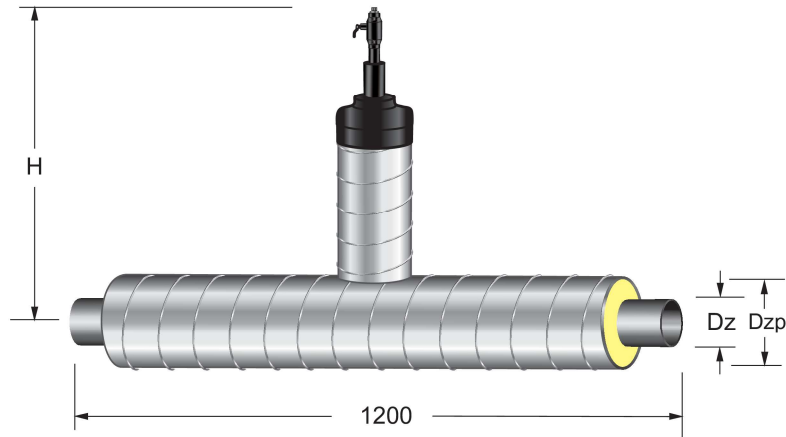


TABLE 13

MAIN PIPE			Vent valve diameter	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp	mm	mm	
mm	mm	mm	mm	mm	
25	33,7	125	33,7	410	ZDSA-25
32	42,4	125	33,7	410	ZDSA-32
40	48,3	125	33,7	410	ZDSA-40
50	60,3	125	33,7	410	ZDSA-50
65	76,1	140	33,7	414	ZDSA-65
80	88,9	160	33,7	427	ZDSA-80
100	114,3	200	33,7	450	ZDSA-100
125	139,7	224	33,7	455	ZDSA-125
150	168,3	250	33,7	457	ZDSA-150
200	219,1	315	33,7	515	ZDSA-200
250	273,0	400	33,7	560	ZDSA-250

Option:

Vent valves with threaded end.

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.13 Drain ball valve

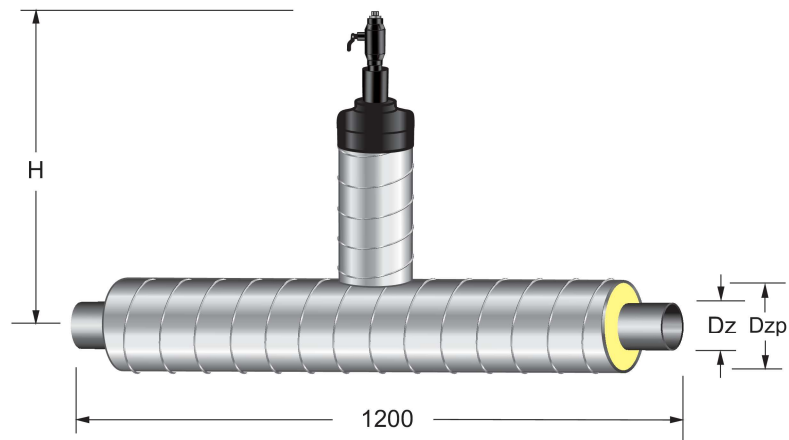


TABLE 14

MAIN PIPE			Vent valve diameter	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp	mm	mm	
mm	mm	mm	mm	mm	
40	48,3	125	48,3	410	ZOSA-40
50	60,3	125	48,3	410	ZOSA-50
65	76,1	140	48,3	414	ZOSA-65
80	88,9	160	48,3	427	ZOSA-80
100	114,3	200	48,3	450	ZOSA-100
125	139,7	224	48,3	455	ZOSA-125
150	168,3	250	48,3	457	ZOSA-150
200	219,1	315	60,3	515	ZOSA-200
250	273,0	400	60,3	560	ZOSA-250

Option:

Drain valves with threaded end.

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.14 Shutoff ball valve and vent valve assembly

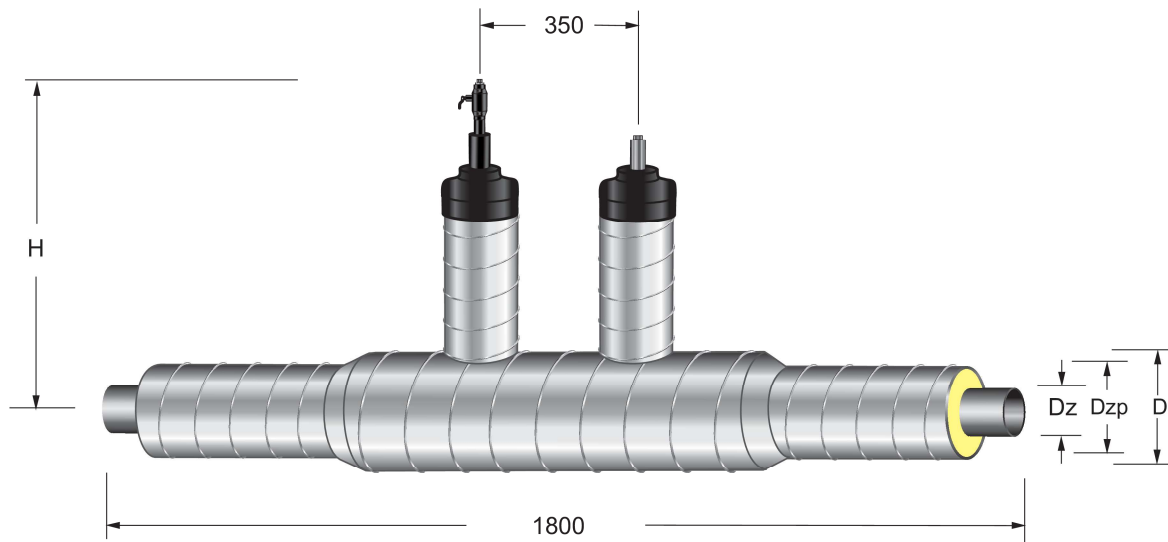


TABLE 15

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
32	42,4	125	125	485	ZKDSA-32
40	48,3	125	140	495	ZKDSA-40
50	60,3	125	140	500	ZKDSA-50
65	76,1	140	160	505	ZKDSA-65
80	88,9	160	200	515	ZKDSA-80
100	114,3	200	225	525	ZKDSA-100
125	139,7	224	250	545	ZKDSA-125
150	168,3	250	315	565	ZKDSA-150
200	219,1	315	400	585	ZKDSA-200
250	273,0	400	450	560	ZKDSA-250

Vent valve diameter:
 for pipeline to DN 300 mm 33,7 mm
 to DN 600 mm 48,3 mm

Option:
 Vent valves with threaded end.

NOTE:

1. Elements with diameters above DN 250 are manufactured according to geometric dimensions agreed with the Customer.
2. Valve dimensions may change depending on the type, kind and choice of the manufacturer/supplier of the steel shut-off valve.



8.15 Shutoff ball valve and vent valve assembly

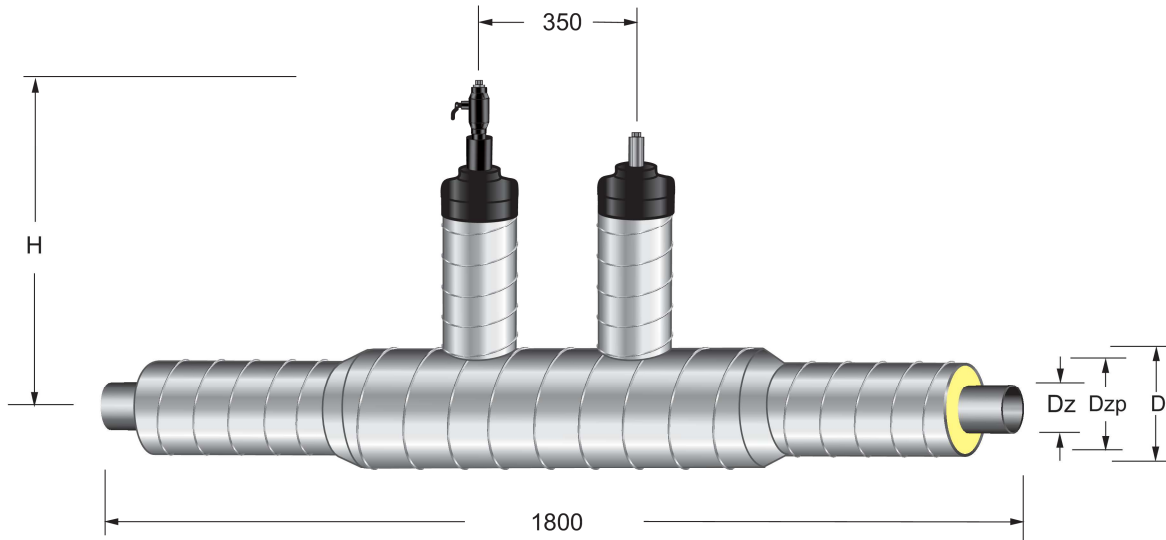


TABLE 16

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
40	48,3	125	140	495	ZKOSA-40
50	60,3	125	140	500	ZKOSA-50
65	76,1	140	160	505	ZKOSA-65
80	88,9	160	200	515	ZKOSA-80
100	114,3	200	225	525	ZKOSA-100
125	139,7	224	250	545	ZKOSA-125
150	168,3	250	315	565	ZKOSA-150
200	219,1	315	400	585	ZKOSA-200
250	273,0	400	450	560	ZKOSA-250

Drain valve diameter:
for pipeline

to DN 150 mm	48,3 mm
to DN 300 mm	60,3 mm
to DN 400 mm	88,9 mm
to DN 600 mm	114,3 mm

Option:

Drain valves with threaded end.

NOTE:

1. Elements with diameters above DN 250 are manufactured according to geometric dimensions agreed with the Customer.
2. Valve dimensions may change depending on the type, kind and choice of the manufacturer/supplier of the steel shut-off valve.



8.16 Drain and vent shutoff ball valve

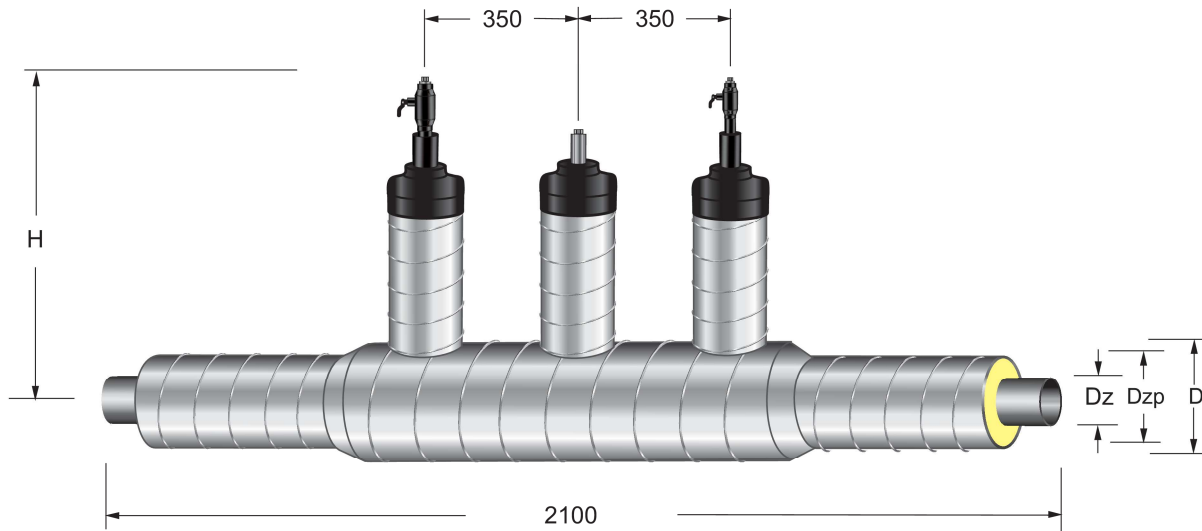


TABLE 17

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm			
40	48,3	125	140	495	ZKODSA-40
50	60,3	125	140	500	ZKODSA-50
65	76,1	140	160	505	ZKODSA-65
80	88,9	160	200	515	ZKODSA-80
100	114,3	200	225	525	ZKODSA-100
125	139,7	224	250	545	ZKODSA-125
150	168,3	250	315	565	ZKODSA-150
200	219,1	315	400	585	ZKODSA-200
250	273,0	400	450	560	ZKODSA-250

Valve diameter for pipeline vent valve / drain valve:
 to DN 150 mm 48,3 mm
 to DN 300 mm 60,3 mm
 to DN 400 mm 88,9 mm
 to DN 600 mm 114,3 mm

Option:

Drain and vent valves with threaded end.

NOTE:

1. Elements with diameters above DN 250 are manufactured according to geometric dimensions agreed with the Customer.
2. Valve dimensions may change depending on the type, kind and choice of the manufacturer/supplier of the steel shut-off valve.



8.17 Longitudinal compensator

8.17.1 Single bellow longitudinal compensator operating under a nominal pressure of 1,6 MPa

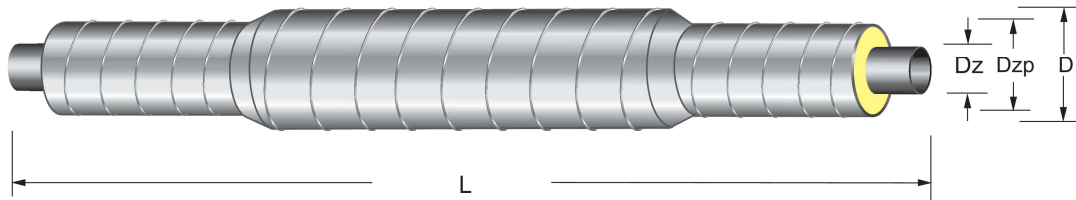


TABLE 17

Nominal diameter	Carrier pipe external diameter	Casing 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	125	160	2000	100	KPSA-40-100
50	60,3	125	200	2000	100	KPSA-50-100
65	76,1	140	200	2000	100	KPSA-65-100
80	88,9	160	225	2000	100	KPSA-80-100
80	88,9	160	225	2000	150	KPSA-80-150
100	114,3	200	250	2500	125	KPSA-100-125
100	114,3	200	250	2500	155	KPSA-100-155
125	139,7	224	315	2500	125	KPSA-125-125
125	139,7	224	315	2500	160	KPSA-125-160
150	168,3	250	400	2500	125	KPSA-150-125
150	168,3	250	400	2500	165	KPSA-150-165
200	219,1	315	450	2500	125	KPSA-200-125
200	219,1	315	450	2500	170	KPSA-200-170
250	273,0	400	500	2500	125	KPSA-250-125
250	273,0	400	500	2500	170	KPSA-250-170

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.17.2 Single bellow longitudinal compensator operating under a nominal pressure of 2,5 MPa

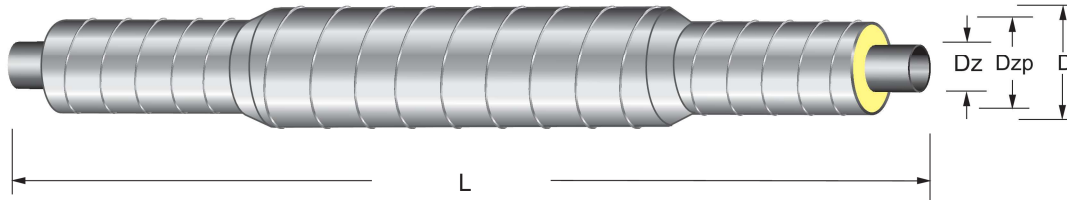


TABLE 18

Nominal diameter	Carrier pipe external diameter	Casing 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	KPSA-80-90
100	114,3	200	250	2500	90	KPSA-100-90
125	139,7	224	315	2500	90	KPSA-125-90
150	168,3	250	315	2500	90	KPSA-150-90
200	219,1	315	450	2500	90	KPSA-200-90
250	273,0	400	500	2500	90	KPSA-250-90

NOTE: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.18 Mains Cold Inset - SPIRO

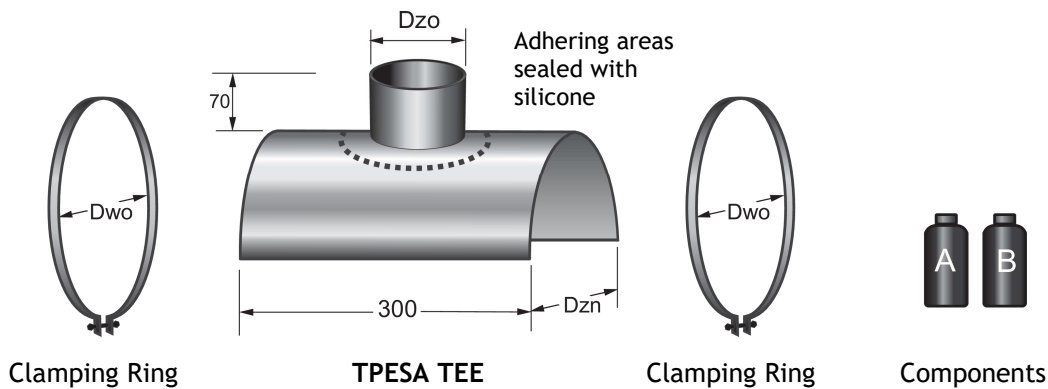
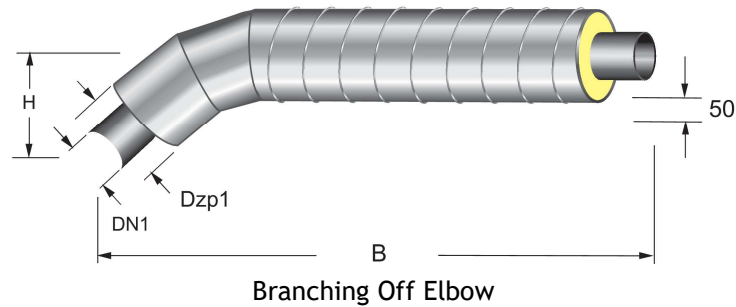


TABLE 19

MAINS		BRANCHING OFF		BRANCHING OFF PIPE		TPESA 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	Clamping Ring Internal Diameter	
DN	Dzp	DN 1	Dzp 1			Dzn	Dzo	Dwo	
mm	mm	mm	mm	mm	mm	mm	mm	mm	
65	140	32	125	170	1200	140	135	150	TPESA - 65/32
80	160	65	140	200	1200	160	150	170	TPESA - 80/65
100	200	65	140	220	1200	200	150	210	TPESA - 100/65
125	224	80	160	242	1200	224	180	234	TPESA - 125/80
150	250	100	200	275	1200	250	224	260	TPESA - 150/100
200	315	125	224	320	1200	315	250	325	TPESA - 200/125

NOTE: Elements with diameters above DN 100 are manufactured according to the geometric dimensions agreed with the client.



9 Fulcrums of Pipeline

9.1 Removable Sliding Support

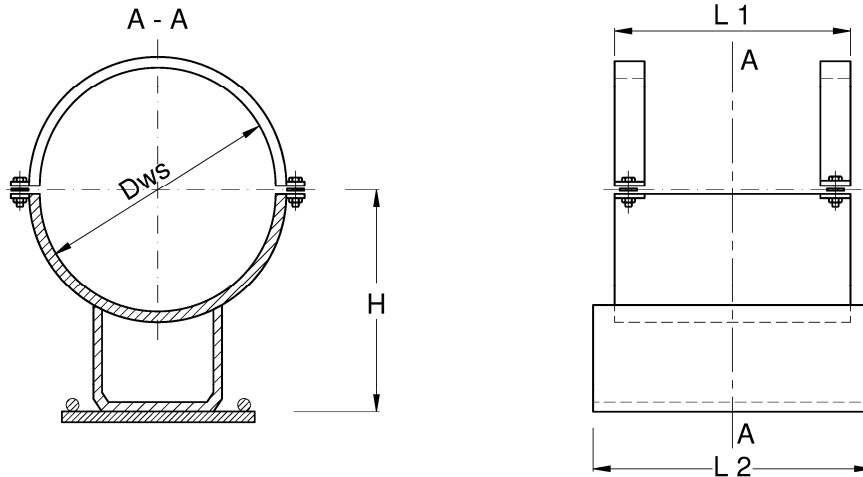


TABLE 20

Steel Carrier Pipe		Jacket Pipe	Clamping Ring	H	L1	L2	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter	Internal Diameter				
DN	Dz	Dzs	Dws	mm	mm	mm	
mm	mm	mm	mm				
20	26,9	125	126,0	150	210	250	RSS - 20
25	33,7	125	126,0	150	210	250	RSS - 25
32	42,4	125	126,0	150	210	250	RSS - 32
40	48,3	125	126,0	150	210	250	RSS - 40
50	60,3	125	126,0	150	210	250	RSS - 50
65	76,1	140	141,0	160	240	280	RSS - 65
80	88,9	160	161,0	160	270	310	RSS - 80
100	114,3	200	201,0	188	340	380	RSS - 100
125	139,7	224	225,0	213	380	420	RSS - 125
150	168,3	250	251,0	213	420	460	RSS - 150
200	219,1	315	316,5	239	540	580	RSS - 200
250	273,0	400	401,5	290	680	720	RSS - 250
300	323,9	450	451,5	315	700	760	RSS - 300
350	355,6	500	501,5	340	760	800	RSS - 350

- Note: 1. Elements with diameters above DN 350 are manufactured by the geometric dimensions agreed with the client.
 2. Nuts and bolts visible in the drawings are not included in the delivery.



9.2 Removable Roller Support

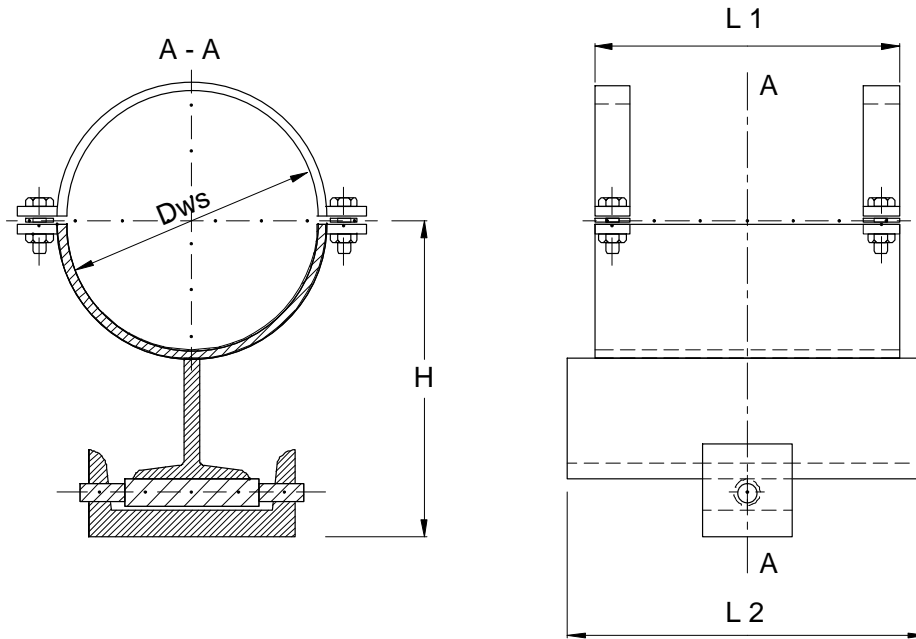


TABLE 21

Steel Carrier Pipe		Jacket Pipe	Clamping Ring	H	L1	L2	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter	Internal Diameter				
DN	Dz	Dzs	Dws				
mm	mm	mm	mm				
20	26,9	125	126,0	163	210	250	RRS - 20
25	33,7	125	126,0	163	210	250	RRS - 25
32	42,4	125	126,0	163	210	250	RRS - 32
40	48,3	125	126,0	163	210	250	RRS - 40
50	60,3	125	126,0	163	210	250	RRS - 50
65	76,1	140	141,0	180	240	280	RRS - 65
80	88,9	160	161,0	180	270	310	RRS - 80
100	114,3	200	201,0	223	340	380	RRS - 100
125	139,7	224	225,0	248	380	420	RRS - 125
150	168,3	250	251,0	248	420	460	RRS - 150
200	219,1	315	316,5	282	540	580	RRS - 200
250	273,0	400	401,5	351	680	720	RRS - 250
300	323,9	450	451,5	376	700	760	RRS - 300
350	355,6	500	501,5	401	760	800	RRS - 350

Note: 1. Elements with diameters above DN 350 are manufactured by the geometric dimensions agreed with the client.
 2. Nuts and bolts visible in the drawings are not included in the delivery.



9.3 Removable Pipe Hanger

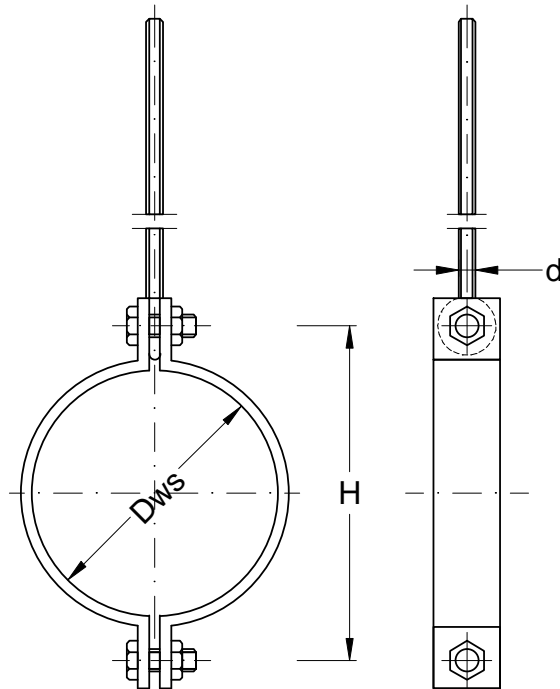


TABLE 22

Steel Carrier Pipe		Jacket Pipe	Clamping Ring	H	D	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter	Internal Diameter			
DN	Dz	Dzs	Dws	mm	mm	
20	26,9	125	126,0	164	16	RCS - 20
25	33,7	125	126,0	164	16	RCS - 25
32	42,4	125	126,0	164	16	RCS - 32
40	48,3	125	126,0	164	16	RCS - 40
50	60,3	125	126,0	164	16	RCS - 50
65	76,1	140	141,0	200	16	RCS - 65
80	88,9	160	161,0	200	16	RCS - 80
100	114,3	200	201,0	240	16	RCS - 100
125	139,7	224	225,0	302	20	RCS - 125
150	168,3	250	251,0	302	20	RCS - 150
200	219,1	315	316,5	367	20	RCS - 200
250	273,0	400	401,5	460	24	RCS - 250
300	323,9	450	451,5	510	24	RCS - 300
350	355,6	500	501,5	560	24	RCS - 350

Note: 1. Elements with diameters above DN 350 are manufactured by the geometric dimensions agreed with the client.
 2. Nuts and bolts visible in the drawings are not included in the delivery.



10 Coupling Unit

Sleeve made of Zinc coated sheet or aluminium sheet sealed with heat shrinkable bands.

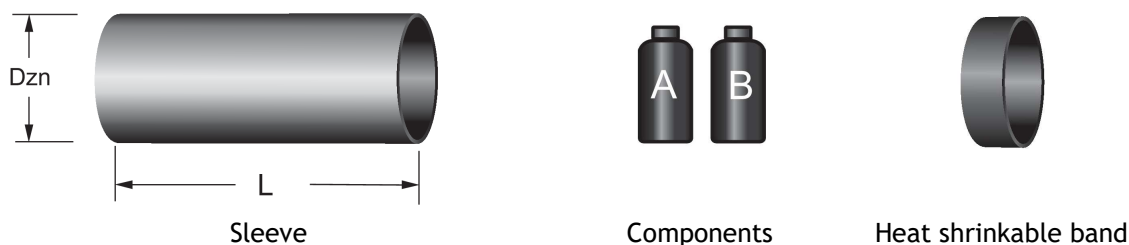


TABLE 23

Nominal Diameter	Steel Pipe External Diameter	Sleeve External Diameter	Components		Length	Heat Shrinkable Band	SYMBOL KATALOGOWY
			A	B			
DN	Dz	Dzn	g	g	L	pcs	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>g</i>	<i>g</i>	<i>mm</i>		
20	26,9	135	154	259	600	2	NS - 20/135
25	33,7	135	151	253	600	2	NS - 25/135
32	42,4	135	145	244	600	2	NS - 32/135
40	48,3	135	140	236	600	2	NS - 40/135
50	60,3	135	135	226	600	2	NS - 50/135
65	76,1	150	154	259	600	2	NS - 65/150
80	88,9	173	204	343	600	2	NS - 80/173
100	114,3	214	304	511	600	2	NS - 100/214
125	139,7	240	352	592	600	2	NS - 125/240
150	168,3	265	387	651	600	2	NS - 150/265
200	219,1	333	583	980	600	2	NS - 200/333
250	273,0	420	1219	2050	750	2	NS - 250/420

- Note:
1. Elements with diameters above DN 250 are manufactured by the geometric dimensions agreed with the client.
 2. On request, shrink bands can be secured with aluminum similar tape or Zink similar tape.



11 Insulation and Pipeline Closing

11.1 Pipeline Closing - End Sleeve

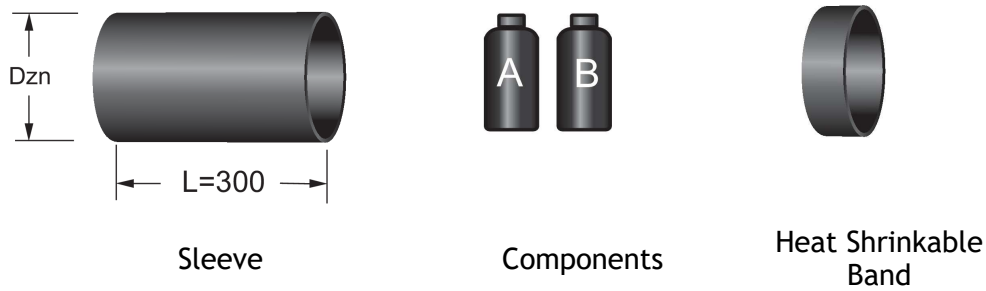


TABLE 24

Nominal Diameter	Jacket Pipe External Diameter	Sleeve External Diameter	Components		Heat Shrinkable Band	Catalogue Reference Number
			A	B		
DN <i>mm</i>	Dzs <i>mm</i>	Dzn <i>mm</i>	A <i>g</i>	B <i>g</i>	<i>szt.</i>	
20	125	135	108	182	1	NKS - 20/135
25	125	135	106	179	1	NKS - 25/135
32	125	135	104	174	1	NKS - 32/135
40	125	135	101	170	1	NKS - 40/135
50	125	135	97	163	1	NKS - 50/135
65	140	150	112	188	1	NKS - 65/150
80	160	173	144	241	1	NKS - 80/173
100	200	214	219	368	1	NKS - 100/214
125	224	240	253	426	1	NKS - 125/240
150	250	265	279	470	1	NKS - 150/265
200	315	333	420	705	1	NKS - 200/333
250	400	420	1234	2074	1	NKS - 250/420

Note: Elements with diameters above DN 250 are manufactured by the geometric dimensions agreed with the client.



12 Additional Information

Preinsulated Pipes and Fittings - type SPIRO must be protected against impacts and deformation of Jacket Pipes.

The Application of preinsulated pipe and fittings has been specified in general above, whilst details referring to design, execution and take over 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 II 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

13 Trade Information

Manufacturer and Seller:

ZAKŁAD PRODUKCYJNO USŁUGOWY
Międzyrzecz

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Trade Service: (+48 95) 742-33-23; 742-33-38

Supplies: (+48 95) 742-33-46; 742-33-56

E-mail: zpu@zpum.pl

When placing orders please quote Catalogue Reference Number.
If products are to be made-to-order, dimension have to be agreed separately.