



TECHNICAL CERTIFICATE OF
APPROVAL

NR AT-15-8619/2015

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ISSUED BY:

ITB WARSAW



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

**ZAKŁAD PRODUKCYJNO USŁUGOWY
Międzyrzecz**

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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 152°C 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 Technical Certificate of Approval No AT-15-8619/2015, issued by the Building Research Institute ITB, Warsaw; expiring on 23 June 2020.

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**.

		Cyclopentane	CO ₂ (freon free)
- thermal conductivity coefficient	- W/mK	0,0244	0,029
- core density min,	- kg/m ³	60	60
- radial compression strength	- MPa	0,3	
- thermal resistance	- °C	max 152	max 142

CASING PIPE - TYPE SPIRO

Casing pipe is made of zinc coated sheet in accordance with PN-EN 10346 or is made of sheet aluminum in accordance with PN-EN 485-4, PN-EN 485-2, PN-EN 485-1.

3 Pipeline Leakage Detection System

ZPU Międzyrzecz Sp. z o.o. preinsulated pipes and fittings can be equipped with any system detecting pipeline leakage. Such a system comprises two wires embedded in the insulation layer. The system signals moisture spots in any place of the pipeline.

4 General Principles of Constructing Preinsulated Overhead Pipelines.

Preinsulated pipes and fittings by ZPU Międzyrzecz Sp. z o.o. - type SPIRO fastened in slide and roller supports are laid in retaining structures. During pipeline constructing removable pipe hanger must be used. Once welding works and tightness test have been completed the leak monitoring system should be installed on the pipeline, then joint casing and thermal insulation are formed and the whole joint is sealed.

5 Quality Assurance System

ZPU Międzyrzecz Sp. z o.o. preinsulated materials and products manufactured presently are based on the Integrated Quality Management System "Environment, compliant with PN-EN ISO-9001:2015-10 and PN-EN ISO 14001:2015-09 - Certificate No JSA - 124/6/2016 issued by the Polish Centre for research and Certification, Warsaw.

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

At our disposal is certificate No. B/1421/III/2011 giving entitlement to safety mark sign of SPIRO pipes and fittings with steel carrier pipe for water supply pipelines to underground air-conditioning equipment in underground excavations.

Since May 23, 2007 we have possessed The Euroheat & Power Certificate No. 01/05 issued by international organization from Sweden which is engaged in the matters of district heating systems. This certificate confirms quality and accordance of our preinsulated assortment with requirements EN 253, EN 448 and Euroheat & Power guidelines. From March 21, 2012 we also have the CSTB-Avis Technique 14/11-1642*V1 Certificate confirming compliance with the quality requirements for preinsulated products with a steel carrier pipe.



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

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

- Carrier Pipe up to DN 1000;
- Jacket Pipe up to DN 1200;

Steel Carrier Pipe				Jacket Pipe TYPE SPIRO		Jacket Pipe TYPE SPIRO	
DN	Dz	Seamless	Welded	Standard insulation		Insulation plus	
		g	g	Dzs	gs	Dzs	gs
<i>Mm</i>	<i>Mm</i>	<i>Mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>Mm</i>	<i>mm</i>
20	26,0	2,9	2,6	100	0,6	125	0,6
25	33,7	2,9	2,6	100	0,6	125	0,6
32	42,4	2,9	2,6	100	0,6	125	0,6
40	48,3	2,9	2,6	100	0,6	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	0,8
200	219,1	6,3	4,5	315	0,8	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	1,0
450	457,0	10,0	6,3	560	0,8	630	1,0
500	508,0	11,0	6,3	630	1,0*	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*	-	-

* minimal wall thickness of the casing pipe

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

The catalog was created for nominal diameter up to DN 250.



7. Specification of Preinsulated Pipes - Type SPIRO

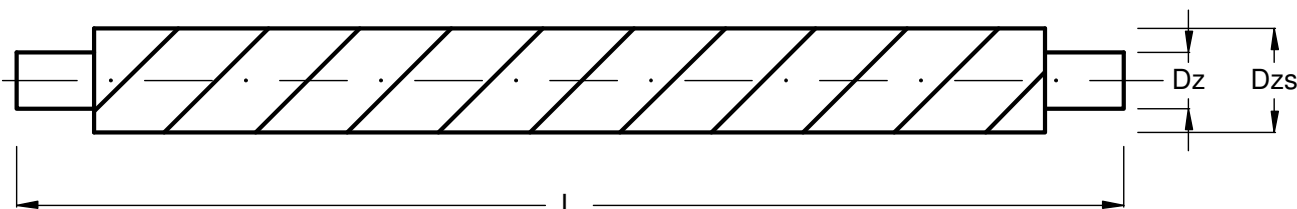


TABLE 1

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	100	6	3,8	3,6	RS - 20/100
25	33,7	100	6	4,2	4,0	RS - 25/100
32	42,4	100	6;12	4,8	4,6	RS - 32/100
40	48,3	100	6;12	5,2	4,9	RS - 40/100
50	60,3	125	6;12	7,1	6,7	RS - 50/125
65	76,1	140	6;12	8,7	8,2	RS - 65/140
80	88,9	160	6;12	11,1	10,2	RS - 80/160
100	114,3	200	6;12	15,5	14,5	RS - 100/200
125	139,7	224	6;12	18,6	17,3	RS - 125/224
150	168,3	250	6;12;16*	24,0	22,0	RS - 150/250
200	219,1	315	6;12;16*	42,5	33,2	RS - 200/315
250	273,0	400	6;12;16*	59,9	46,3	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*	128,7	88,7	RS - 450/560
500	508,0	630	6;12;16*	157,3	100,2	RS - 500/630
600	610,0	800	6;12;16*	218,0	140,1	RS - 600/800
700	711,0	900	6;12;16*	-	180,4	RS - 700/900
800	813,0	1000	6;12;16*	-	222,0	RS - 800/1000
900	914,0	1120	6;12;16*	-	273,6	RS - 900/1120
1000	1016,0	1250	6;12;16*	-	328,5	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

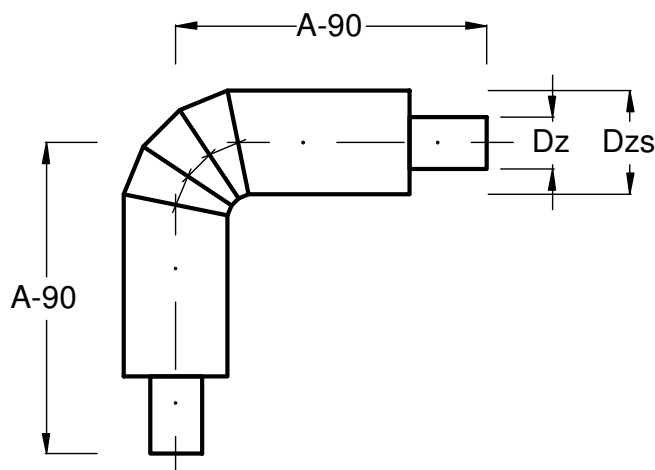


TABLE 2

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	100	600	3,4	KS - 20/90
25	33,7	100	600	3,9	KS - 25/90
32	42,4	100	600	4,9	KS - 32/90
40	48,3	100	600	5,3	KS - 40/90
50	60,3	125	600	6,8	KS - 50/90
65	76,1	140	600	8,2	KS - 65/90
80	88,9	160	600	10,1	KS - 80/90
100	114,3	200	900	22,7	KS - 100/90
125	139,7	224	900	27,0	KS - 125/90
150	168,3	250	900	33,8	KS - 150/90
200	219,1	315	1200	68,8	KS - 200/90
250	273,0	400	1200	91,9	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

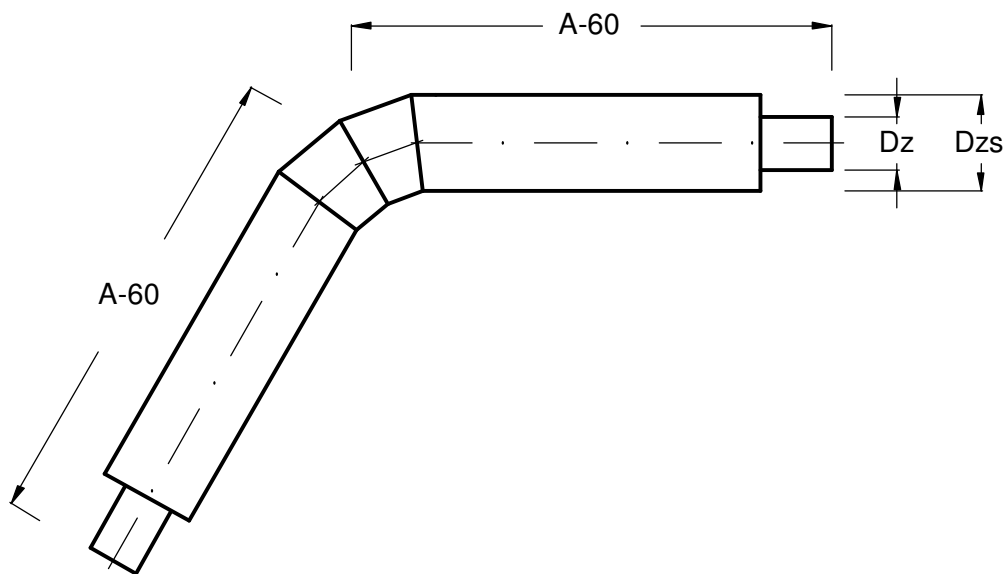


TABLE 3

Steel Carrier Pipe		Jacket Pipe	Dimension	Weight	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter			
DN	Dz	Dzs	A 60	1pcs	
<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>kg</i>	
20	26,9	100	600	3,5	KS - 20/60
25	33,7	100	600	4,0	KS - 25/60
32	42,4	100	600	5,1	KS - 32/60
40	48,3	100	600	5,5	KS - 40/60
50	60,3	125	600	7,2	KS - 50/60
65	76,1	140	600	8,8	KS - 65/60
80	88,9	160	600	11,0	KS - 80/60
100	114,3	200	900	24,3	KS - 100/60
125	139,7	224	900	29,0	KS - 125/60
150	168,3	250	900	36,9	KS - 150/60
200	219,1	315	1200	75,2	KS - 200/60
250	273,0	400	1200	103,9	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

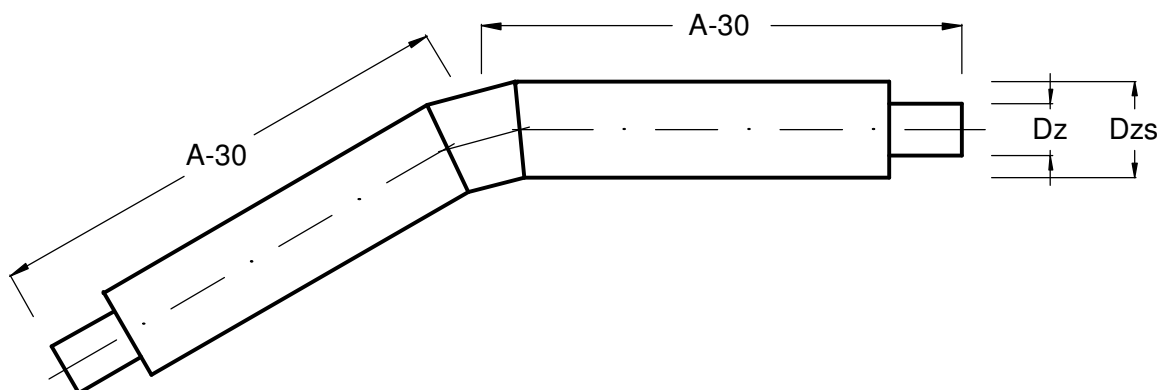


TABLE 4

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	100	600	3,5	KS - 20/30
25	33,7	100	600	4,0	KS - 25/30
32	42,4	100	600	5,2	KS - 32/30
40	48,3	100	600	5,6	KS - 40/30
50	60,3	125	600	7,3	KS - 50/30
65	76,1	140	600	9,0	KS - 65/30
80	88,9	160	600	11,3	KS - 80/30
100	114,3	200	900	24,8	KS - 100/30
125	139,7	224	900	29,7	KS - 125/30
150	168,3	250	900	37,8	KS - 150/30
200	219,1	315	1200	77,2	KS - 200/30
250	273,0	400	1200	107,4	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

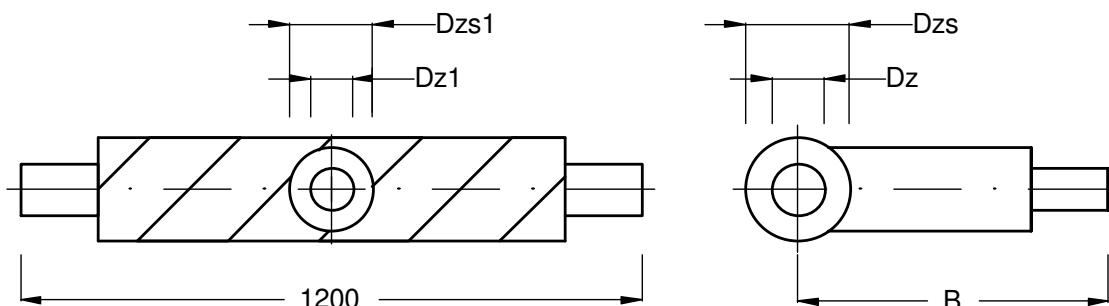


TABLE 5

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

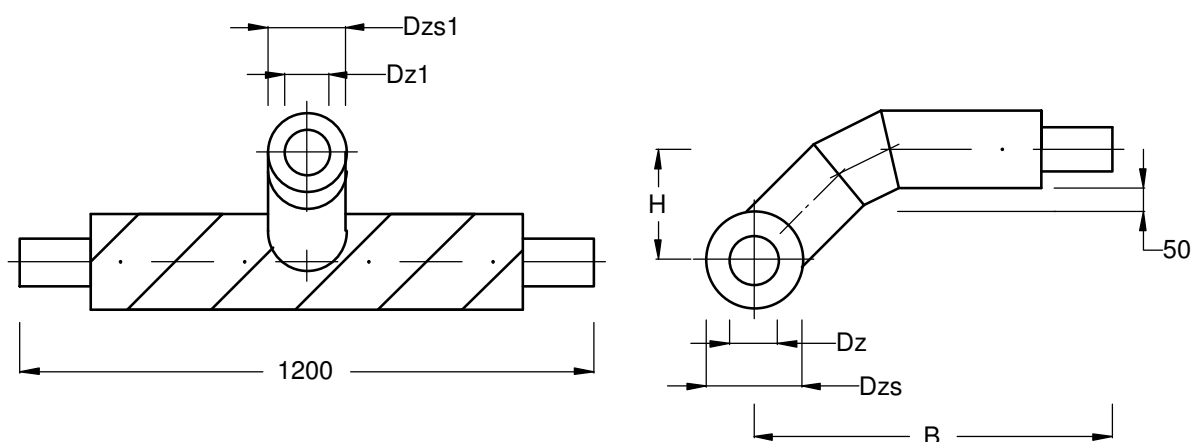


TABLE 6

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	
mm	mm	mm	mm	mm	mm	mm	
20	26,9	100	26,9	100	140	600	TWS - 20/20
25	33,7	100	26,9	100	140	600	TWS - 25/20
32	42,4	100	33,7	100	160	600	TWS - 32/25
40	48,3	100	42,4	100	160	600	TWS - 40/32
50	60,3	125	48,3	100	168	600	TWS - 50/40
65	76,1	140	60,3	125	183	600	TWS - 65/50
80	88,9	160	76,1	140	200	600	TWS - 80/65
100	114,3	200	88,9	160	230	600	TWS - 100/80
125	139,7	224	114,3	200	262	900	TWS - 125/100
150	168,3	250	139,7	224	288	900	TWS - 150/100
200	219,1	315	168,3	250	332	900	TWS - 200/150
250	273,0	400	219,1	315	408	1200	TWS - 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

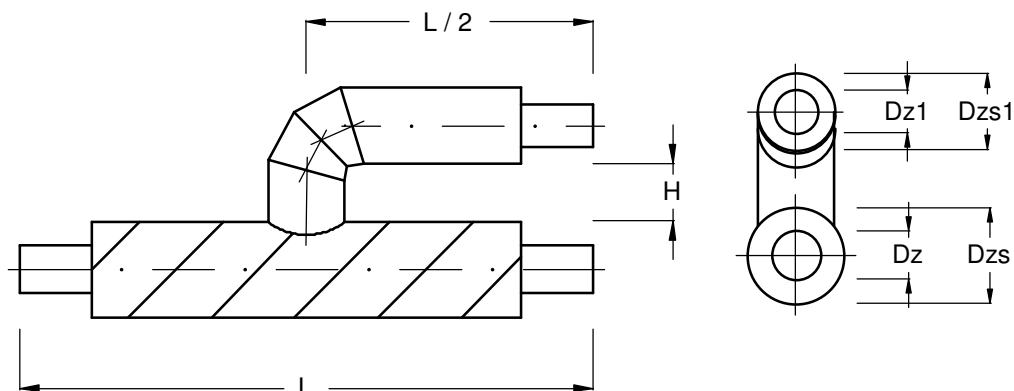


TABLE 7

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

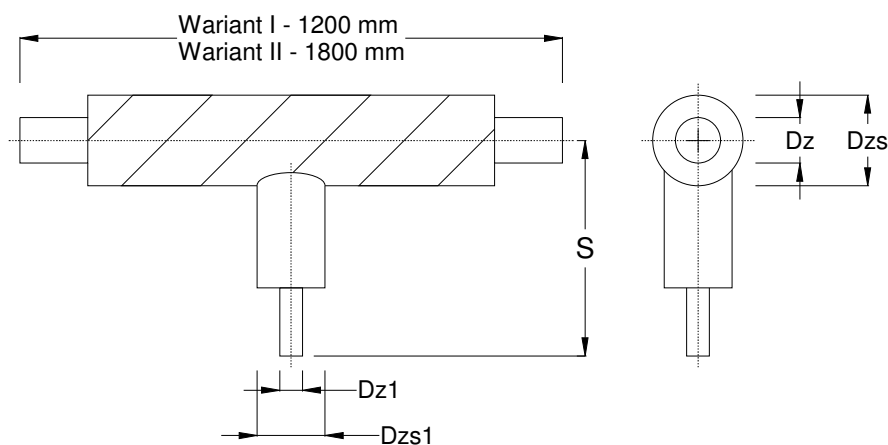


TABLE 8

Straight Section			Vertical Section		S	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	100	33,7	100	400	TOSA - 25/25
32	42,4	100	33,7	100	400	TOSA - 32/25
40	48,3	100	33,7 42,4	100 100	400	TOSA - 40/25 TOSA - 40/32
50	60,3	125	33,7 42,4	100 100	430	TOSA - 50/25 TOSA - 50/32
65	76,1	140	42,4 48,3	100 100	440	TOSA - 65/32 TOSA - 65/40
80	88,9	160	42,4 48,3	100 100	440	TOSA - 80/32 TOSA - 80/40
100	114,3	200	48,3 60,3	100 125	460	TOSA - 100/40 TOSA - 100/50
125	139,7	224	48,3 60,3	100 125	480	TOSA - 125/40 TOSA - 125/50
150	168,3	250	48,3 60,3	100 125	480	TOSA - 150/40 TOSA - 150/50
200	219,1	315	60,3 76,1	125 140	510	TOSA - 200/50 TOSA - 200/65
250	273,0	400	60,3 76,1	125 140	550	TOSA - 250/50 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

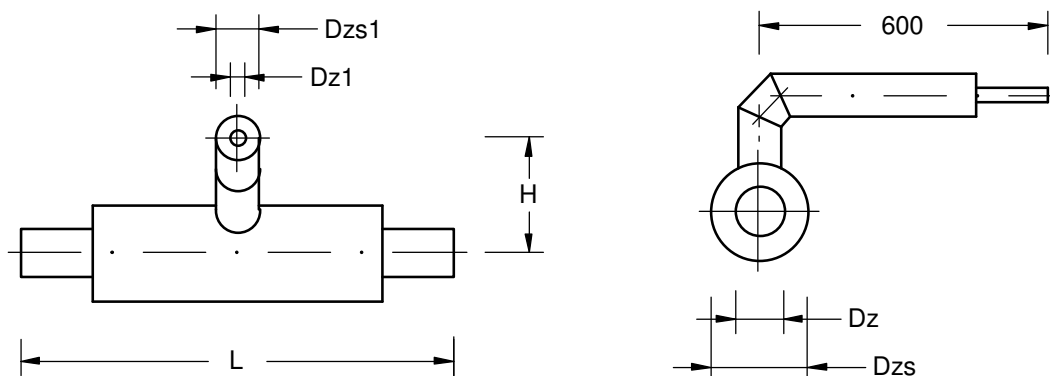


TABLE 9

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	mm	mm	
65	76,1	140	33,7	100	900	210	TDSA - 65
80	88,9	160	33,7	100	900	220	TDSA - 80
100	114,3	200	33,7	100	900	240	TDSA - 100
125	139,7	224	33,7	100	900	250	TDSA - 125
150	168,3	250	33,7	100	900	260	TDSA - 150
200	219,1	315	33,7	100	1200	300	TDSA - 200
250	273,0	400	33,7	100	1200	340	TDSA - 250

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



8.9 Reducing Pipe

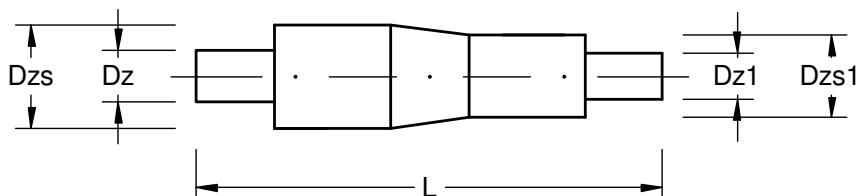


TABLE 10

Nominal Diameter	Straight Section		Reduced Segment		Length	Catalogue Reference Number
DN/DN1	Dz	Dzs	Dz1	Dzs1	L	
mm	mm	mm	mm	mm	mm	
25/20	33,7	100	26,9	100	900	ZSA - 25/20
32/20	42,4	100	26,9	100	900	ZSA - 32/20
32/25	42,4	100	33,7	100	900	ZSA - 32/25
40/25	48,3	100	33,7	100	900	ZSA - 40/25
40/32	48,3	100	42,4	100	900	ZSA - 40/32
50/32	60,3	125	42,4	100	900	ZSA - 50/32
50/40	60,3	125	48,3	100	900	ZSA - 50/40
65/40	76,1	140	48,3	100	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

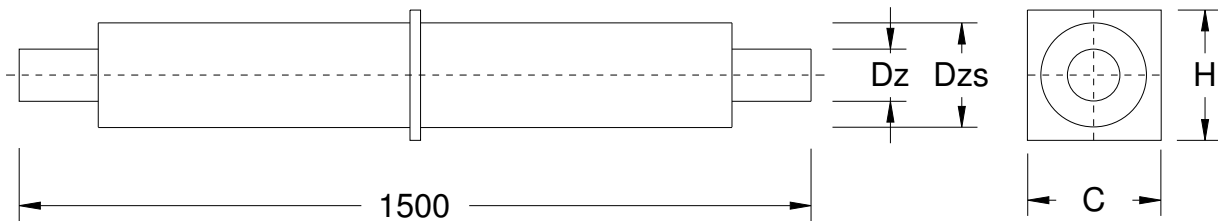


TABLE 11

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	100	150	150	PSSS - 20
25	33,7	100	150	150	PSSS - 25
32	42,4	100	150	150	PSSS - 32
40	48,3	100	150	150	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

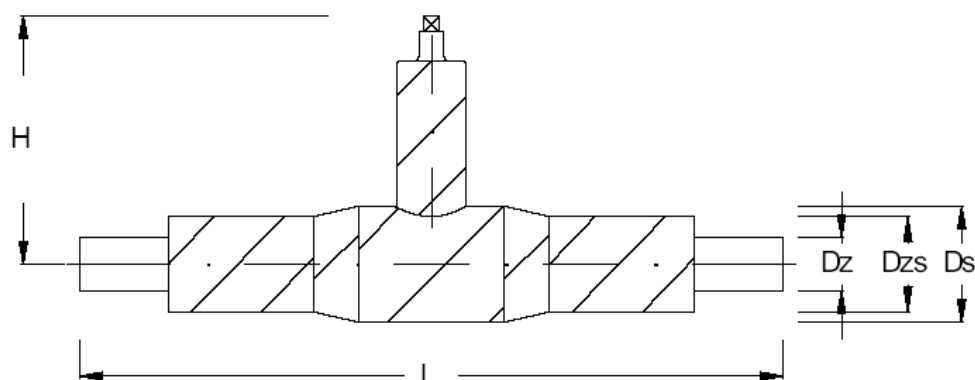


TABLE 12

Straight Section			Ds	H	L	Catalogue Reference Number
Nominal Diameter	Carrier Pipe External Diameter	Jacket Pipe External Diameter				
DN	Dz	Dzs				
mm	mm	mm	mm	mm	mm	
20	26,9	100	100	380	1200	ZPSA - 20
25	33,7	100	100	384	1200	ZPSA - 25
32	42,4	100	100	388	1200	ZPSA - 32
40	48,3	100	125	403	1200	ZPSA - 40
50	60,3	125	140	410	1200	ZPSA - 50
65	76,1	140	160	414	1200	ZPSA - 65
80	88,9	160	200	427	1200	ZPSA - 80
100	114,3	200	224	450	1500	ZPSA - 100
125	139,7	224	250	455	1500	ZPSA - 125
150	168,3	250	315	457	1500	ZPSA - 150
200	219,1	315	400	515	1800	ZPSA - 200
250	273,0	400	450	560	1800	ZPSA - 250
- KEY			- 36 mm - 50 mm			ZKK - 36 ZKK - 50

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



8.12 Vent ball valve

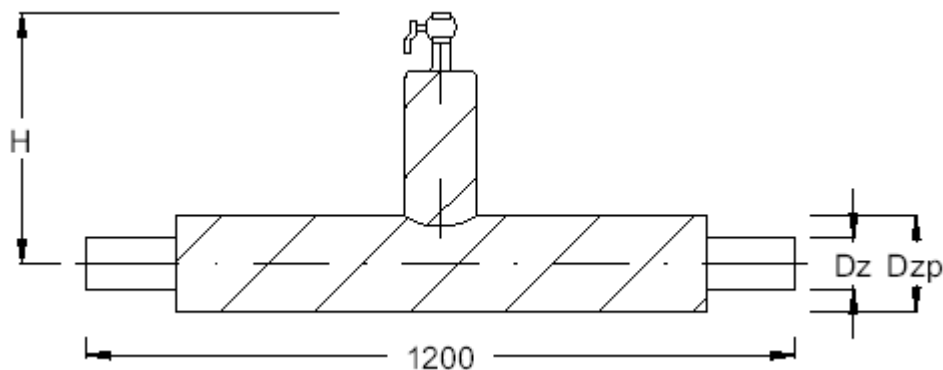


TABLE 13

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	
25	33,7	100	33,7	384	ZDSA-25
32	42,4	100	33,7	388	ZDSA-32
40	48,3	100	33,7	403	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

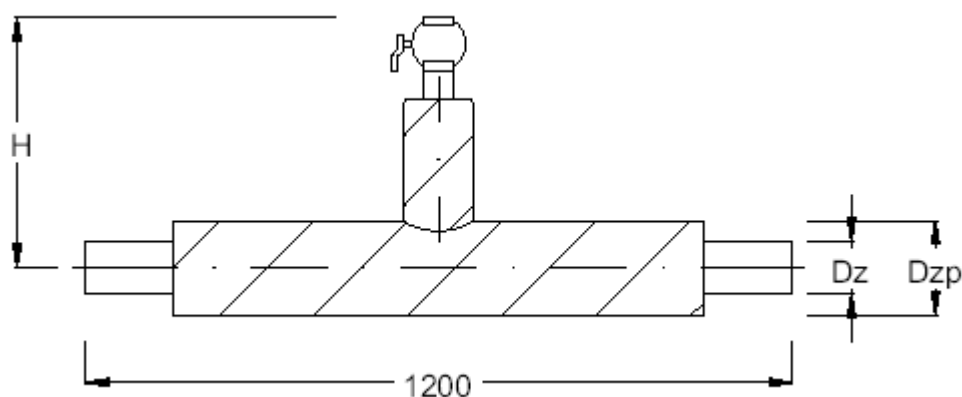


TABLE 14

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	
40	48,3	100	48,3	403	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	48,3	515	ZOSA-200
250	273,0	400	48,3	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

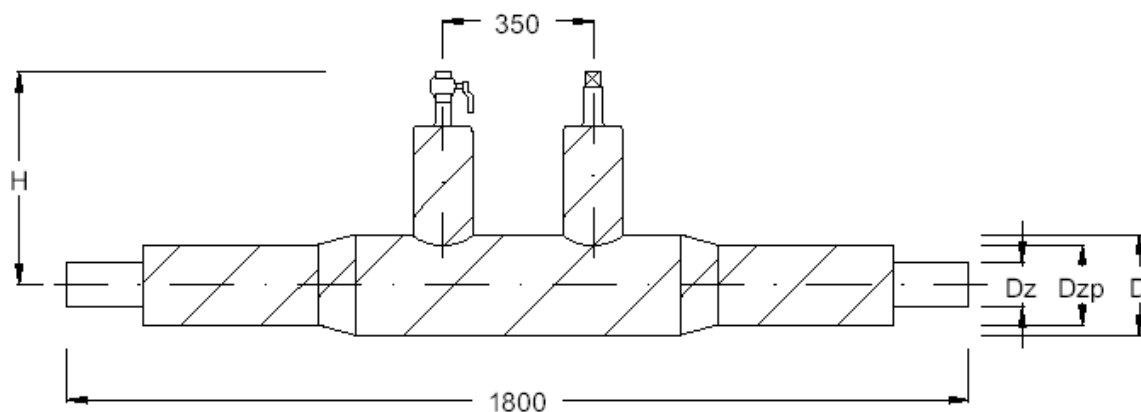


TABLE 15

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm	mm	mm	
32	42,4	100	110	388	ZKDSA-32
40	48,3	100	125	403	ZKDSA-40
50	60,3	125	140	410	ZKDSA-50
65	76,1	140	160	414	ZKDSA-65
80	88,9	160	200	427	ZKDSA-80
100	114,3	200	225	450	ZKDSA-100
125	139,7	224	250	455	ZKDSA-125
150	168,3	250	315	457	ZKDSA-150
200	219,1	315	400	515	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: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.15 Shutoff ball valve and vent valve assembly

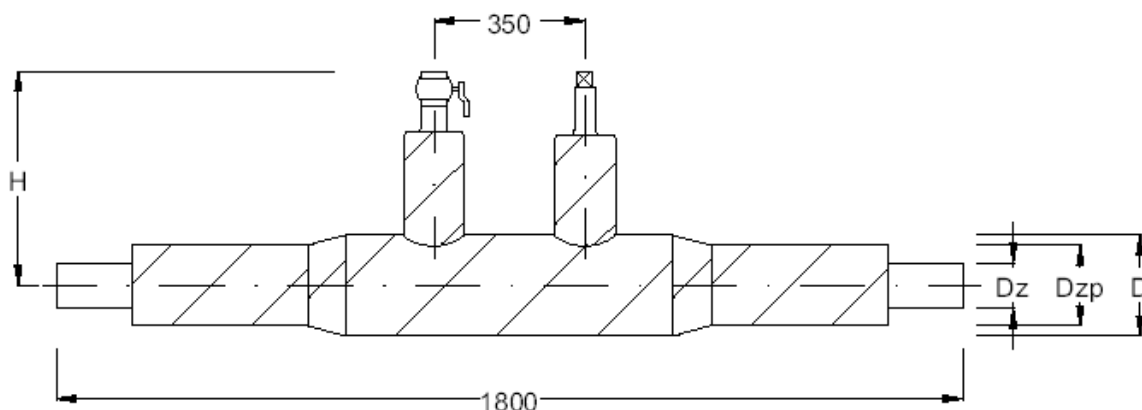


TABLE 16

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm	mm	mm	
40	48,3	100	125	403	ZKOSA-40
50	60,3	125	140	410	ZKOSA-50
65	76,1	140	160	414	ZKOSA-65
80	88,9	160	200	427	ZKOSA-80
100	114,3	200	225	450	ZKOSA-100
125	139,7	224	250	455	ZKOSA-125
150	168,3	250	315	457	ZKOSA-150
200	219,1	315	400	515	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: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.16 Drain and vent shutoff ball valve

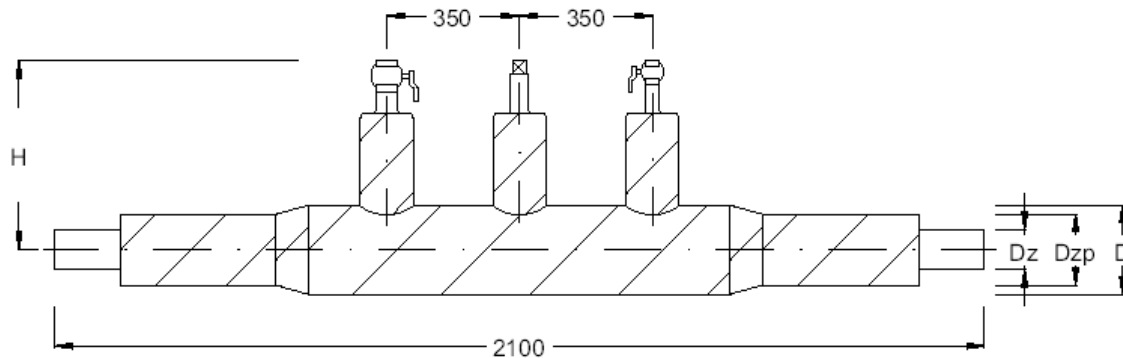


TABLE 17

MAIN PIPE			D	H	CATALOGUE REFERENCE NUMBER
Nominal diameter	Carrier pipe external diameter	Casing pipe external diameter			
DN	Dz	Dzp			
mm	mm	mm	mm	mm	
40	48,3	100	125	403	ZKODSA-40
50	60,3	125	140	410	ZKODSA-50
65	76,1	140	160	414	ZKODSA-65
80	88,9	160	200	427	ZKODSA-80
100	114,3	200	225	450	ZKODSA-100
125	139,7	224	250	455	ZKODSA-125
150	168,3	250	315	457	ZKODSA-150
200	219,1	315	400	515	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: Elements with diameters above DN 250 are manufactured according to the geometric dimensions agreed with the client.



8.17 Longitudinal compensator

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

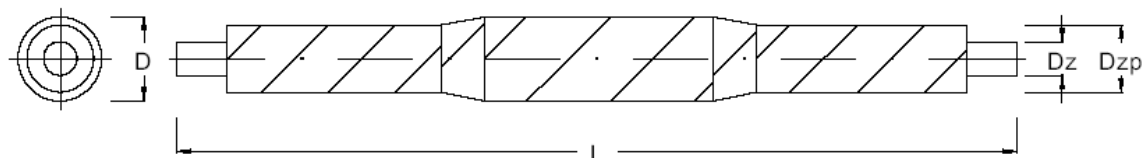


TABLE 17

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	100	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

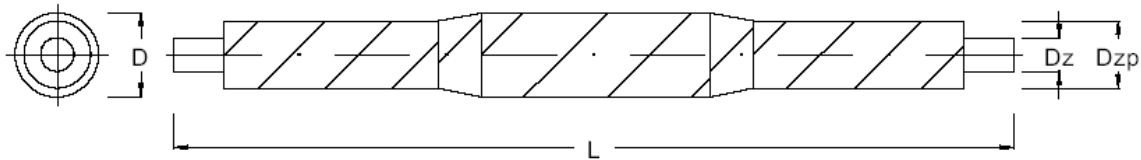


TABLE 18

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

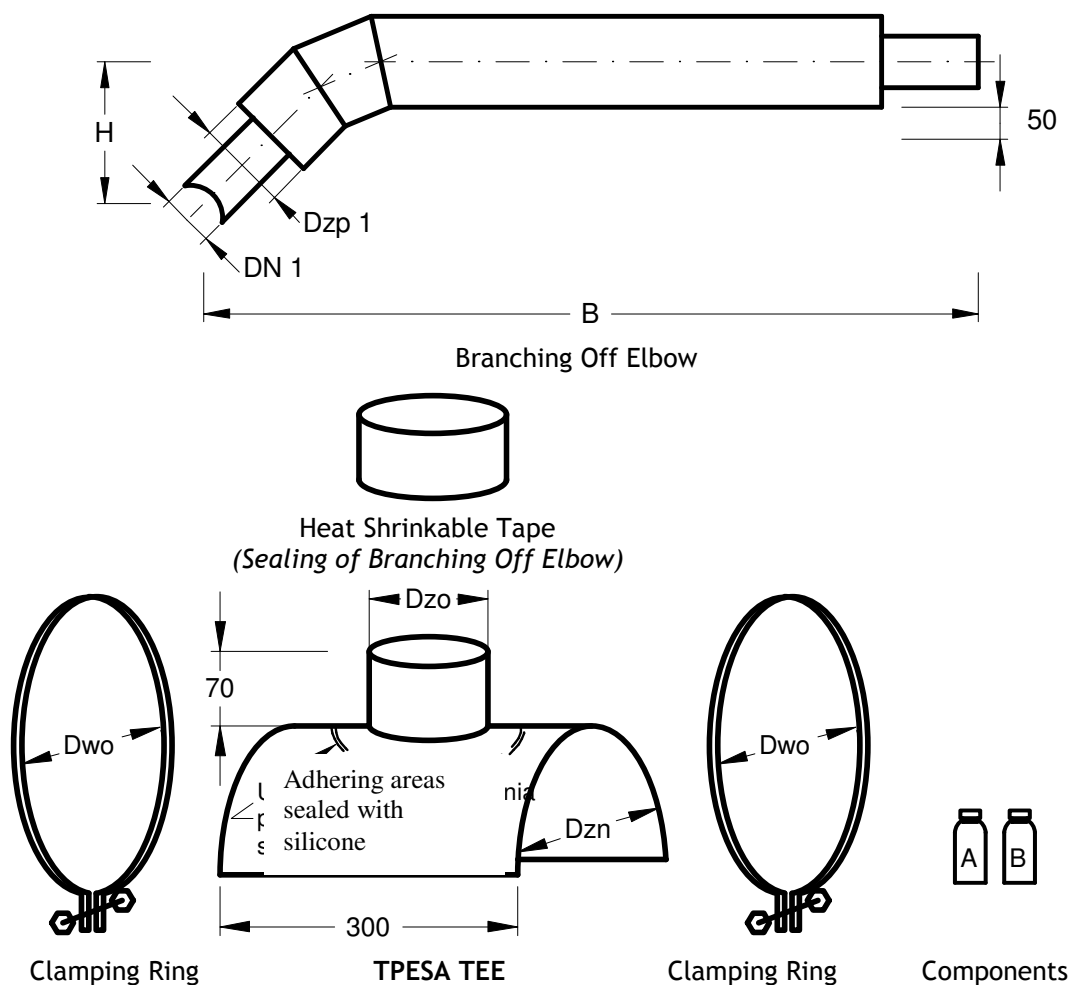


TABLE 19

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	
32	100,0	25	100,0	150	900	100,0	125,0	110,0	TPESA - 32/25
40	100,0	32	100,0	160	900	100,0	125,0	110,0	TPESA - 40/32
50	125,0	40	125,0	168	900	125,0	140,0	135,0	TPESA - 50/40
65	140,0	50	140,0	183	1200	140,0	160,0	150,0	TPESA - 65/50
80	160,0	65	140,0	200	1200	160,0	200,0	170,0	TPESA - 80/65
100	200,0	65	140,0	220	1200	200,0	224,0	210,0	TPESA - 100/65

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

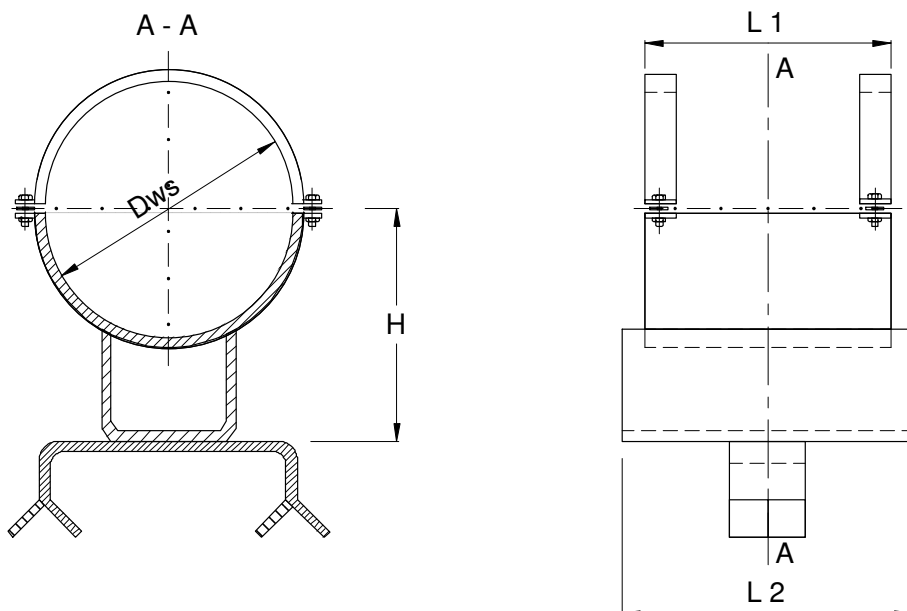


TABLE 20

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	100	101,0	138	170	210	RSS - 20
25	33,7	100	101,0	138	170	210	RSS - 25
32	42,4	100	101,0	138	170	210	RSS - 32
40	48,3	100	101,0	138	170	210	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

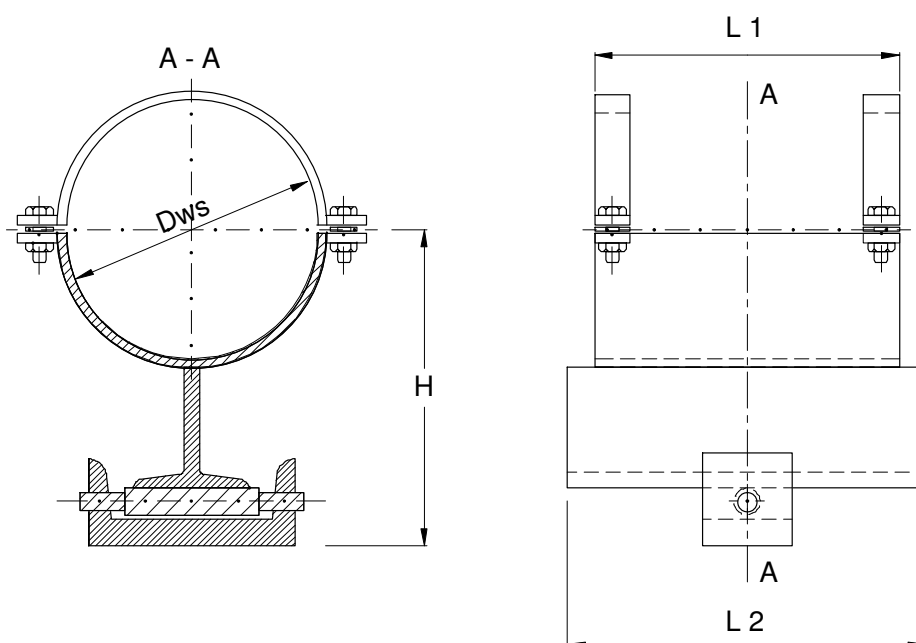


TABLE 21

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	mm	mm	mm	
20	26,9	100	101,0	150	170	210	RRS - 20
25	33,7	100	101,0	150	170	210	RRS - 25
32	42,4	100	101,0	150	170	210	RRS - 32
40	48,3	100	101,0	150	170	210	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

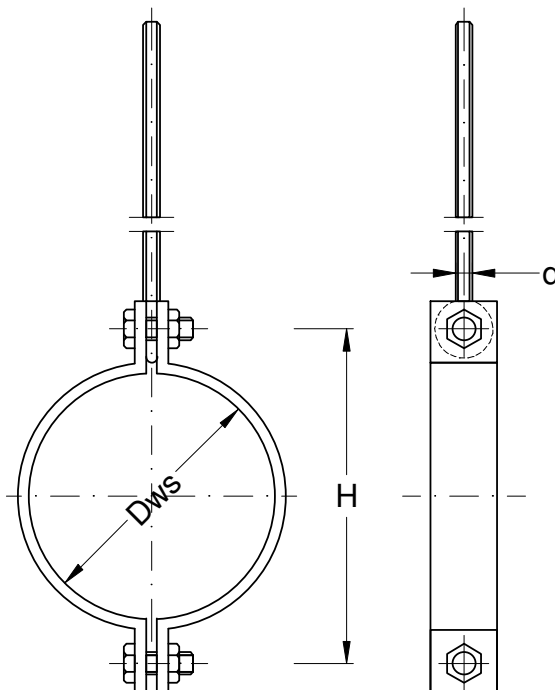


TABLE 22

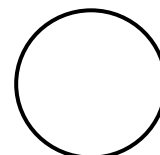
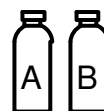
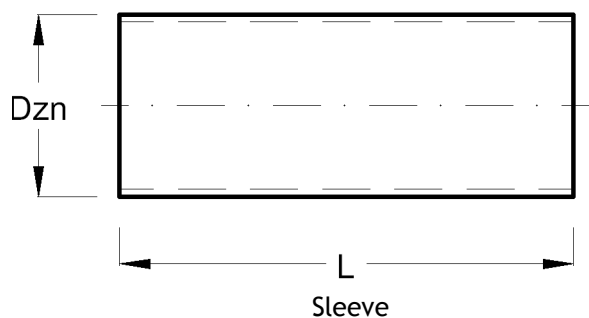
Steel Carrier Pipe		Jacket Pipe	Clamping Ring	H	D	Catalogue Reference Number
Nominal Diameter	External Diameter	External Diameter	Internal Diameter			
DN	Dz	Dzs	Dws			
mm	mm	mm	mm	mm	mm	
20	26,9	100	101,0	139	16	RCS - 20
25	33,7	100	101,0	139	16	RCS - 25
32	42,4	100	101,0	139	16	RCS - 32
40	48,3	100	101,0	139	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.



Components Heat shrinkable band

TABLE 23

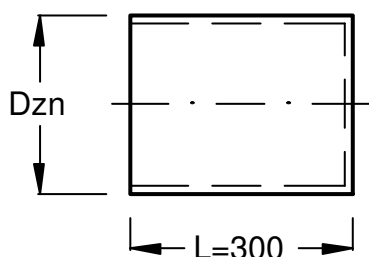
Nominal Diameter	Steel Pipe External Diameter	Sleeve External Diameter	Components		Length	Heat Shrinkable Band	SYMBOL KATALOGOWY
DN	Dz	Dzn	A	B	L		
mm	mm	mm	g	g	mm	pcs	
20	26,9	110	90	146	600	2	NS - 20/110
25	33,7	110	86	141	600	2	NS - 25/110
32	42,4	110	124	202	600	2	NS - 32/110
40	48,3	110	120	195	600	2	NS - 40/110
50	60,3	135	141	229	600	2	NS - 50/135
65	76,1	150	155	253	600	2	NS - 65/150
80	88,9	173	199	324	600	2	NS - 80/173
100	114,3	214	310	506	600	2	NS - 100/214
125	139,7	240	396	646	600	2	NS - 125/240
150	168,3	265	435	709	600	2	NS - 150/265
200	219,1	333	571	931	600	2	NS - 200/333
250	273,0	420	1241	2023	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

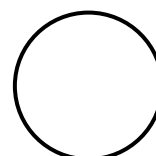
11.1 Pipeline Closing - End Sleeve



Sleeve



Components



Heat Shrinkable
Band

TABLE 24

Nominal Diameter	Jacket Pipe External Diameter	Sleeve External Diameter	Components		Heat Shrinkable Band	Catalogue Reference Number
DN	Dzs	Dzn	A	B		
mm	mm	mm	g	g	szt.	
20	100	110	60	97	1	NKS - 20/110
25	100	110	57	93	1	NKS - 25/110
32	100	110	82	134	1	NKS - 32/110
40	100	110	79	129	1	NKS - 40/110
50	125	135	98	160	1	NKS - 50/135
65	140	150	117	191	1	NKS - 65/150
80	160	173	149	243	1	NKS - 80/173
100	200	214	230	374	1	NKS - 100/214
125	224	240	283	461	1	NKS - 125/240
150	250	265	332	541	1	NKS - 150/265
200	315	333	484	789	1	NKS - 200/333
250	400	420	1099	1791	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
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 2. Manual | Detection of Pipe Leaks
Connection of Pulse Monitoring System in Thermal Utilities
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 3. Manual | Manual of Execution and take Over
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 4. Manual | Joint Unit Assembly Insulation and Sealing
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 5. Manual | Manual of Steel Pipe Welding
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 6. Manual | Steel Pipe Connection Welding Quality Inspection
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 7. Manual | DX Joints electrically welded
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |
| 8. Manual | DT Type Heat Shrinkable Joints Electrically Welded
<i>ZPU Międzyrzecz Sp. z o. o. System</i> |

13 Trade Information

Manufacturer and Seller:

ZAKŁAD PRODUKCYJNO USŁUGOWY
Międzyrzecz
Polskie Rury Preizolowane Sp. z o.o.
ul. Zakaszewskiego 4, 66-300 Międzyrzecz
fax: (095) 742-33-01, 742-33-02
Phones:
Secretary: (095) 741-25-26; 742-33-00; 742-00-93
Trade Service: (095) 742-33-23; 742-33-38
Supplies: (095) 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.