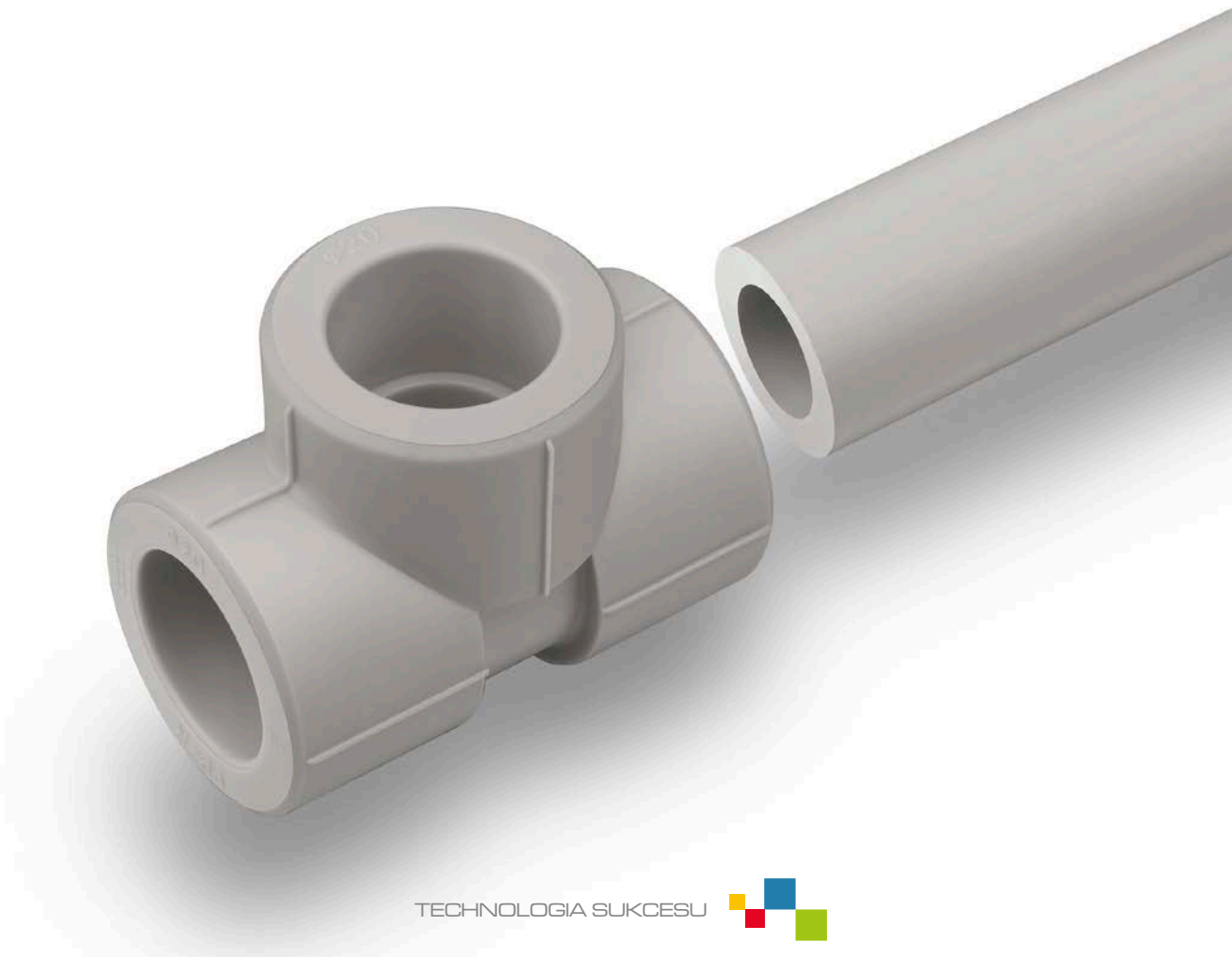
∅ 16–110 mm

SYSTEM **KAN-therm**

PP

High quality
for reasonable price



TECHNOLOGIA SUKCESU

ISO **9001**

Contents

3 KAN-therm PP System

3 KAN-therm PP System

System KAN-therm PP is a complete installation system consisting of pipes and fittings made of polypropylene PP-R (type3).

The system is widely used in construction, particularly in water supply systems.

The elements of the system are connected by socket welding (thermal polyfusion) with the use of electric welders. Welding technique through a homogeneous combination provides outstanding tightness and mechanical strength of the installation.

The material

The plastic used in the production of pipes and fittings of the System KAN-therm PP is the high quality random polypropylene copolymer (PP-R) which used to be marked as Type 3.

System KAN-therm PP is characterised by a number of advantages:

- high microbiological and physiological inertness of products
- high chemical resistance,
- resistance to material corrosion,
- low thermal conductivity,
- low specific mass,
- resistance to scale accumulation,
- dampening of flow vibrations and noises,
- mechanical strength,
- homogeneity of connections,
- high operation durability.

The scope of uses

The installation System KAN-therm PP, due to its material properties, has a wide range of use:

- cold (20°C/1.0 MPa) and hot (60°C/1.0 MPa) water in residential buildings in hospitals, hotels, office buildings, schools,
- central heating systems (temp. up to 90°C, working pressure up to 0.6 MPa),
- compressed air systems,
- balneological installations,
- installations in agriculture and gardening,
- industrial pipelines, e.g. for transporting of aggressive media and food substances,
- naval installations.

The scope of applications includes new installations, as well as repairs, modernizations and replacements.

Sanitary systems installation

System KAN-therm PP installations, thanks to the special properties of PP-R polypropylene (physiological and microbiological inertness, resistance to corrosion, to scale accumulation, vibration resistance, high thermal insulation of pipes), they are widely used especially in water supply systems, in particular in the installation of risers and horizontal pipes.

This refers to both cold and hot water installations - in residential buildings, hospitals, hotels, office buildings, schools, on ships, etc.

System KAN-therm PP installations are indispensable in the replacement of old, corroded water supply installations.

Due to the specific technique of connection, thermal polyfusion, i.e. welding, tightness and durability of the installation is guaranteed.

Elements of the system

System KAN-therm PP includes the following elements:

- PP-R pipes in the form of straight sections, uniform and compound,
- uniform PP-R fittings,
- „adaptor" couplings with metal threads,
- sleeves for flange connections, pipe joint connections,
- expansion bends, wallplates, ball valves,
- fixing elements,
- tools for cutting, machining and welding.

Pipes

Pipe types

KAN-therm PP System features four pipe types which differ in wall thickness and structure (compound pipes):

- uniform pipes PN 10 (20 –110 mm),
- uniform pipes PN 16 (20 –110 mm),
- uniform pipes PN 20 (16 –110 mm),
- compound pipes PN 16 Stabi Al (20 –75 mm),
- compound pipes PN 20 Stabi Al (16 –110 mm),
- compound pipes PN16 Glass (20-110 mm).
- compound pipes PN20 Glass (20-110 mm).

Dimension (range) and pressure classification of PP-R pipes

$$S = (D-s)/2s$$

$$SDR = 2\times S+1 = D/s$$

S – pipe dimension series in accordance with ISO 4065
SDR – Standard Dimension Ratio
D – nominal external tube diameter
s – nominal tube wall thickness
PN – pipe pressure range

S	SDR	PN
5	11	10
3.2	7.4	16
2.5	6	20

Pipes PN10 (S5/SDR11)					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
20 × 1,9	20	1.9	16.2	0.206	0.107
25 × 2,3	25	2.3	20.4	0.327	0.164
32 × 2,9	32	2.9	26.2	0.531	0.267
40 × 3,7	40	3.7	32.6	0.834	0.412
50 × 4,6	50	4.6	40.8	1.307	0.638
63 × 5,8	63	5.8	51.4	2.075	1.010
75 × 6,8	75	6.8	61.4	2.941	1.420
90 × 8,2	90	8.2	73.6	4.254	2.030
110 × 10,0	110	10.0	90.0	6.362	3.010

Pipes PN16 (S3,2/SDR7,4)					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
20 × 2,8	20	2.8	14.4	0.163	0.148
25 × 3,5	25	3.5	18.0	0.254	0.230
32 × 4,4	32	4.4	23.2	0.415	0.370
40 × 5,5	40	5.5	29.0	0.615	0.575
50 × 6,9	50	6.9	36.2	1.029	0.896
63 × 8,6	63	8.6	45.8	1.633	1.410
75 × 10,3	75	10.3	54.4	2.307	2.010
90 × 12,3	90	12.3	65.4	3.358	2.870
110 × 15,1	110	15.1	79.8	4.999	4.300

Pipes PN20 (S2,5/SDR6)					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
16 × 2,7	16	2.7	10.6	0.088	0.110
20 × 3,4	20	3.4	13.2	0.137	0.172
25 × 4,2	25	4.2	16.6	0.216	0.266
32 × 5,4	32	5.4	21.2	0.353	0.434
40 × 6,7	40	6.7	26.6	0.556	0.671
50 × 8,3	50	8.3	33.4	0.866	1.050
63 × 10,5	63	10.5	42.0	1.385	1.650
75 × 12,5	75	12.5	50.0	1.963	2.340
90 × 15,0	90	15.0	60.0	2.827	3.360
110 × 18,3	110	18.3	73.4	4.208	5.040

Pipes PN 16 (S3,2/SDR7,4) Stabi Al					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
20×2,8	20 (21,7)*	2.8	14.4	0.163	0.194
25×3,5	25 (26,7)*	3.5	18	0.254	0.292
32×4,4	32 (33,7)*	4.4	23.2	0.415	0.462
40×5,5	40 (41,6)*	5.5	29	0.615	0.682
50×6,9	50 (51,6)*	6.9	36.2	1.029	1.003
63×8,6	63 (64,5)*	8.6	45.8	1.633	1.540
75×10,3	75 (76,5)*	10.3	54.4	2.307	2.590

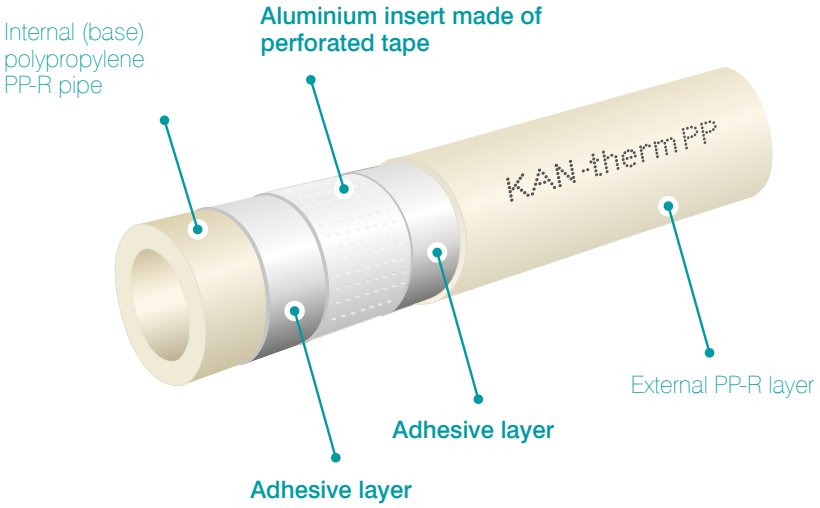
Pipes PN 20 (S2,5/SDR6) Stabi Al					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
16 × 2,7	16 (17,8)*	2.7	10.6	0.088	0.160
20 × 3,4	20 (21,8)*	3.4	13.2	0.137	0.218
25 × 4,2	25 (26,9)*	4.2	16.6	0.216	0.328
32 × 5,4	32 (33,9)*	5.4	21.2	0.353	0.520
40 × 6,7	40 (41,9)*	6.7	26.6	0.556	0.770
50 × 8,3	50 (51,9)*	8.3	33.4	0.866	1.159
63 × 10,5	63 (64,9)*	10.5	42.0	1.385	1.770
75 × 12,5	75 (76,9)*	12.5	50.0	1.963	2.780
90 × 15,0	90 (92)*	15.0	60.0	2.830	3.590
110 × 18,3	110 (112)*	18.3	73.4	4.210	5.340

Pipes PN 16 (S3,2/SDR7,4) Glass					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
20 × 2,8	20	2.8	14.4	0.163	0.160
25 × 3,5	25	3.5	18.0	0.254	0.250
32 × 4,4	32	4.4	23.2	0.415	0.430
40 × 5,5	40	5.5	29.0	0.615	0.650
50 × 6,9	50	6.9	36.2	1.029	1.000
63 × 8,6	63	8.6	45.8	1.633	1.520
75 × 10,3	75	10.3	54.4	2.307	2.200
90 × 12,3	90	12.3	65.4	3.358	3.110
110 × 15,1	110	15.1	79.8	4.999	4.610

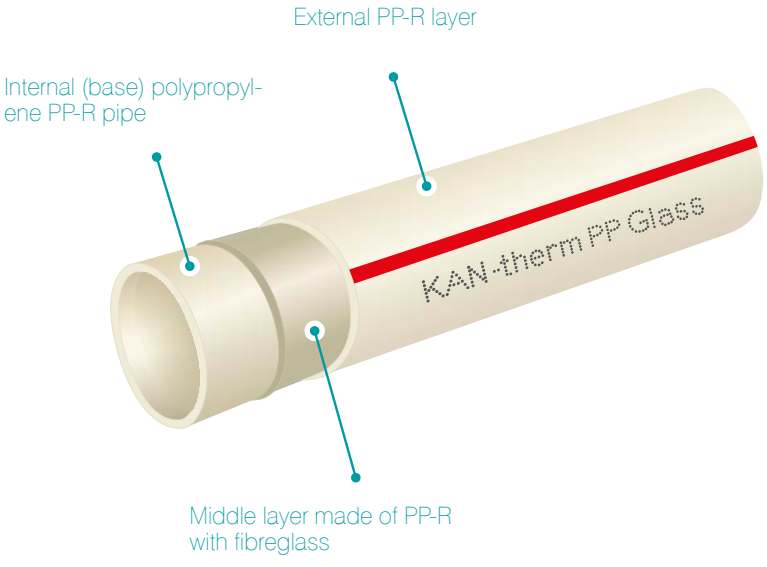
Pipes PN 20 (S2,5/SDR6) Glass					
Dimensions	Ext. diameter D	Wall thick s	Int. diameter d	Unit volume	Unit mass
[mm]	[mm]	[mm]	[mm]	[l/m]	[kg/m]
20 × 3,4	20	3.4	13.2	0.137	0.180
25 × 4,2	25	4.2	16.6	0.216	0.290
32 × 5,4	32	5.4	21.2	0.353	0.460
40 × 6,7	40	6.7	26.6	0.556	0.680
50 × 8,3	50	8.3	33.4	0.866	1.000
63 × 10,5	63	10.5	42.0	1.385	1.550
75 × 12,5	75	12.5	50.0	1.963	2.340
90 × 15,0	90	15.0	60.0	2.827	3.360
110 × 18,3	110	18.3	73.4	4.208	4.900

Application (in accordance with ISO 10508)	P_{rob}(dop) [bar]	Pipe type
Cold utility water **T = 20 °C**	10	PN10 (S5) PN16 (S3,2) PN16 (S3,2) Stabi Al and Glass PN20 (S2,5) PN20 (S2,5) Stabi Al and Glass
Hot utility water **[Class 1]** T_d/T_{max} = 60/80°C	10	PN20 (S2,5) PN20 S2 5 Stabi Al and Glass
	8	PN16 (S3,2) PN16 (S3,2) Stabi Al and Glass
Hot utility water **[Class 2]** **T_d/T_{max} = 70/80°C**	8	PN20 (S2,5) PN20 Stabi Al i Glass
	6	PN16 (S3,2) PN16 Stabi Al and Glass
Floor heating, low temperature radiator heating **[Class 4]** **T_d/T_{max} = 60/70°C**	10	PN16 (S3,2) PN20 (S2,5) PN16 (S3,2) Stabi Al and Glass PN20 (S2,5) Stabi Al and Glass
Radiator heating **[Class 5]** **T_d/T_{max} = 80/90°C**	6	PN16 (S3,2) PN20 (S2,5) PN16 (S3,2) Stabi Al and Glass PN20 (S2,5) Stabi Al and Glass

Compound pipesj KAN-therm PP Stabi Al



Compound pipesj KAN-therm PP Glass



Thermal elongation

Every pipeline, when exposed to temperature difference ΔT undergoes elongation (or shortening) by the ΔL value. This amount is calculated with the below formula:

$$\Delta L = \alpha \times L \times \Delta T$$

where:

α – thermal linear elongation coefficient [mm/mK]
- 0,15 [mm/mK] – homogenous PP pipes
- 0,05 [mm/mK] – PP Glass pipes
- 0,03 [mm/mK] – PP Stabi pipes

L – pipeline section length [m]

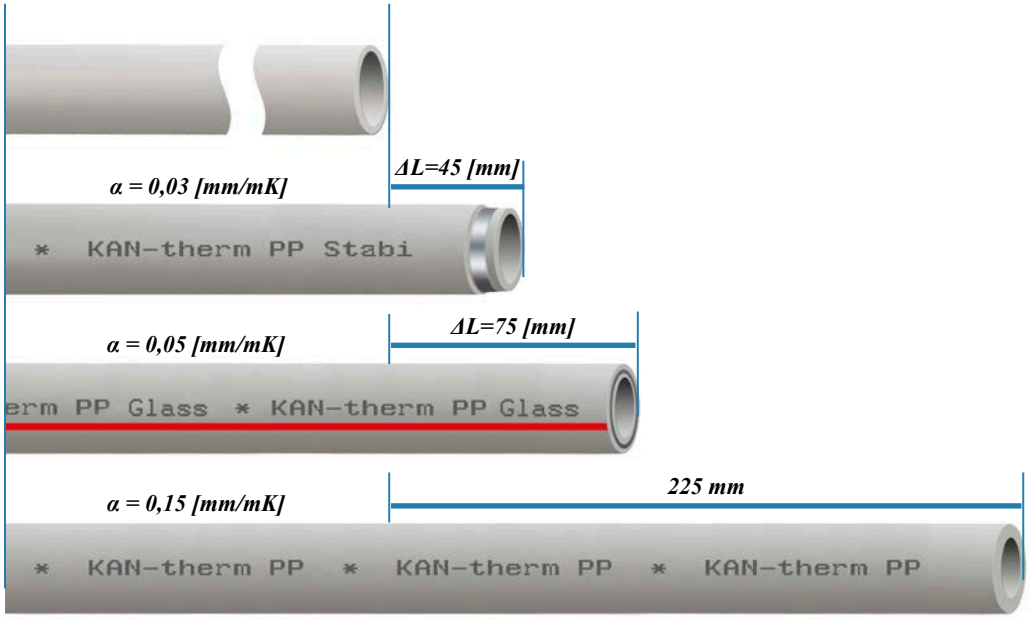
ΔT – temperature difference during installation and use [K]

Example:

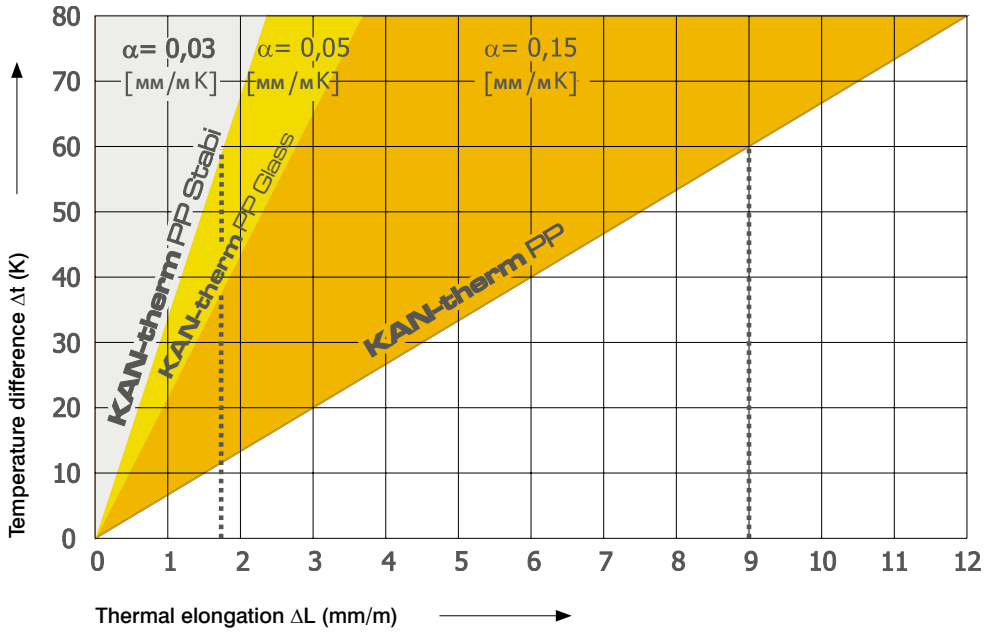
Elongation of 25 m pipe KAN-therm PP Stabi, KAN-therm PP Glass, KAN-therm PP homogenous at temperature difference 60°C.

- KAN-therm PP Stabi ΔL = 0,03×25×60 = 45 [mm]
- KAN-therm PP Glass ΔL = 0,05×25×60 = 75 [mm]
- KAN-therm PP homogenous ΔL = 0,15×25×60 = 225 [mm]

Elongation of 25 m pipe



Comparison of thermal elongation or KAN-therm PP pipes, homogeneous and joint Stabi Al and Glass



Compensators

In order to eliminate linear elongation effects (uncontrolled movements of pipelines and their deformation), compensation solutions with different structures are sued (flexible arm, U- and Z-shape compensators).

$$Ls = K \times \sqrt{Dz \times \Delta L}$$

where:
Ls – flexible arm's length [mm]
K – material coefficient = 20
Dz – external diameter of the pipe [mm]
ΔL – elongation of the pipe-line length [mm]

„L", „Z", and „U" compensator selection

Table 1 Required expansion compensation length A [mm] for System KAN-therm PP

Elongation values ΔL [mm]	Pipe external diameters d_z [mm]									
	16	20	25	32	40	50	63	75	90	110
	Required expansion compensation length A [mm]									
2	113	126	141	160	179	200	225	245	268	297
4	160	179	200	226	253	283	318	346	380	420
6	196	219	145	277	310	346	389	424	465	514
8	226	253	283	320	358	400	449	490	537	593
10	253	283	316	358	400	447	502	548	600	663
12	277	310	346	392	438	490	550	600	657	727
14	299	335	374	423	473	529	594	648	710	785
16	320	358	400	453	506	566	635	693	759	839
18	339	379	424	480	537	600	674	735	805	890
20	358	400	447	506	566	632	710	775	849	938
22	375	420	469	531	593	663	745	812	890	984
24	392	438	490	554	620	693	778	849	927	1028

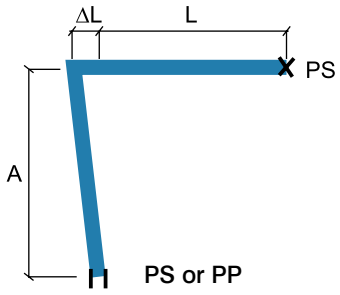
Table 1 Required expansion compensation length A [mm] for System KAN-therm PP

Elongation values ΔL [mm]	Pipe external diameters d_z [mm]									
	16	20	25	32	40	50	63	75	90	110
	Required expansion compensation length A [mm]									
26	408	456	510	577	645	721	809	883	968	1070
28	423	473	529	599	669	748	840	917	1004	1110
30	438	490	548	620	693	775	869	949	1039	1149
32	453	506	566	640	716	800	898	980	1073	1187
34	466	522	583	660	738	825	926	1010	1106	1223

Table 1 presents required expansion compensation length A for different thermal elongation values ***ΔL*** and pipe external diameters d_z.

Rules for selection of different types of compensators are given below:

„L" type compensator



A – flexible arm length

PP – sliding support (allows only axial movement of a pipeline)

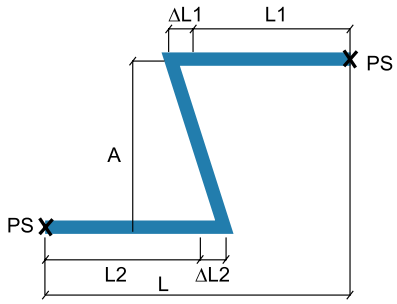
PS – fixed point (prevents any movement of a pipeline)

L – the initial length of a pipelineu

ΔL – pipeline thermal elongation

For compensation arm ***A*** dimensioning, a substitute length L_z=***L*** is taken, and for Lz length the thermal elongation value ***ΔL***, is determined from formula. Next, the expansion compensation length ***A*** is determined on the basis of Tab. 1.

„Z" type compensator



A – flexible arm length

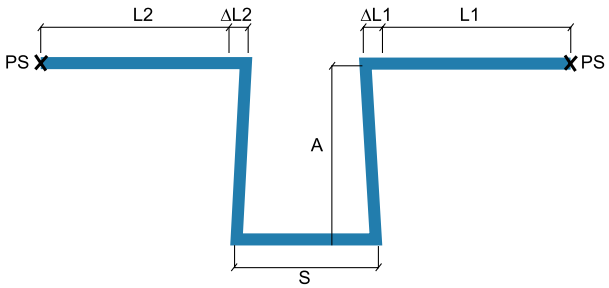
PS – fixed point (prevents any movement of a pipeline)

L – the initial length of a pipelineu

ΔL – pipeline thermal elongation

For compensation arm A dimensioning ***L1*** and ***L2*** sum is taken as a substitute length L_z=***L1+L2*** and for L_z length a substitute ***ΔL*** is determined from formula. Next, the expansion compensation length A is determined on the basis of Tab. 1.

„U” type compensator



A – flexible arm length

PS – fixed point (prevents any movement of a pipeline)

L – the initial length of a pipelineu

ΔL – pipeline thermal elongation

S – szerokość kompensatora U kształtowego

In case of placing fixed point ***PS*** in the section of compensator length S, for compensation arm ***A*** dimensioning, the greater value from ***L1*** and ***L2*** is taken as a substitute length for ***Lz: Lz=max (L1, L2)*** and for this length the substitute elongation ***ΔL*** is determined on the basis of formula, and then compensation arm ***A*** of Tab. 1.

Compensator width: ***S = A/2.***

Connection technique

1. Cutting the pipes with scizors.
2. Removing of the aluminum foil with a coarse file (only for compound Stabi pipesi).

3. Marking of the welding depth.
4. Heating of the pipe and the connector. Parameters:
- welding depth,
- welding time.

5. Connecting of the elements. Parameters:
- joining time.

6. Holding and cooling of the joint. Parameters:
- cooling time.

CAUTION!

In order to make a tight and strong connection between a pipe and a KAN-therm PP System fitting, it is advised to use heating cover plates available in the KAN-therm PP System offer.

Welding parameters				
Ext. pipe diameter	Welding depth	Heating time	Joining time	Cooling time
[mm]	[mm]	[sek.]	[sek.]	[min.]
16	13.0	5	4	2
20	14.0	5	4	2
25	15.0	7	4	2
32	16.0	8	6	4
40	18.0	12	6	4
50	20.0	18	6	4
63	24.0	24	8	6
75	26.0	30	10	8
90	29.0	40	10	8
110	32.5	50	10	8

The heating time of thin-walled pipes (PN 10) is reduced by half (the heating time for fittings remains unchanged). The heating time at external temperatures below +5°C should be increased by 50%. It is forbidden to cool the welded components rapidly (e.g. with cold water).

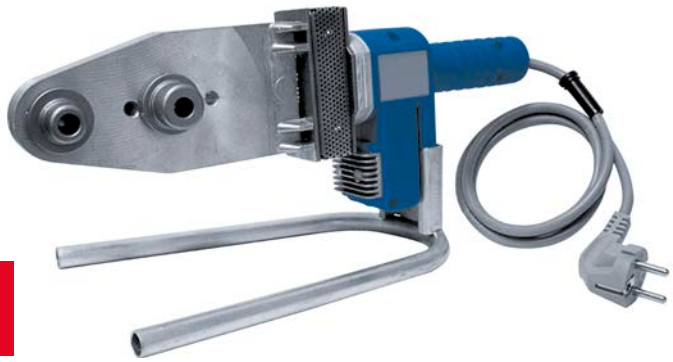
Thread sealing

It is advised to seal threaded connections with such an amount of hemp, that leaves the thread tops not covered. Using too much hemp may lead to thread damage. By winding hemp just after the first thread ridge you can avoid skew screwing and damaging the thread.

CAUTION

Do not use chemical sealants or glues.

Welding temperature 260°C



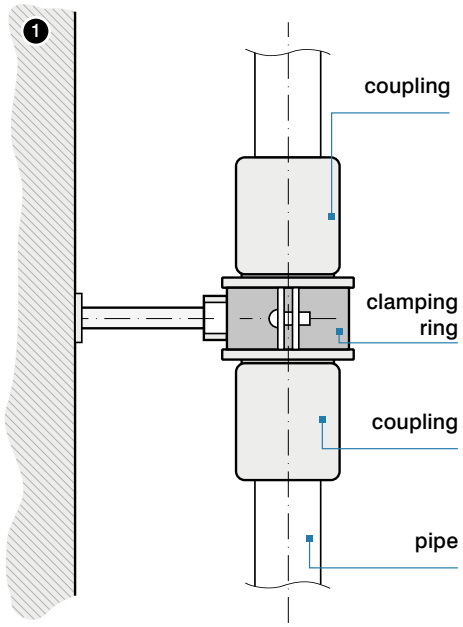
Installation of pipe saddle fittings PP

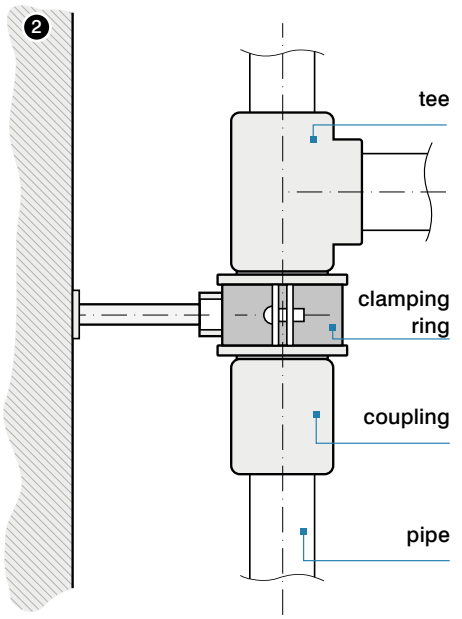
1. Drilling a hole under the pipe saddle fitting
2. Processing the hole – removing the burrs made when drilling..

3. Welding the pipe saddle fitting.
4. Ready connection.

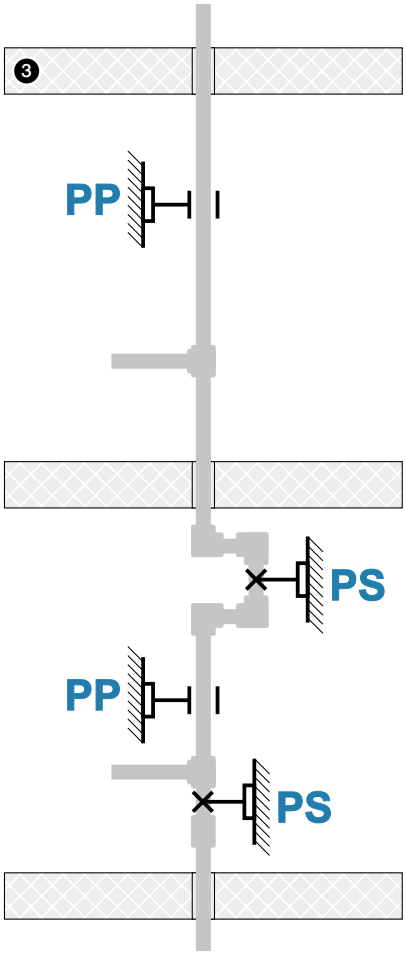
Installation procedures

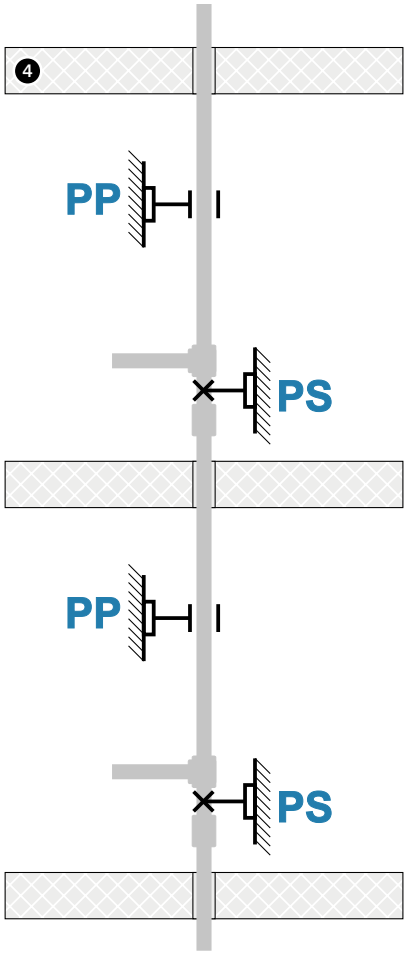
Fixed installation points - installation examples (Fig. 1 and 2)





Examples of installation of hot water risers depending on pipe types (Fig. 3 and 4)
3. Installation made of pipes: System KAN-therm PP PN16, PN20
4. Installation made of pipes: System KAN-therm PP Stabi and KAN-therm PP Glass: PP – slidable point, PS – fixed point





Maximum distances between supports for KAN-therm PP System uniform pipes depending on the diameter and medium temperature. For vertical pipeline sections, the distance between the supports can be increased byabout 30%.

T [°C]	External pipe diameter D [mm]									
	16	20	25	32	40	50	63	75	90	110
	Distance between fixing points [cm]									
20	50	60	70	90	100	120	140	150	160	180
30	50	60	70	90	100	120	140	150	160	180
40	50	60	65	80	90	110	130	140	150	170
50	50	60	65	80	90	110	130	140	150	170
60	50	55	60	75	85	100	115	125	140	160
70	50	50	60	70	80	95	105	115	125	140

Maximum distances between supports for KAN-therm Stabi Al System pipes depending on the diameter and medium temperature. For vertical pipeline sections, the distance between the supports can be increased by about 30%.

T [°C]	External pipe diameter D [mm]									
	16	20	25	32	40	50	63	75	90	110
	Distance between fixing points [cm]									
20	100	120	130	150	170	190	210	220	230	250
30	100	120	130	150	170	190	210	220	230	240
40	100	110	120	140	160	180	200	210	220	230
70	70	90	100	120	140	160	180	190	200	200

Maximum distances between supports for KAN-therm Stabi Al System pipes depending on the diameter and medium temperature. For vertical pipeline sections, the distance between the supports can be increased by about 30%.

T [°C]	External pipe diameter D [mm]									
	16	20	25	32	40	50	63	75	90	110
50	100	110	120	140	160	180	200	210	220	210
60	80	100	110	130	150	170	190	200	210	200
70	70	90	100	120	140	160	180	190	200	200

Maximum distances between supports for KAN-therm System PP Glass pipes depending on the diameter and medium temperature. For vertical pipeline sections, the distance between the supports can be increased by about 30%.

T [°C]	External pipe diameter D [mm]								
	20	25	32	40	50	63	75	90	110
	Distance between fixing points [cm]								
0	120	140	160	180	205	230	245	260	290
20	90	105	120	135	155	175	185	195	215
30	90	105	120	135	155	175	185	195	210
40	85	95	110	125	145	165	175	185	200
50	85	95	110	125	145	165	175	185	190
60	80	90	105	120	135	155	165	175	180
70	70	80	95	110	130	145	155	165	170

Tools - safety

All tools must be applied and used in accordance with their purpose and the manufacturer's instructions.

Use for other purposes or in other areas are considered to be inconsistent with the intended use.

Intended use also requires compliance with the instructions, conditions of inspection and maintenance and relevant safety regulations in their current version.

All works done with tools, which do not meet the application compatible with the intended purpose may result in damage to tools, accessories and pipes.

The consequence may be the leak and / or damage.

Table: selection of Steel flange connections

Code	Size	Amount of screws/ nuts	Screw size	Screw class	Nut class	Amount of washers	Flange	Flat O-Ring
04109140	40 DN32 PN16	4	M16	8.8	8	4	DN32	DN32 EPDM
04109150	50 DN40 PN16	4	M16	8.8	8	4	DN40	DN40 EPDM
04109163	63 DN50 PN16	4	M16	8.8	8	4	DN50	DN50 EPDM
04109175	75 DN65 PN16	8	M16	8.8	8	8	DN65	DN65 EPDM
04109190	90 DN80 PN16	8	M16	8.8	8	8	DN80	DN80 EPDM
04109110	110 DN100 PN16	8	M16	8.8	8	8	DN100	DN100 EPDM