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benchmark
CERTIFICATION

Certificate of Approval

AFC Insaat Malzemeleri ve San.Tic.Ltd.Sti.

Basaksehir 5.Etap 1.Kisim Kalamis Sit. D31 Blok D.1 Esenler Istanbul,Turkey

has implemented a Management System complying with the requirements of

ISO 9001:2000

For the provision of manufacturing, sales and marketing, exporting and importing of plastic pipes and fittings (PPRC, PVC, PE), irrigation hoses and fittings (PVC,PE), radiator and heating systems

IAF

JAS-ANZ


САНИТАРНО-ЭПИДЕМИОЛОГИЧЕСКОЕ ЗАКЛЮЧЕНИЕ


СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ

СЕРТИФИКАТ СООТВЕТСТВИЯ

0877084


ГИГИЕНИЧЕСКАЯ ХАРАКТЕРИСТИКА ПРОДУКЦИИ

In reference to our privious correspondence regarding building materials we would like introduce us as one of the leading pprc pipes and fittings manufacturer in Turkey and doing sales locally and exporting to different countries around the globe. We request you to contact us for any of your requirement or any kind of inquiry regarding the products we are manufacturing. It will be pleasure for us to serve you and do business with your organization for our mutual benifits by providing the utmost service the best quality and competable rates and privilage concessions for you. There in the following you will find a brief introduction of our company and products for your reference.

AFC Group is one of the leading building materials manufacturer since 2005s located in Istanbul city and doing export since 2007 from Turkey to other countries. We mainly deal with the production of PPR-C type 3 Pipes and Fittings.

Via our Exports Department in Istanbul we are currently exporting to North African Countries, sub-continental countries, Arabic countries, middle eastern countries,middle asian countries, Russia, Ukraine, Balkans. Our products comply with Turkish, Russian, European Standards, and our quality is assured by ISO 9002. A brief information regarding our products are below for your kind attention. For detailed information you are kindly requested to contact us or visit our web-site www.afcbuilding.com

AFC THERM WHITE PIPE PN 25

Can be used in hot and cold water installations in housing; and also with compressed air and water distribution systems in industrial use. The wall of the pipes has sufficient thickness to provide strength againts high pressures.

PN 25 pipes can be used under 10 bar atmospheric pressure and 65^{0}C hot water or air transmissions. It may be used under 20 bar pressure if the circulating water is cold. The test pressure is 65 bars and burst pressure is 103 bars.

D	S
20	3.4
25	4.2
32	5.4
40	6.7
50	8.4
63	10.5
75	12.5
90	15.0
110	18.4

AFC THERM ALUMINIUM FOILED WHITE PIPE PN 25

AFC Plastic Products Inc. Also produces aluminium foil wrapped stable pipes that minimize elongation originating from heat.
AFC Aluminium Folied stable pipes is produced by laminating 0.15 mm. Aluminium foil on PN 20 plastic pipes and then with another coating of PPRC overlap. The aluminium foil within the two layers of plastic activates as an agent to reduce the extension capability of the pipes nearly to the level or metal pipes. The stable pipe bears all of the physical qualifications of PN 25 plastic pipes and can be safely used under 10 bar pressure at 90^{0}C liquid or air temperatures.

D	S
20	3.4
25	4.2
32	5.4
40	6.7
50	8.4

D	d	D	L	k
20	19.5	28.0	34.0	4
25	24.5	33.5	37.0	4
32	31.5	42.5	41.0	4
40	39.5	53.0	45.0	4
50	49.5	67.0	52.0	4
63	62.5	84.0	60.0	4
75	74.5	101.5	65.0	4

ELBOW 90°

The elbow is used where the pipeline makes a curve of 90° at cornes. Joined is made by fusion.

D	d	D	L	t
20	19.5	28.5	25.5	14.5
25	24.5	33.0	29.5	16.0
32	31.5	43.5	35.0	18.0
40	39.5	52.0	41.5	20.5
50	49.5	67.0	50.0	23.5
63	62.5	86.1	60.0	27.5
75	74.5	99.0	69.0	30.5

END CAP

It is used a stoper at the dead end lines to stop water flow. It may be attached at the top end of columns during tests and may be welded to other ends where there is no thread.

D	d	D	L
20	19.5	30.0	26.0
25	24.5	35.0	29.0
32	31.5	42.5	32.0
40	39.5	53.5	37.0
50	49.5	68.0	45.0
63	62.5	82.5	52.0
75	74.5	101.5	59.0

ELBOW 45°

This elbow is used where the pipe line changes 45° direction. Joining is made by fusion.

D	d	D	L	t
20	19.5	28.5	25.5	14.5
25	24.5	33.0	29.5	16.0
32	31.5	43.5	35.0	18.0
40	39.5	52.0	20.5	20.5
50	49.5	67.0	50.0	23.5
63	62.5	86.1	60.0	27.5
75	74.5	99.0	69.0	30.5

REDUCER

This is joint piece that is used for joining bigger size pipes to smaller size pipes, to reduce to lower diameter pipes. The joining is made by fusion welding.

D	d	d1	D	L	L1	L2
25/20	25.0	19.5	30.0	39.0	19.0	14.5
32/20	32.0	19.5	34.0	41.0	24.0	14.5
32/25	32.0	24.5	34.0	45.0	24.0	16.0
40/20	30.0	19.5	40.0	47.5	23.0	16.0
40/25	35.0	24.5	40.0	47.5	28.0	18.0
40/32	40.0	31.5	42.0	47.5	28.0	18.0
50/25	50.0	33.2	50.0	48.0	20.5	25.5
50/32	50.0	33.2	50.0	48.0	20.5	25.5
50/40	50.0	33.2	53.5	48.0	23.5	23.5
63/25	63.0	41.5	63.0	52.0	24.5	27.0
63/32	63.0	41.5	63.0	52.0	24.5	27.0
63/40	53.5	41.5	63.0	52.0	24.5	27.0
63/50	63.0	49.5	67.0	52.0	27.0	24.0
75/50	67.0	49.0	75.0	60.0	24.0	30.0
75/63	75.0	62.5	84.0	85.0	27.5	37.5

FEMALE TEE

This threaded “T” is used at joints to battery, tap or other connections under plaster. The threads must be chosen from the right size of the pipe to be connected to, and will be welded at both ends.

D	d	G	D	D1	L	L1	L2
20*1/2*20	19.5	1/2”	30.0	40.0	51.0	37.0	14.5
25*1/2*25	24.5	1/2”	35.0	40.0	74.0	37.5	16.0
25*3/4*25	24.5	3/4”	35.0	40.0	74.0	37.5	16.0
32*1*32	31.5	1”	43.0	53.0	75.0	48.5	18.0

FEMALE ELBOW

It is used a stoper at the dead end lines to stop water flow. It may be attached at the top end of columns during tests and may be welded to other ends where there is no thread.

D	d	G	L	L1	L2
20*1/2	19.5	1/2	36.0	31.0	14.5
25*1/2	24.5	1/2	39.5	31.5	16.0
25*3/4	24.5	3/4	39.5	31.5	16.0
32*1	31.5	3/4	46.0	34.0	18.0

MALE ELBOW

This elbow is used in attachments under and over the plaster.

D	d	G	L	L1	L2	L3
20*1/2	19.5	1/2	49.0	36.0	31.0	14.5
25*1/2	24.5	1/2	52.5	39.5	31.5	16.0
25*3/4	24.5	3/4	52.5	39.5	31.5	16.0
32*1	31.5	3/4	59.5	46.0	34.0	18.0

UNEQUAL TEE

This “T” is used for extensions to different diameter size piping; it also server as a reducer. Therefore there is no need to use an adaptor when this piece is used.

A B C	L	K1	K2	K3
20*25*20	14.5	20.5	15.5	17.0
25*20*20	16.0	19.0	17.0	17.0
25*25*20	16.0	19.0	15.5	17.0
25*20*25	16.0	19.0	17.0	17.0

T PART

This “T” is used to take an outlet. The joining is made by fusion welding.

D	d	G	L	L1	L2
20	19.5	30.0	51.0	28.0	14.5
25	24.5	35.0	59.0	32.0	16.0
32	31.5	43.0	70.0	38.0	18.0
40	39.5	53.4	83.0	41.5	20.5
50	49.5	66.5	105.0	55.5	23.5
63	62.5	84.5	126.0	70.0	28.0
75	74.5	101.5	160.0	81.0	30.0

FEMALE SOCKET

This is an intermediate joining piece to be used in connecting metal pipes to AFC THERM pipes. It is welded to the end of the lines and is used in joining to threaded armatures or other threaded connections. It is female threaded and can be tightened by usin pincers.

D	d	G	L	L1	L2
20*1/2	19.5	1/2”	40.0	24.5	15.0
20*3/4	19.5	3/4”	40.0	23.5	15.0
25*1/2	24.5	1/2”	40.0	23.5	16.5
25*3/4	24.5	3/4”	40.0	24.5	16.5
32*1	31.5	1”	44.0	27.0	17.0
40*1.1/4	39.5	1.1/4”	47.0	25.0	20.5
50*1.1/2	49.5	1.1/2”	54.0	29.0	23.5
63*2	62.5	2”	76.0	30.0	26.0
75*2.1/2	74.5	2.1/2”	82.0	30.0	31.0

MALE SOCKET

This Union piece is used when galvanized and metal pipe is joined to AFC THERM plastic pipe. There is a canal on the head for adjustable pincers.

D	d	G	L	L1	L2	L3
20*1/2	19.5	1/2”	53.5	40.0	24.5	15.0
20*3/4	19.5	3/4”	53.5	40.0	24.5	15.0
25*1/2	24.5	1/2”	53.5	40.0	24.5	16.5
25*3/4	24.5	3/4”	53.5	40.0	24.5	16.5
32*1	31.5	1”	62.5	44.0	27.0	17.0
40*1.1/4	39.5	1.1/4”	81.0	47.0	25.0	20.5
50*1.1/2	49.5	1.1/2”	90.0	54.0	29.0	23.5
63*2	62.5	2”	101.0	57.0	30.0	26.0
75*2.1/2	74.5	2.1/2”	107.0	61.0	30.0	31.0

SOCKET

The socket is used in joining two pipes to each other. Both ends are welded together to the pipe. It provides advantage when short length cut pipes or renewing faulty pipeces together.

MALE THREADED TEE

This “T” is used on top or under plaster where a threaded exit joint is necessary.

D	d	G	L	L1	L2	L3
20*1/2*20	19.5	1/2”	51.0	14.5	37.0	13.5
25*1/2*25	24.5	1/2”	74.0	16.0	37.5	13.5
25*3/4*25	24.5	3/4”	74.0	16.0	37.5	13.5
32*1*32	31.5	1”	74.0	18.0	37.5	13.5

DOUBLE WALL DISC CONNECTOR

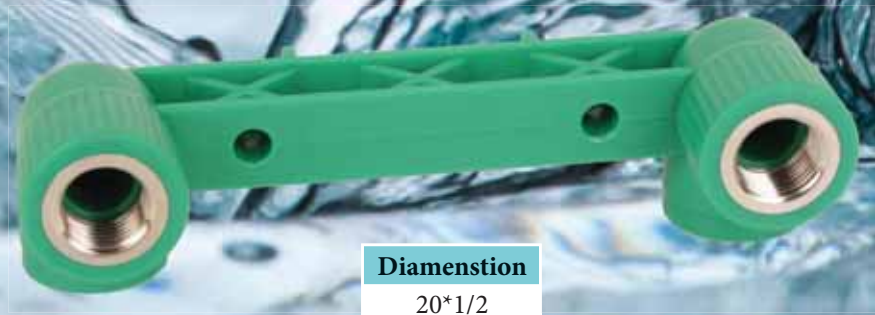
Diamenstion
20*1/2
25*1/2

THREADED END CAP

This is cap for sealing the pipe ends with threaded and is used during tests. It has a hexagonal head and is made of polypro-pylene.

D	G	L
20*1/2	1/2”	34
25*3/4	3/4”	39
32*1	1”	35

WALL DISC CONNECTOR



Diamenstion
20*1/2
25*1/2

GATE VALVE

The valve is used mostly used on walls and over the plaster installations to cut water flow.

D	d	D	D1	L	L1	L2
20	19.5	44.5	34.0	77.0	28.0	14.5
25	24.5	44.5	34.0	77.0	28.0	16.0
32	31.5	52.0	42.5	81.0	38.0	18.0

BATTERY CONNECTION

This piece is used in connections under plaster. Behind the interior threaded elbow, there is a fastening piece with holes. When the battery is correctly adjusted to its place, the elbow is screwed to the floor. The elbow is made of chrome plated brass and laminated with plastic.

D	d	G	L	L1	L2
20*1/2	19.5	1/2”	36.0	31.0	14.5

BRIDGE

This piece is used where two pipes cross each other and one has to bridge over the other pipe.

G	d	a
20	20	40
25	25	50
32	32	64
40	40	80

CLAMP

They are used to stable and fix the pipe installation to ground and walls. They are made in two types and are screwed in by screws through the holes and provide a fix grip but free move to the pipes

CLAMP	
D	G
20	20.5
25	24
32	32
40	37.2
50	46

FOİLED CLAMPS	
D	G
22	20.5
27	24
34	32
42	37.2
52	46

UNION FEMALE ADAPTOR

Diameter & Thickness (mm)	CODE	PACK
Ø 20 x 3,4	20OBIDR	140
Ø 25 x 4,2	25OBIDR	70
Ø 32 x 5,4	32OBIDR	50

UNION MALE ADAPTOR

Diameter & Thickness (mm)	CODE
Ø 20 x 3,4	20OBDDR
Ø 25 x 4,2	25OBDDR
Ø 32 x 5,4	32OBDDR

CHROMIUM VALVE

Diameter & Thickness (mm)	CODE	PACK
Ø 20 x 3,4	20KRV	30
Ø 25 x 4,2	25KRV	25
Ø 32 x 5,4	32KRV	24
Ø 40 x 6,7	40KRV	12

Minimum Pressure of flow *P* min *F*1	TYPE OF THE POINT	Calgulation of flow during intake:		
		TYPE OF THE POINT 1) Mixed water		Only cold or heated potable water
		$V_{R\ COLD}$	$V_{R\ HOT}$	V_{R}
BAR	DESIGNATION	I/s	I/s	I/s
	Taps:			
0.5	2) Withoutinlet DN 15	-	-	0,3
0.5	2) Withoutinlet DN 20	-	-	0,5
0.5	2) Withoutinlet DN 25	-	-	1
1	2) Withoutinlet DN 10	-	-	0,15
1	2) Withoutinlet DN 15	-	-	0,15
1	Shower headsfoshower	0,1	0,1	0,2
1,2	Flushvalvesacc. To DN 3265 DN 15	-	-	0,7
1,2	Part 1 DN 20	-	-	1
0,4	DN 25	-	-	1
1	Siphon for toilet DN 15	-	-	0,3
1	Dish washer DN 15	-	-	0,15
1	Washing Machine DN 15	-	-	0,25
	Battery:			
1	Shower DN 15	0,15	0,15	-
1	Bath tub DN 15	0,15	0,15	-
1	Kitchen Sink DN 15	0,07	0,07	-
1	Washatand DN 15	0,07	0,07	-
1	For small bath tub DN 15	0,07	0,07	-
1	Battery DN 20	0,3	0,3	-
0,5	DIN19542 kitchen sink DN 15	-	-	0,13
1	Electric water boiler DN 15	-	-	0,10

P.N. Resources and machine that are not listed in the above table must be considered, big armature flows or those given as minimum flow pressure must be calculated according to the data given by the manufacturer,
1) For mixed water resources, the flow is 15^0 C for cold water and 60^0 C for lukewarm drinking water.
2) Water without jet and valves with lo meter hose attachment, or in water tankers, the loss of pressure will be calculated according to minimum flow pressure on lump sum basis. In this case, the minimum flow pressure will be raised from 1.0 to 1.5 bars.
3) Fully opened water faucet.

Reagent	Concentration	Temperature		
		20°C	60°C	100°C
acetic anydride	100 %	G	-	-
acetic acid:di tri chlorc acetic acid	sol	G	-	-
acetic acid	up to 40 %	G	G	-
acetic acid	50 %	G		G
acetic glacial acid	over 96 %	G	S	N
acetone	100 %	G	S	
acetophenone anydride	100 %	G	S	-
acrylonitrile	100 %	G	-	-
air		G	G	G
almond oil		G	-	-
alum	sol	G	-	-
ammonia (gas)	100 %	G	-	-
ammonia (satured in water)		G	G	-
ammonia liquor	up to 30 %	G	G	-
ammonium acetate	sat. sol	G	G	-
ammonium bicarbonate	sat. sol	G	G	-
ammonium chloride	sat. sol	G	G	-
ammonium fluoride	sol.	G	G	-
ammonium hydroxide	sol.	G	-	-
ammonium methaphosphate	sat. sol.	G	G	G
ammonium nitrate	sat. sol	G	G	G
ammonium phosphate	sat. sol	G	G	-
ammonium sulphate	sat. sol	G	G	G
ammonium acetate	100 %	G	-	-
amyl alcohol	100 %	S	G	G
aniline	100 %	S	-	-
anisole	100 %	G	-	-
apple juice		G	G	-
barium chloride	sat. sol.	G	G	G
barium carbonate	sat. sol.	G	G	G
barium hydroxide	sat. sol.	G	G	G
barium sulphate	sat. sol.	G	G	G
benzoic acid	sat. sol.	G	-	-
benzoyl acid	100 %	G	G	-
benzoil alcohol	100 %	G	S	-
borax	sol	G	G	-
boric acid	sat. sol.	G	-	
butane	100 %	G	G	-
butanol	100 %	G	S	S
butyglycol	100 %	G	-	-
butyphenol	cold sat. sol.	G	-	-
butly phlalate	100 %	G	S	S
calsium carbonate	sat. sol.	G	G	G
calcium chloride	sat. sol.	G	G	G
calcium hydroxide	sat. sol.	G	G	-
calcium nitrate	sat. sol.	G	G	-
carbon dioxide, gaseous, dry	100 %	G	G	-
carbon dioxide, gaseous, wat		G	G	-
carbon di-sulphide	100 %	NS	NS	NS

Reagent	Concen-tration	Temperature		
		20°C	60°C	100°C
carbon tetrachloride	100 %	NS	NS	NS
castor-oil	100 %	G	G	-
chloroethanol (2-Chlorethanol)	100 %	G	-	-
chome alum	sat. sol.	G	G	-
chromic acid	up to 40 %	S	S	NS
citrit acid	10 %	G	G	G
coconut-oil		G	-	-
corn-oil		G	S	-
cotton-oil		G	S	-
cresol	over 90 %	G	-	-
cupric chloride	sat. sol.	G	G	-
cupric nitrate	30 %	G	G	
cupric sulphate	sat. sol.	G	G	-
cyclohexane	100 %	G	-	-
cyclohexanol	100 %	G	S	-
dextrin	sol.	G	G	-
dextrose	sol.	G	G	-
di-butly phtalate	100 %	G	S	NS
di-chlorothylene acid	100 %	S	-	-
di-chlorothylene	100 %	S	-	-
di-ethanolamine	100 %	G	-	-
di-ethyl ether	100 %	G	S	-
di-ethylen glycol	100 %	G	G	-
di-glycolic acid	sat. sol.	G	-	-
di-isoctyl phtalate	100 %	G	S	-
di-methylamine	100 %	G	-	-
di-octyl phtalate	100 %	S	G	-
dioxan	100 %	S	S	-
ethanolamine	100 %	G	S	-
ethylalcohol (ethanole)	up to 95 %	G	-	-
ethylene chloride	100 %	NS	G	-
ethyleneglycole	100 %	G	NS	G
formaldehyde	40 %	G	G	-
formic acid	10 %	G	-	S
			G	

Quantity	SI Unit	Alternate SI Unit	Conversion k Factor	1/k	US Unit	Conversion k Factor	1/k
Length	m		1	1	in (inch) ft (foot) mi (mile)	39,370 3.281 $6.214x10^{-4}$	$2.54x10^{-2}$ 0.305 1609.344
Area	m^2	hectare	10^4	10^{-4}	in^2 ft^2 mi^2	1550 10.764 $3.681x10^{-7}$	$6.452x10^{-4}$ 0.093 $2.590x10^{-6}$
Volume	m^3	dm3=1	1000	0,001	ft^2 gal (gallon) gal (gallon) UK	35.315 264.172 219.969	0.0283 $3.785x10^{-4}$ $4.546x10^{-4}$
Mass	kg	ton	1000	0,001	ıbm (paund) gr (grain) oz (ounce)	2.205 15432.4 35.274	0.454 $6.479x10^{-4}$ $2.835x10^{-4}$
Force	N	kgf dyn	0,102 10^5	9,807 10^{-5}	ıbf	0.225	4.448
Pressure	N/mm^2Mpa	kgf/mm^2 bar dyn/cm^2	0,102 10 10^7	9,807 0,1 10^{-7}	psi (ıbf/in^2) mmHg=torr(0^0)	145 7500.62	$6.895x10^{-4}$ $1.333x10^{-4}$
Energy	J	kgf-m erg	0,102 10^7	9,807 10^{-7}	ıbf-It cal BTU	0.738 0.239 $9.478x10^{-4}$	1.356 4.184 1055.06
Povver	W	kcal/hr	0,860	1,162	BTU/hr	3.415	0.293
Temperature (absolute) (difference)	K K, °C	kgf/sm2 cm	1,102 1000	9,807 0,001	^{0}R (dankine) ıbf s/ft^2	1.8 1.8	0.555 0.555
Viscosity (dynamic)	Pa s=N /s/m^2					0.0209	47.880
Viscosity (kinamatic)	m^2/s	g/cm^2			ft^2/s	10.764	0.093
Density	kg/m^2		0,001	1000	ıbf/ft^3	0.0624	16.018
Thermal Conductivity	W/m K	kcal/m h °C	0,860	1000	BTUin/ft^2hr °F BTU/ft hr °F	6.933 0.578	0.144 1.731
Specific Entrophy	kj/kg K	kcal/h °C	$2,390X10^{-1}$	4,184	BTU/bm °R	$2.388x10^{-1}$	4.187

AFC Heating PPR Pipes and Fittings / Project Design Information

Chemical Resistance

Polypropylene is one of the most chemically resistant polymers. Below you will see the chemical resistance of PP-R products according to DIN 53756; the chemical resistance related with composition, quality condition concentration, time of affection and temperature of material. In this table the chemicals and the resistance in different temperatuer is shown.

Materials are classified in 4 groups;

*Resistant

*Not resistant

*Partically resistant

*There isn't enough information

a the below symbols are used for the concentration of the chemical:

VL : Mass ratio ‹ 10 % Solution in water

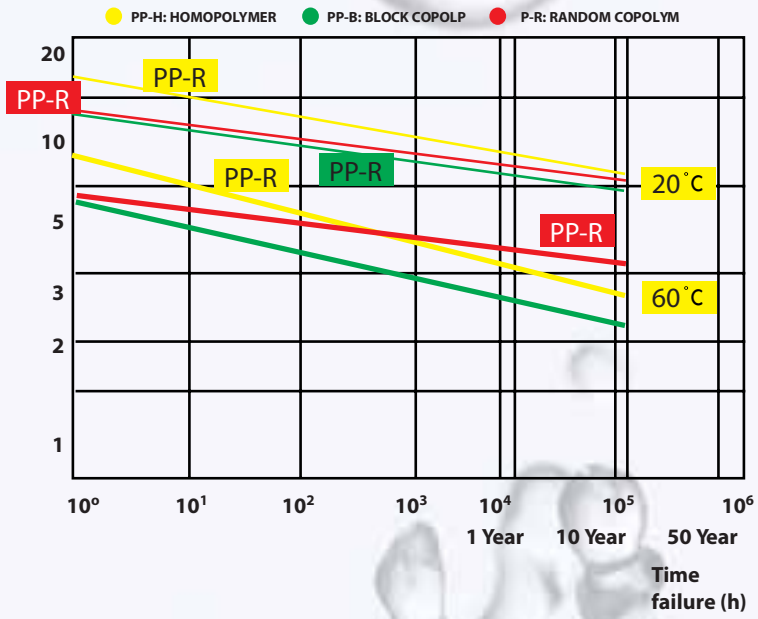
L : Mass ratio › 10 % Solution in water

GL : Saturated solution in water (at 20˚C)

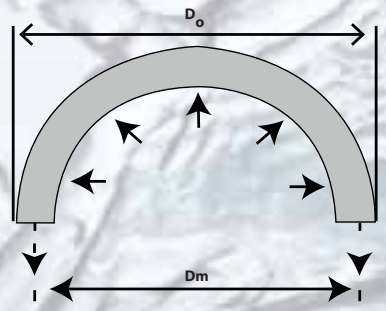
H : Adapted

TR : Technical pure

TA : Trace amount



Hydrostatic Pressure, P



Figue 1.

$$\sigma \times 2 \times S = P \times Dm$$

$$Dm = D_o - S$$

$$\sigma = P\frac{(D_o - S)}{2s}$$

σ : Desing stres

P : Working pressure (Mpa)

D_o : External diameter (mm)

S : Thickness (mm)

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For having enough elasticity, in application the leught of bending side of the pipe is important. This can be calculated as fallows.

Ls=K.$\sqrt{d.\triangle L}$ in this formula

Ls= Leught of free bending piece L=Leught of pipe

K= Constant coefficient for Dizayn pipes = 30

$\triangle$L=Elongation or shringkage in mm

d= Outside diameter of AFC pipe in (mm)

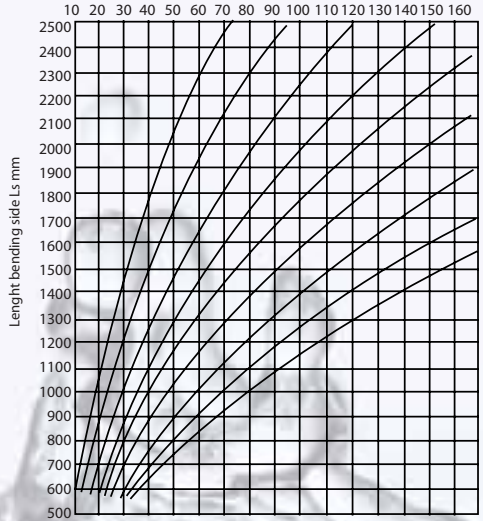
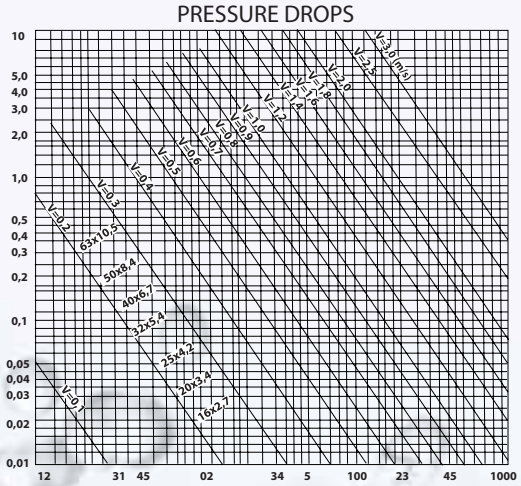


Figure 8: Lenght bending side (Ls) depending on extention



Expansion or shrinkage compensation arrangements can be installed in buildings very easily. For making one expansionloop as infig. 4, four elbows will be enough. The necessary length of free bending piece (Ls) can easily be calculated from the formula above or by using the figüre.

Figure 9

For straight pipes having length more than 5 meters, to compansete the expansion an expansion piece must be used. Crossover should be used at the junctions of the laid pipes. For crossover piece 20 mm, 25 mm and 32 mm sizes are available.

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Calculation of Thermal Expansion in PP-R Pipes

Expansion of the polyprolyene pipes are relatively higher and linear expansion coetficient is 10 times bigger than metal pipes. That's why in installation this expansion character must be taken into consideration.

Linear enpansion coefficient of AFC pipes: temperature is between 30-90 $^{\circ}$C the expansion $\triangle$L is calculated with the folloving formula:

$\triangle = \lambda \times l \triangle T$ $\triangle$l= Linear expansion in mm

λ = Linear expansion coefficient = $\frac{mm}{m.^{\circ}C}$

AFC pipe (Averere value) λ=0.183 $\frac{mm}{m.K}$

l= Pipe lenght in m

$\triangle$T=Temperature difference $^{\circ}$K or $^{\circ}$C

$\triangle$T=Difference of temperature between hot water and ambiant temperature in $^{\circ}$C

Example:

Pipe temperature at the first installation is: + 16 $^{\circ}$C and pipe lenght is 8 m

Minimum pipe temperature (for cold water) : + 9 $^{\circ}$C

Maximum pipe temperature (for hot water) : + 70 $^{\circ}$C

1- Difference between pipe temperature at the first installation and minimum pipe temperature.

$\triangle T_1$=9 - 16= -7 $^{\circ}$C

2- Difference between pipe temperature at the first installation and maximum pipe temperature.

$\triangle T_2$=70-16=54 $^{\circ}$C

Expansion of pipe for $\triangle T_1$

$\triangle L_1$=8m (-7 $^{\circ}$C).0,183 mm/m= -10,2mm

Expansion of pipe for T_2

$\triangle L_2$=8m *54 $^{\circ}$C*0,183 mm/m $^{\circ}$C= 79.0mm

1.1 General

Raw Material

AFC PP-R pipes and fittings are manufactured from high quality, Polypropylene Random Co- Polymer resins (PP Type 3 raw material).
Its physical and chemical properties make AFC a versatile piping system in a wide range of applications in different industries.
Its adventages over other PP types 1 or 2 and other thermoplastic pipes in the potable water industries are its high impact strength and resistance to high temperatures.

1.2 Mechanical* Thermal Properties

Pal/polypropylene Random Co-Polymer (PP Type 3)

Property		Test Method	Unit	Value
Viscositiy Number J		ISO 1628 T3 cm^3/g	430	
Melt Flow Rate	MRF 190/5	ISO 1133 Condition 18	g/10 min.	0.5
	MRF 230/2.16	ISO 1133 Condition 12	g/10min.	0.3
	MRF 230/5		g/10min.	1.5
Density at 23 °C		ISO 1183 cm^3/g	0.898	
Crystalline Melting Temperature		DIN 53736 B2 cm^3	150-154	
Tensile Stress at Yield		ISO 527	N/mm^2	23
Tensile Strenght at break		Speed 50mm/min	N/mm^2	40
Elongation at Break		Test Specimen 1B	%	>50
Ball Indentation Hardness		ISO 2039 T1 (132N)	N/mm^2	43
Flexural Stress at 3,5%		DIN 53452	N/mm^2	20
Outer Fibre Strain				
Modulus of Elasticity, Tensile Test		ISO 527	N/mm^2	700
Shear Modulus				
	-10 °C		N/mm^2	1100
	0 °C		N/mm^2	770
	10 °C		N/mm^2	500
	20 °C		N/mm^2	370
	30 °C		N/mm^2	300
	40 °C		N/mm^2	240
	50 °C		N/mm^2	180
	60 °C		N/mm^2	140
Mechanical Strenght Properties		De-DIN 8078		no failure
Termined byImpact Strenght at	0 °C			
Impact Strenght	RT		kj/m^2	no failure
(Charpy)	0 °C		kj/m^2	no failure
	-10 °C		kj/m^2	no failure
Notched Impact Strenght RT			kj/m^2	20
(Charpy)	0 °C	ISO 179/1 e A	kj/m^2	4
	-10 °C		kj/m^2	3
Coefficient of Linear Thermal Expansion		VDE 0304 Parti & 4	K-1	1.5x10.4
Thermal Conductivity at	20 °C	DIN 52612	W/mk	0.24
Specific Heat at	20 °C	Adiabatic Calorimeter	kj/kg K	2.0

ISO=International Organization for Standardization VDE= Verband Deutscher Electrotechniker The test specimens were made and the test methods selected in accordance with DIN 16774, part2.

Projected Service Life

The following table provides a more detailed information with regards to the permissible pressure of various pipe pressure rating at varioui temperatures. These values are derived from the hoop stres chart and formula.
Under normal working pressures and conditions, the averege service life of AFC pipes projected to be 50 years or more.

Example

A PN 10, cold water pipe, transporting water at a temperature of 30 °C can last for more than 50 years under normal conditions with an operating pressure of 11,1 bars or 161 P.S.I
A PN 20, hot water pipe, transporting water at a temperature of 70 °C can for more than 50 years under normal conditions with ar operating pressure of 8,5 bars or 123 P.S.I

1. Hygiene & Health Concerns

AFC products are manufactured with health concerns in mind.
Connection of pipes does not require additives such as cement solvent or fluxes or solder.
To ensure the safety of AFC pipes and fitting for usage relating to human contact and consumption with potable the following are strictly adhered to. DIN 1988Part2
-Drinking Water Supply Systems, Materials, Components, Appliances, Desing And Installation. Ktw-Recommendations
-Federal Health Office, Germany DVGW
-Test certificate
-Water Bylaws Scheme/wrc, Tests of Effect on Water Quality based on BS 6920

1.7 UV Resistance

AFC Products are produced with UV stabilisers. However, Tike ali other piping systems including metals, pipe works should not be left exposed under direct sunlidht without insulating or protection from direct sunlight or UV radiation.

1.8 Fire Ctassification

AFC pipes and fittings comply anda re claaified under the requirements of the fire ctassification, B2 (Normally inflammable) according to DIN 4102, in case of a fire outbreak of temperature ›800°C, under ideal conditions, with sufficien oxygen only carbon dioxide and water vapour are produced as the raw material of Polypropylene Random Co-polymer is a hydrocarbon chain. Toxic fumes or dioxin will not be emitted.

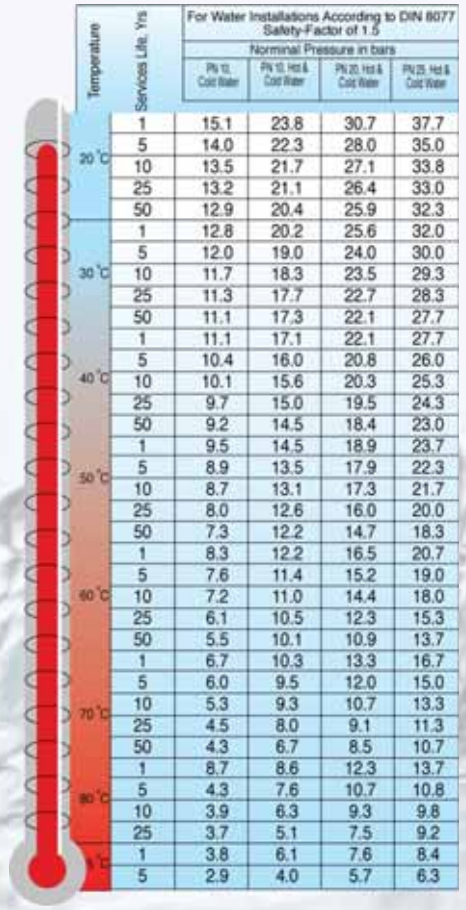
1.9 Sotmd Insulation

Compared to metallic pipes, AFC does not need further insulation to
decrease the decibel level when water flows at relatively high speeds.
The reason is simply that metals transmit noises quicker and louder, whereas, plastics dampen the noises. Hence "whistling" and noises resulting from water hammer effect are largely reduced to nonexistence.

1.10 Advantages of Using AFC From the above properties of AFC system and application areas,

compared to other conventional metal or plastic piping systems Vesbo has the flowing advantages which makes it.

THE SYSTEMS OF THE NEW MILLENIUM.
* Rust and Corrosion Free
* Rupture Free No Scaling
* High Resistance to Acids and Chlocides
* Noise Free At High Flow Rates
* High Pressure Tolerances And Rating
* Insulation Is Not Necessary for Interior Applications
* Light Weight
* Speed and Ease Of Fusion Technogy
* Extensive in Time and Labour



Temperature	Services Life, Yrs	For Water Installations According to DIN 8077 Safety-Factor of 1.5 Nominal Pressure in bars			
		PN 10, Cold Water	PN 10, Hot & Cold Water	PN 20, Hot & Cold Water	PN 25, Hot & Cold Water
20 °C	1	15.1	23.8	30.7	37.7
	5	14.0	22.3	28.0	35.0
	10	13.5	21.7	27.1	33.8
	25	13.2	21.1	26.4	33.0
	50	12.9	20.4	25.9	32.3
30 °C	1	12.8	20.2	25.6	32.0
	5	12.0	19.0	24.0	30.0
	10	11.7	18.3	23.5	29.3
	25	11.3	17.7	22.7	28.3
	50	11.1	17.3	22.1	27.7
40 °C	1	11.1	17.1	22.1	27.7
	5	10.4	16.0	20.8	26.0
	10	10.1	15.6	20.3	25.3
	25	9.7	15.0	19.5	24.3
	50	9.2	14.5	18.4	23.0
50 °C	1	9.5	14.5	18.9	23.7
	5	8.9	13.5	17.9	22.3
	10	8.7	13.1	17.3	21.7
	25	8.0	12.6	16.0	20.0
	50	7.3	12.2	14.7	18.3
60 °C	1	8.3	12.2	16.5	20.7
	5	7.6	11.4	15.2	19.0
	10	7.2	11.0	14.4	18.0
	25	6.1	10.5	12.3	15.3
	50	5.5	10.1	10.9	13.7
70 °C	1	6.7	10.3	13.3	16.7
	5	6.0	9.5	12.0	15.0
	10	5.3	9.3	10.7	13.3
	25	4.5	8.0	9.1	11.3
	50	4.3	6.7	8.5	10.7
80 °C	1	8.7	8.6	12.3	13.7
	5	4.3	7.6	10.7	10.8
	10	3.9	6.3	9.3	9.8
	25	3.7	5.1	7.5	9.2
95 °C	1	3.8	6.1	7.6	8.4
	5	2.9	4.0	5.7	6.3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