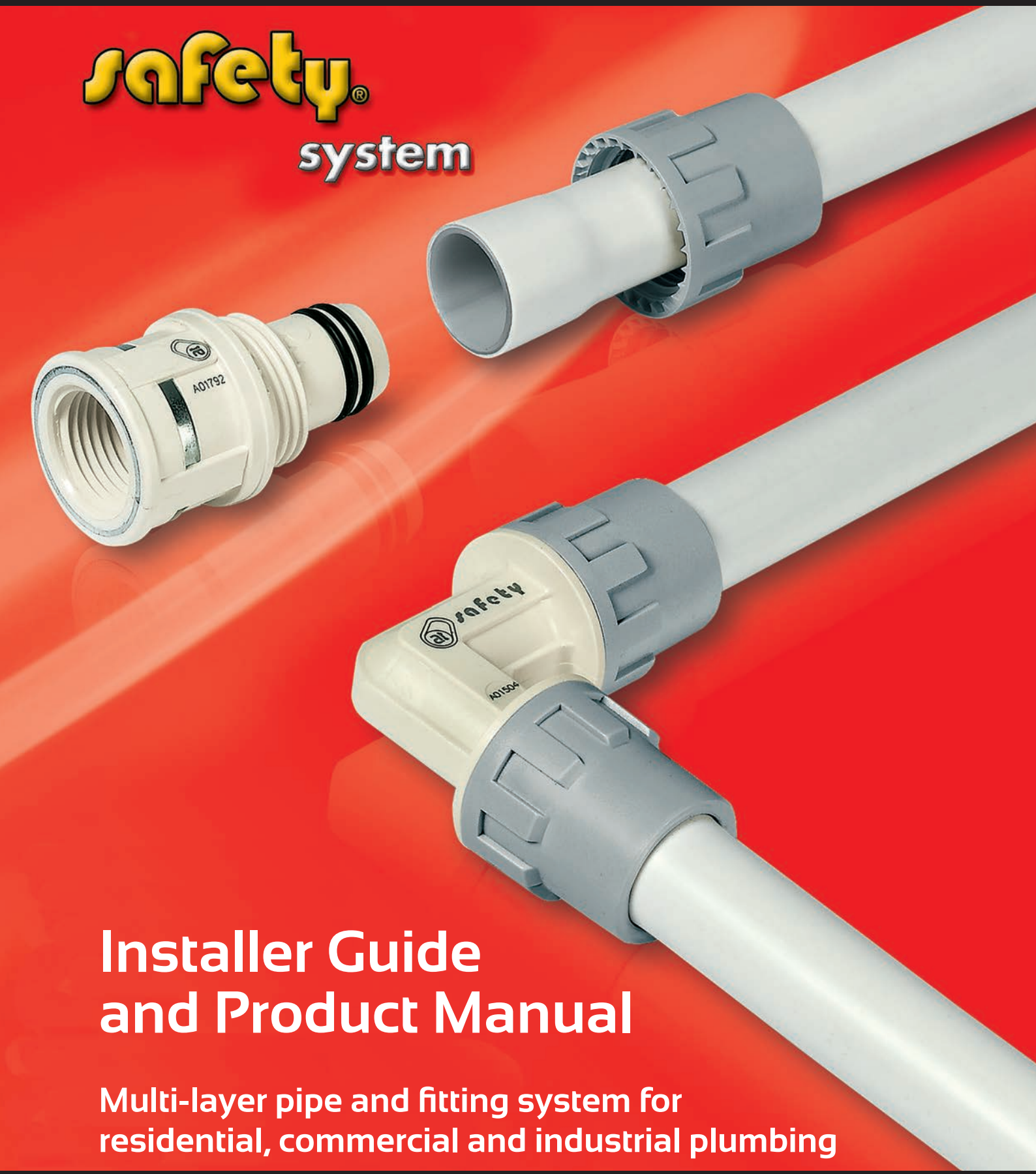
safety® system



Installer Guide and Product Manual

Multi-layer pipe and fitting system for residential, commercial and industrial plumbing

aquatechnik® australia

Multi-layer Polymer Pipe & Fitting Systems for Residential, Commercial & Industrial Plumbing

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Multi-layer Polymer Pipe & Fitting Systems for Residential, Commercial & Industrial Plumbing

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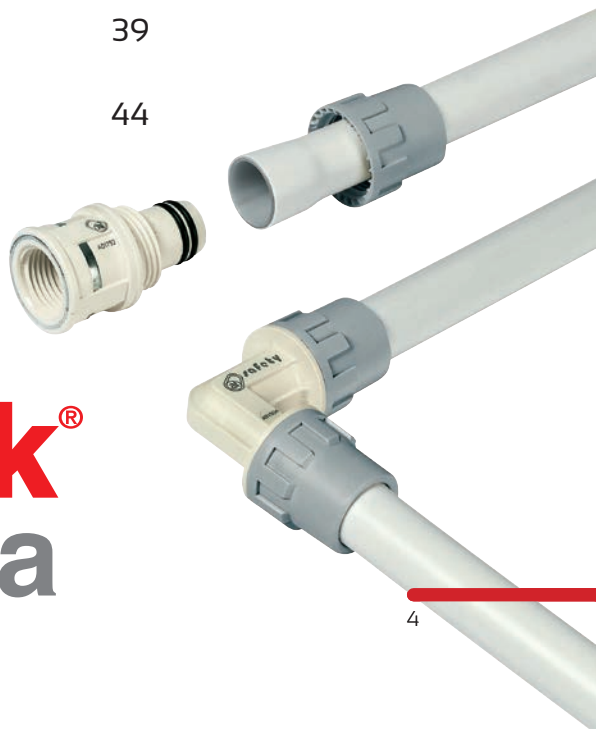

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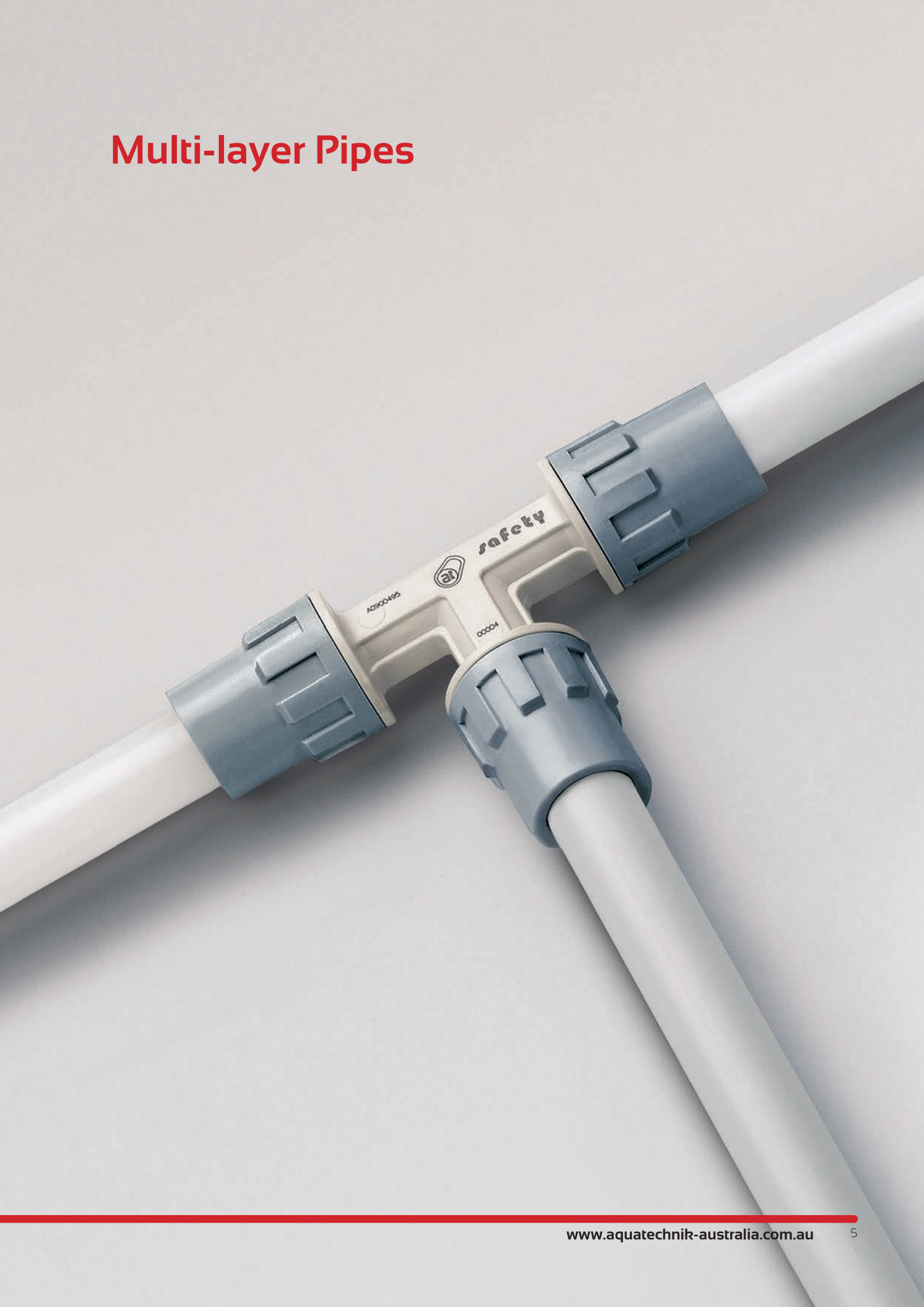
Multi-layer Pipes



multi-calor

The pipe used in the **multi-calor** system is made by integrating different materials, resulting in the terminology “multi-layer”.

The polymer of the internal/eternal layer is cross-linked polyethylene (PE-X, see table of values and features). This produces pipe with very good performance with high temperature fluids under pressure and leaves the characteristics of potable water unchanged.

During the production process, the external cover of the pipe (PE-X) is combined with thin aluminium alloy layers, welded lengthwise – by laser beam plasma – and then combined with a special adhesive to make the materials bond perfectly. The result is that the metal (Al) is covered by a PE-X layer, protecting it from corrosion.

All the process stages are checked by computerised quality control ensuring every batch meets the appropriate standards.

The **multi-calor** pipe range is certified by regulatory authorities and complies with the laws in force for the conveyance of potable fluids for human consumption in countries including Italy, Germany, Spain, the Netherlands, Norway, Poland, USA, France, Russia and Australia.

PIPE SPECIFICATIONS	multi-color		
Name	PE-X + Al + PE-X Cross-linked polyethylene + aluminium + cross-linked polyethylene		
Reference standards	UNI EN 21003; DIN 4726; DVGW W542; KIWA BRL-5610; AENOR RP01.54: AS 4176.2		
Aluminium welding	butt with TIG method (with control camera)		
Colour	white		
Chemical reticulation inner layer	PE-Xb silans, minimum value 65%		
Chemical reticulation outer layer	PE-Xb silans, minimum value 65%		
Aluminium alloy	Treatment: annealing Yield: minimum value 50 MPa Elongation at fracture: minimum value 30% Ductility/malleability: can be folded to 180° Expansion after welding: increased by 20%		
Adhesive between layers	Adhesion value: always higher than 80 N/cm²		
Oxygen permeability	(According to DIN 4726 Standard) % mg/l 0.00		
Max. temperature	in continuous working conditions 95°C peak 100°C		
Hot working conditions (for heating)	a + 95°C	10 bar/1000kPa	min. life 50 years
Cold working conditions (for conditioning)	a + 5°C	20 bar/2000kPa	min. life 50 years
Thermal conductivity at 20°C	W/mK		0.43
Expansion coefficient	mm/mK		0.026
Internal roughness	mm		0.007
Bending radius	pipe Ø x 6 times		
Potability and organoleptic features	Watermark Certification – Evaluated to AS 4176.2 2010 – Multi-layer pipes for pressure applications – Multi-layer piping systems for hot and cold water plumbing applications – Pipes (ISO 21003-2:2008, MOD) Certificate No: WMK26042		
Quality control and sale authorisation	According to UNI EN ISO 9001:2000 Supervision by the Test and Laboratory Manager		

The **multi-color** pipes satisfy all the requirements of UNI EN 21003, on the conveyance of potable warm and cold fluids, for human consumption, for radiator heating, low temperature conditioning, floor panel system and other systems possible with the basic material.

Dimensions and Tolerances

multi-color SYSTEM PN 10 BY 95°C UNI 10954/1 – WHITE COLOUR

EXT. Ø MM	Thick mm	Alu Mm	Int. Ø mm	Content H2O l/m	Packages			Pack. Weight no insul. kg
					Roll no insul. m	Pipes m 4 m	Weight kg/m	
16	2	0.30	12.0	0.113	100	*40*	0.120	12.00 *4.80*
16	2	0.30	12.0	0.113	250	–	0.120	30.00
20	2	0.40	16.0	0.201	100	*40*	0.150	15.00 *6.00*
20	2	0.40	16.0	0.201	150	–	0.150	22.50
26	3	0.58	20.0	0.314	50	*40*	0.300	15.00 *12.00*
32	3	0.75	26.0	0.531	50	*40*	0.410	20.50 *16.40*
40	3.5	0.80	33.0	0.960	–	*20*	0.590	*11.80*
50	4	1.00	42.0	1.385	–	*20*	0.835	*16.70*
63	4.5	1.20	54.0	2.289	–	*12*	1.325	*15.90*

Pipes

Rolls

TEMPERATURE	Pressure – bar/kPa	Life – Years
20°C	20/2000	50
95°C	10/1000	50

PIPES

The **multi-color** pipe can be used in all the plant-engineering systems and particularly:

HOUSING: hot and cold potable water; heating systems; conditioning and cooling systems; garden irrigation; distribution networks; sanitary systems.

INDUSTRIAL: hot and cold potable water; conditioning and heating systems; compressed air; supply to machinery pneumatic and hydraulic circuits; marine; agriculture; green houses; sanitary systems and other applications compatible with the basic material.

SERVICE INDUSTRY: hot and cold potable water; shops; laboratories; surgeries; schools; gym and swim centres; restaurants, public premises; religious buildings; animal care and breeding centres; etc.

Regression Lines

REFERENCE REGRESSION LINES FOR MULTI-LAYER PIPING: multi-color

internal pressure (bar)

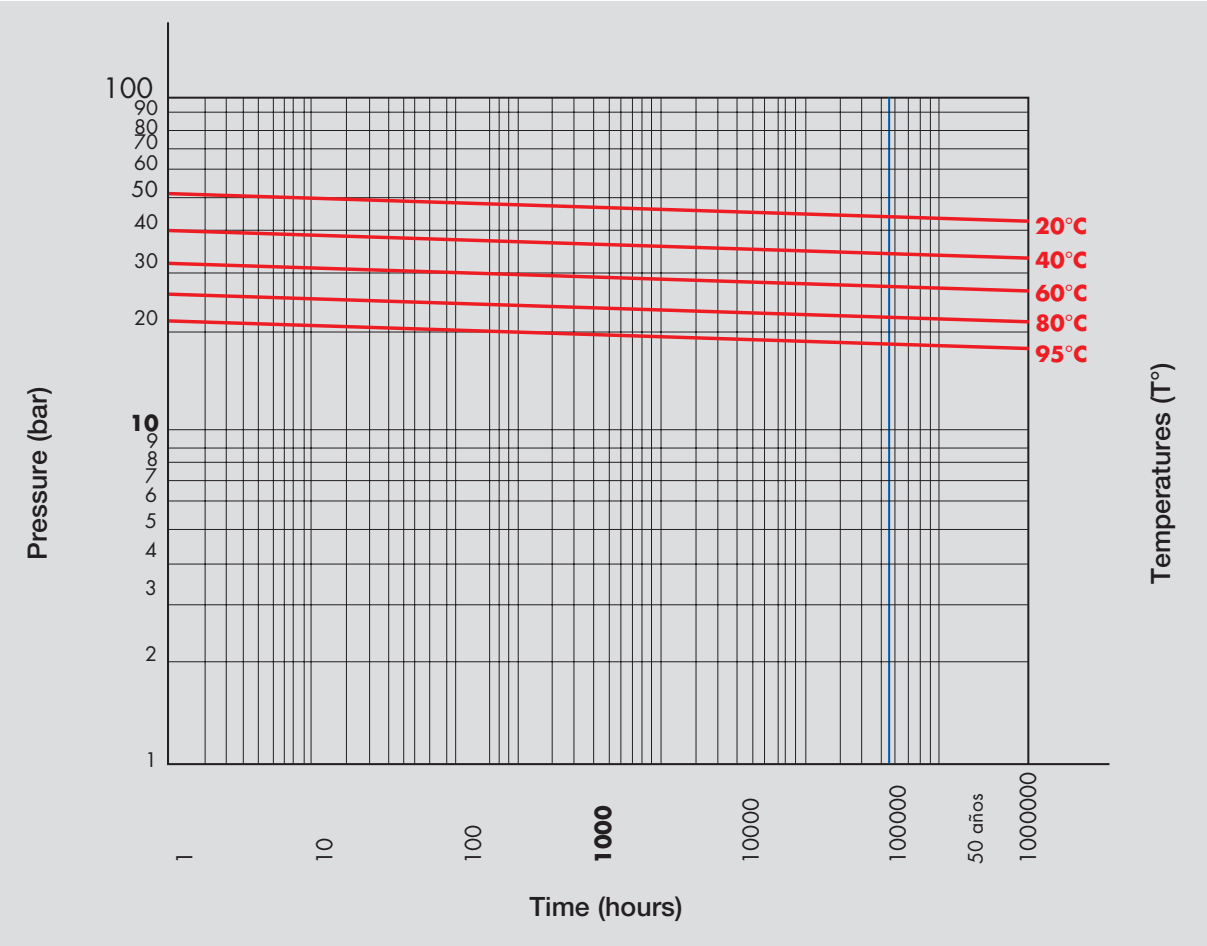


Table obtained by the reference regression lines for multi-layer piping according to indirect evaluation method used to issue the UNI EN 21003 standard

TEMPERATURE	Stress duration 10 years bar/kPa	Stress duration 20 years bar/kPa	Stress duration 50 years bar/kPa
20°C	43.3/4330	42.9/4290	42.5/4250
40°C	34.2/3420	33.9/3390	33.5/3350
60°C	27.2/2720	26.9/2690	26.7/2670
80°C	21.8/2180	21.6/2160	21.4/2140
95°C	18.4/1840	18.4/1840	18.2/1820

Linear Expansion and Clamping

Linear Expansion and Clamping

When pipes are heated, they become longer. This phenomenon is common for all materials and it should be carefully considered during installation.

NOTE 1 – Walled-up piping does not require any special indication, as even the smallest expansion is absorbed by the insulation layers covering the pipes.

NOTE 2 – For cold water and conditioning piping, the influence of linear expansion is quite negligible, except for very high temperatures (for example, 10°C).

NOTE 3 – In case of compressed air piping systems installed out of the wall, you should consider the surrounding ambient temperatures.

LINEAR EXPANSION OF multi-color PIPES (EN MM)

Pipe length m	Δt 10	Δt 20	Δt 30	Δt 40	Δt 50	Δt 60	Δt 70	Δt 80
0.5	0.12	0.25	0.37	0.50	0.62	0.75	0.87	1.00
1.0	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00
2.0	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00
3.0	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00
4.0	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
5.0	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00
6.0	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00
7.0	1.75	3.50	5.25	7.00	8.75	10.50	12.50	14.00
8.0	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
9.0	2.25	4.50	6.75	9.00	11.25	13.50	15.75	18.00
10.0	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00

Example of calculation of Δt
Fluid temp. = 70°C
Room temp. = 20°C
Δt = 70° – 20° = 50°C

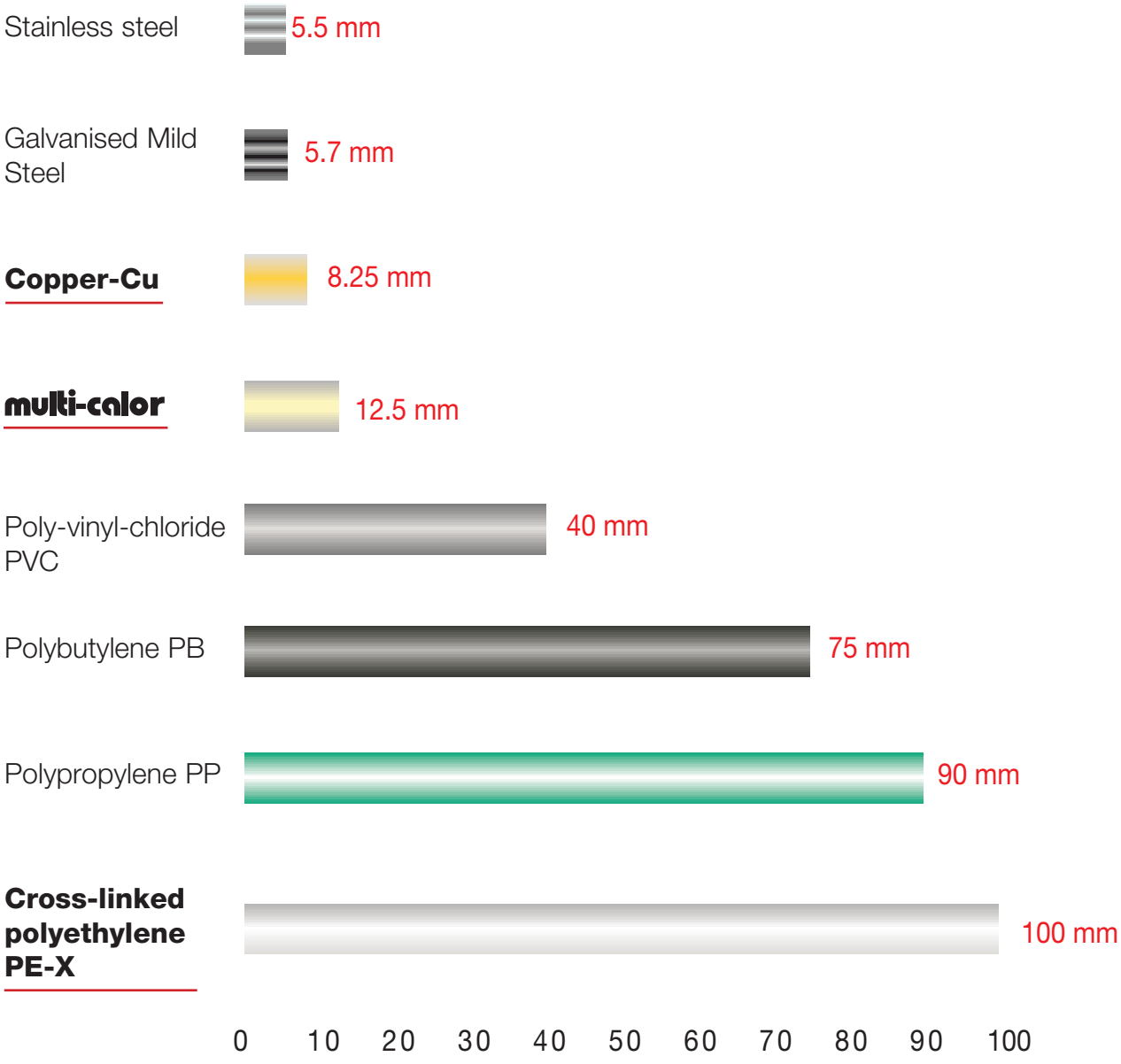
CLAMPING DISTANCE OF multi-color (EN MM)

Δt	Ø 16 mm	Ø 20 mm	Ø 26 mm	Ø 32 mm	Ø 40 mm	Ø 50 mm	Ø 63 mm
0°C	1300	1550	1700	1900	2300	2550	3000
10°C	1150	1400	1500	1550	1850	2350	2900
20°C	1000	1200	1300	1550	1850	2350	2900
30°C	1000	1200	1300	1500	1750	2250	2800
40°C	1000	1100	1200	1450	1750	2100	2800
50°C	900	1100	1200	1450	1700	2100	2700
60°C	800	1000	1100	1400	1600	1900	2500
70°C	700	900	1000	1300	1500	1800	2300

It is very interesting that the **multi-color** pipes are much more stable in axial elongation than other thermo-plastic materials.

They can actually be compared to the usual metallic pipes used in thermal-sanitary plant-engineering.

COMPARISON TABLE FOR ELONGATION IN MM: ΔT 50°C FOR 10 LINEAR M OF PIPE



safety System

Fittings

The safety system is a range of patented fittings designed to ensure the highest safety when connecting multi-layer pipes and to improve the technical and working performance of installations.

The long development on prototypes in different materials allowed a careful choice of materials for the final product. These fittings have been tested to verify their reliability under the harshest working conditions.

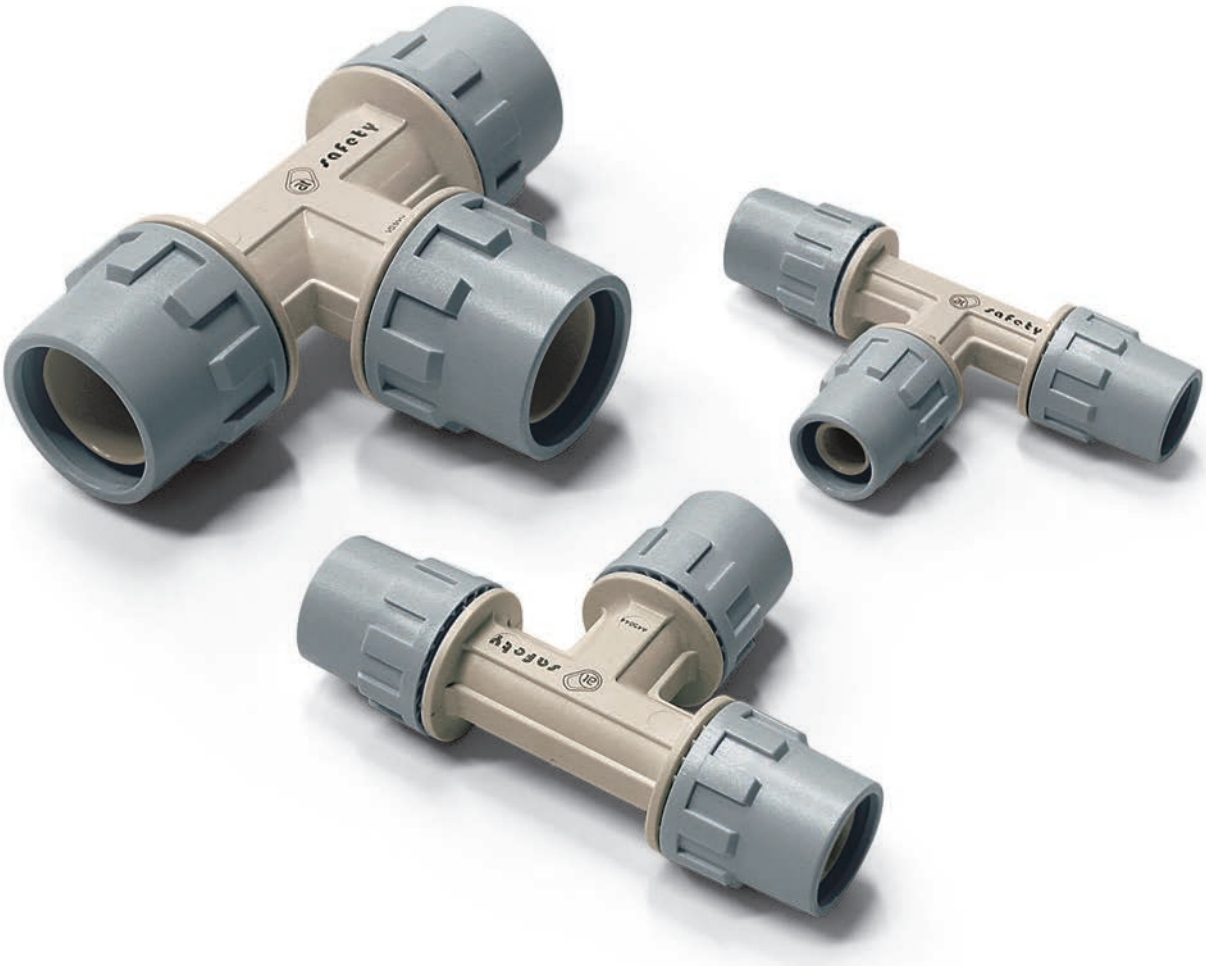
safety has gained highly positive results, confirmed by Quality Certification institutes, resulting in highly successful introduction into the market.

The range of fittings is extensive to cater for any kind of sanitary system.

The safety fittings have obtained the following certifications:

- WMK26042, Australia;
- WRAS (Nr. 0807073, United Kingdom);
- IIP (Nr. 380/2012, Italy);
- RINA (Nr. MAC257610CS, Italy);
- DVGW (Nr. DW-8501BP5634, Germany);
- SKZ (Nr. 372410/11/92490, Germany);
- HY (Nr. C-134677-05-Sf, Germany);
- AENOR (Nr. 001/004899, Spain);
- CSTBat (Nr. 105-1308, France);
- KIWA-KOMO (Nr. K40532/02, The Netherlands);
- BYGGFORKS (Nr. 1192, Norway);
- ITB (Nr. AT-15-7359/2007, Poland);
- NSF (Nr. 3B050, USA);
- GOST-R (Nr. POCC IT.TH02.B00373, Russia);
- VUPS (Nr. 227/C5/2012/0095, (Czech Republic);

NB: The entire safety range, processing tools included, is an exclusive property of Aquatechnik and is regularly protected by a licence.



Technical Features

The idea to develop the safety fittings arose from the desire to match the internal diameter of the fitting to the internal bore of the pipe – consequently decreasing pressure drops and friction. This is achieved by expanding the pipe to allow a fitting of the same nominal bore size to be inserted.

By searching for the best solution, the technical details of the pipe/fitting junction has attained the highest reliability and safety for pipes placed in walls. After all the necessary tests, approvals and patents were obtained for the whole range and the tools from appropriate authorities. Following this, the distribution to the individual markets began.

The expanded socket on the pipe head is made using Aquatechnik patented tooling, ensuring a fast and safe connection every time.

THE FITTING BODY

Aquatechnik safety fittings are produced in DZR brass alloy or in PPSU by injection moulding. They have a ribbed structure to withstand the thermal-mechanical stressing from the fluids and a special device for locking the conical cap.

The fitting body has a conical thread at its end and hollow seats for the peroxidic EPDM o-ring. The synthetic washer keeps the pipe insulated at the junction and avoids potential corrosion or electro-chemical action.

THE CAP

The fitting cap is moulded at high temperature. The cap should be screwed on the thread until the locking device engages with the fitting body. The conical shape allows the cap to lock securely without excessive tightening.

TECHNICAL SPECIFICATION OF PPSU

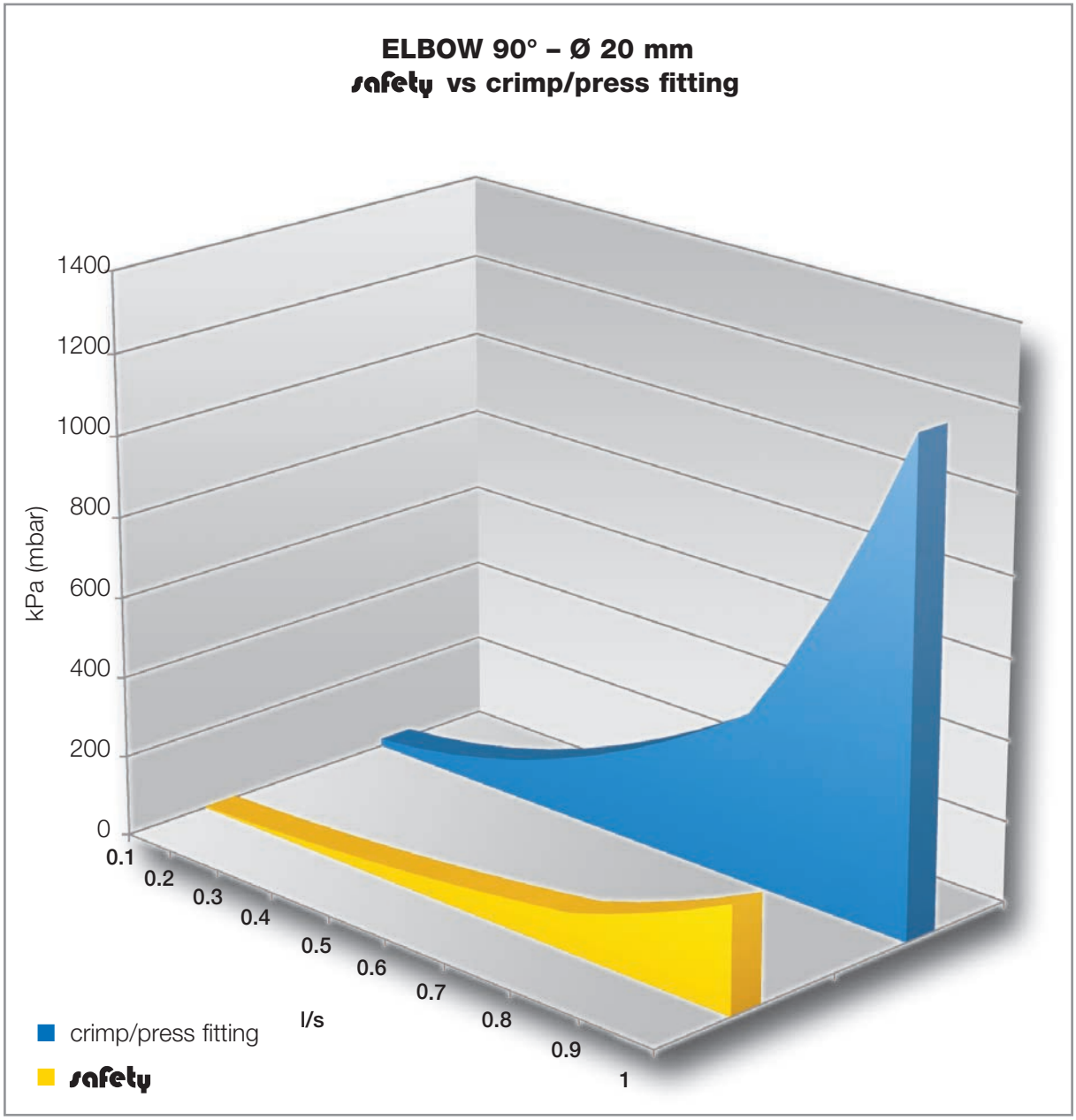
Conditions	U.M.	Values
Working temperature	°C	from -100 till +207
Life time (working pressure 8bar)	years	50
Resistance against traction	N/mm^2	70
Bending test	N/mm^2	2400
Impact resistance	J/m	694
Resistance against chemical and oxidant agents	–	Stable
Elongation by breaking	%	From 60 till 120

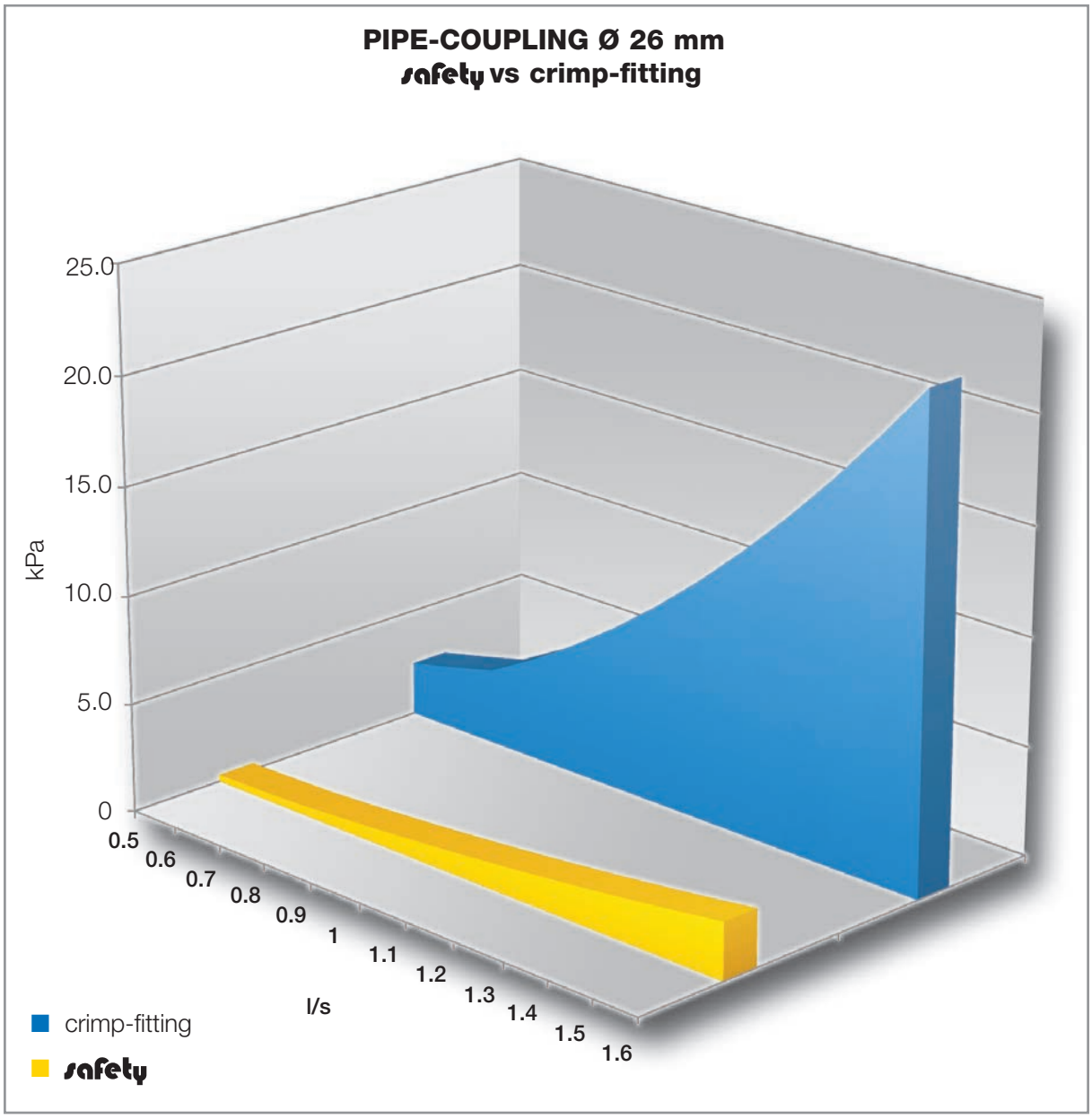
Comparison of Pressure Drops of Fittings

When designing a potable water or heating supply system, the pressure drops occurring along the piping are one of the most important factors to consider.

Unlike the safety system, most multi-layer pipe systems use crimp fittings that reduce the internal bore of the pipe. This can cause internal erosive forces, reduced flow rate and pressure decreases.

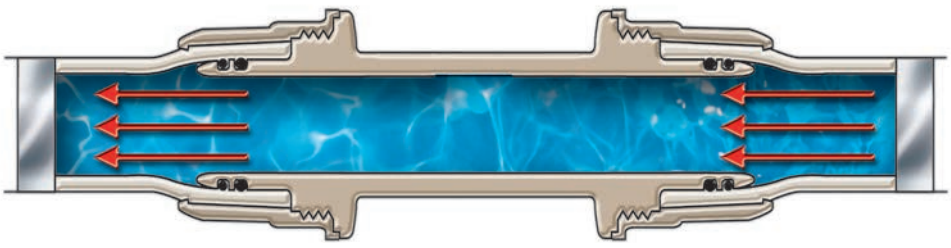
PRESSURE DROP COMPARISON TABLE BETWEEN safety FITTINGS AND CRIMP/PRESS FITTINGS





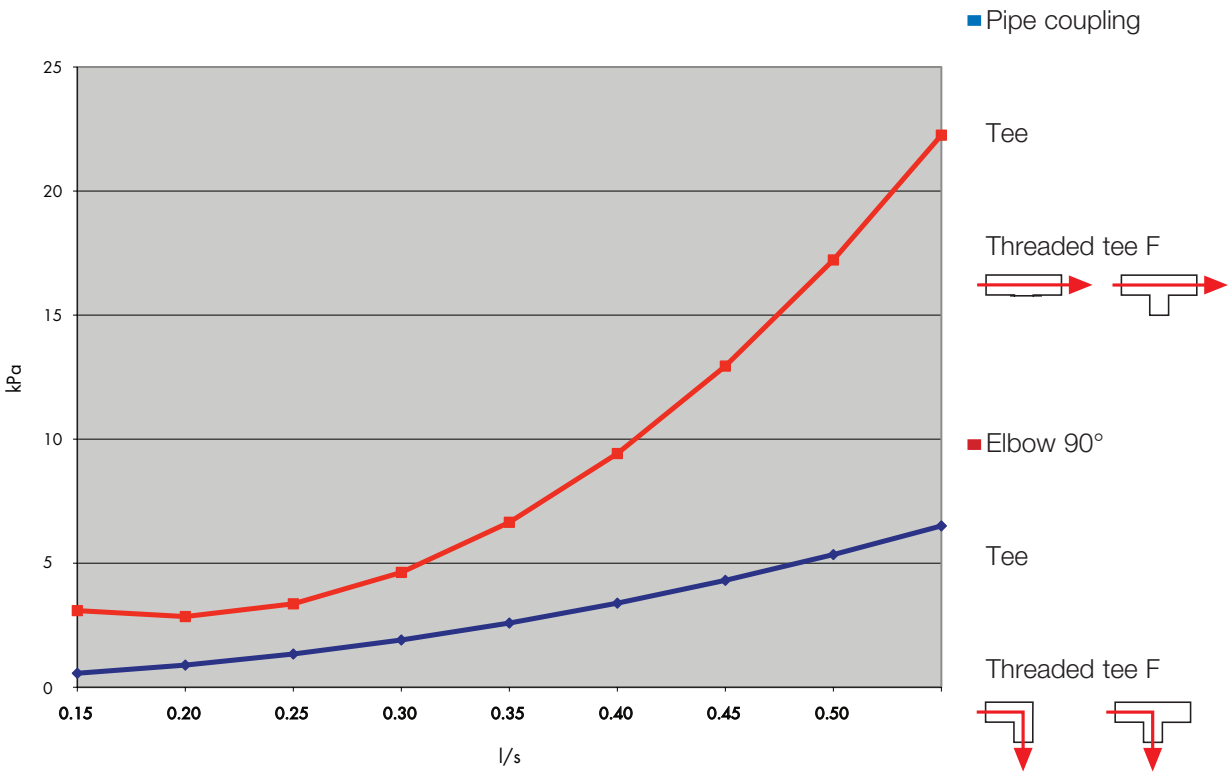
crimp-fitting section

safety fitting section

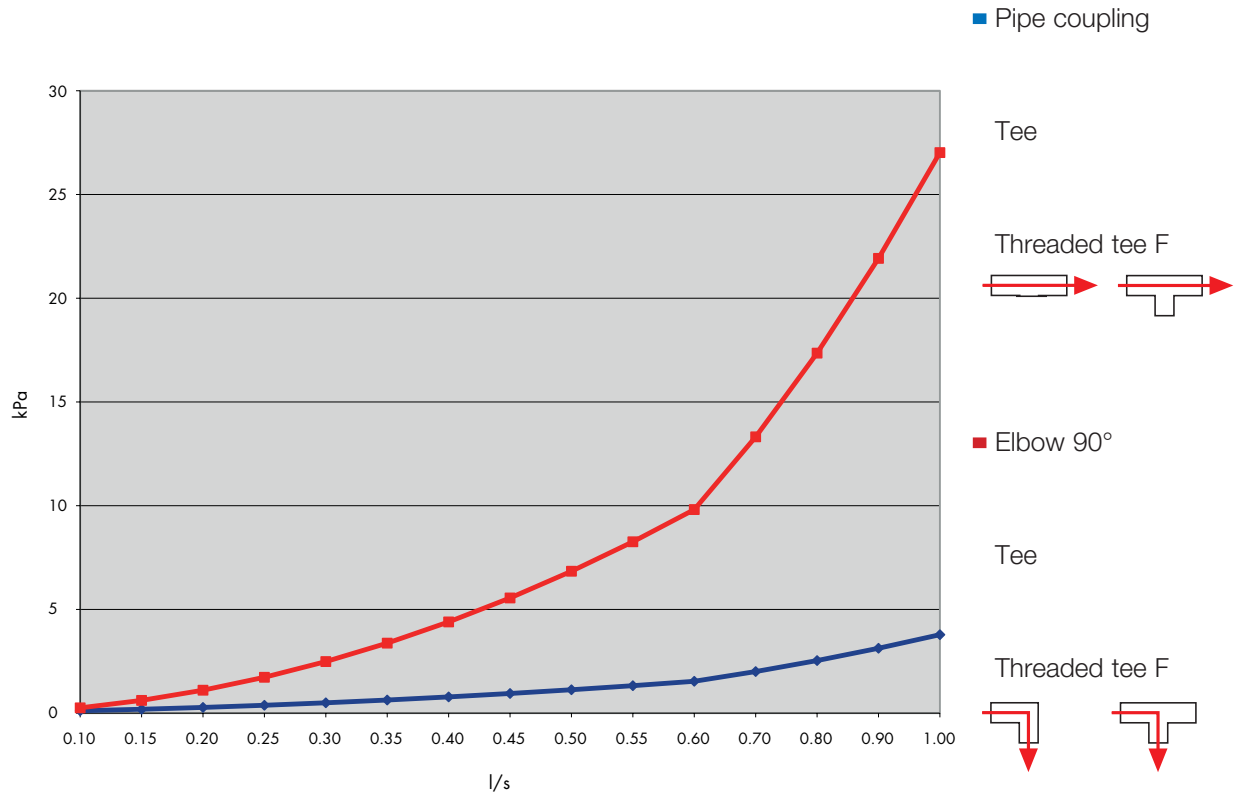


Pressure Drops of Fittings

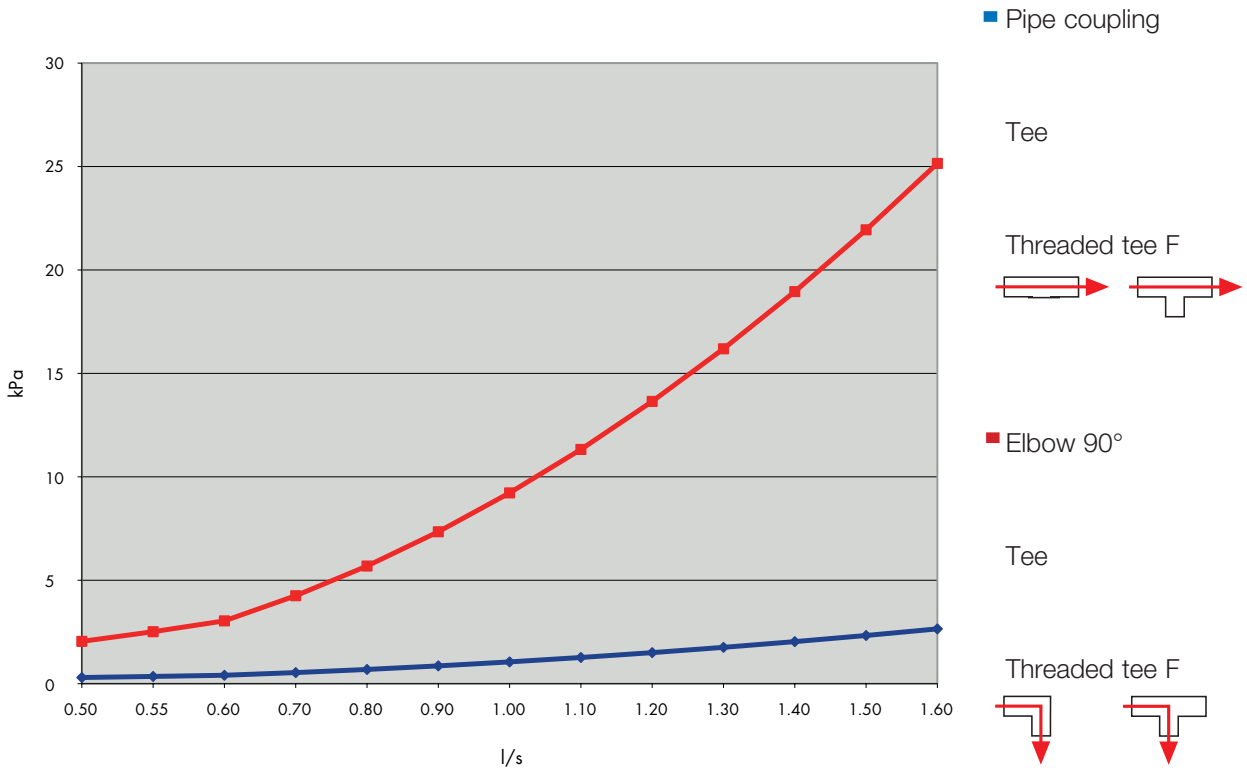
safety FITTINGS Ø 16 X 2 MM



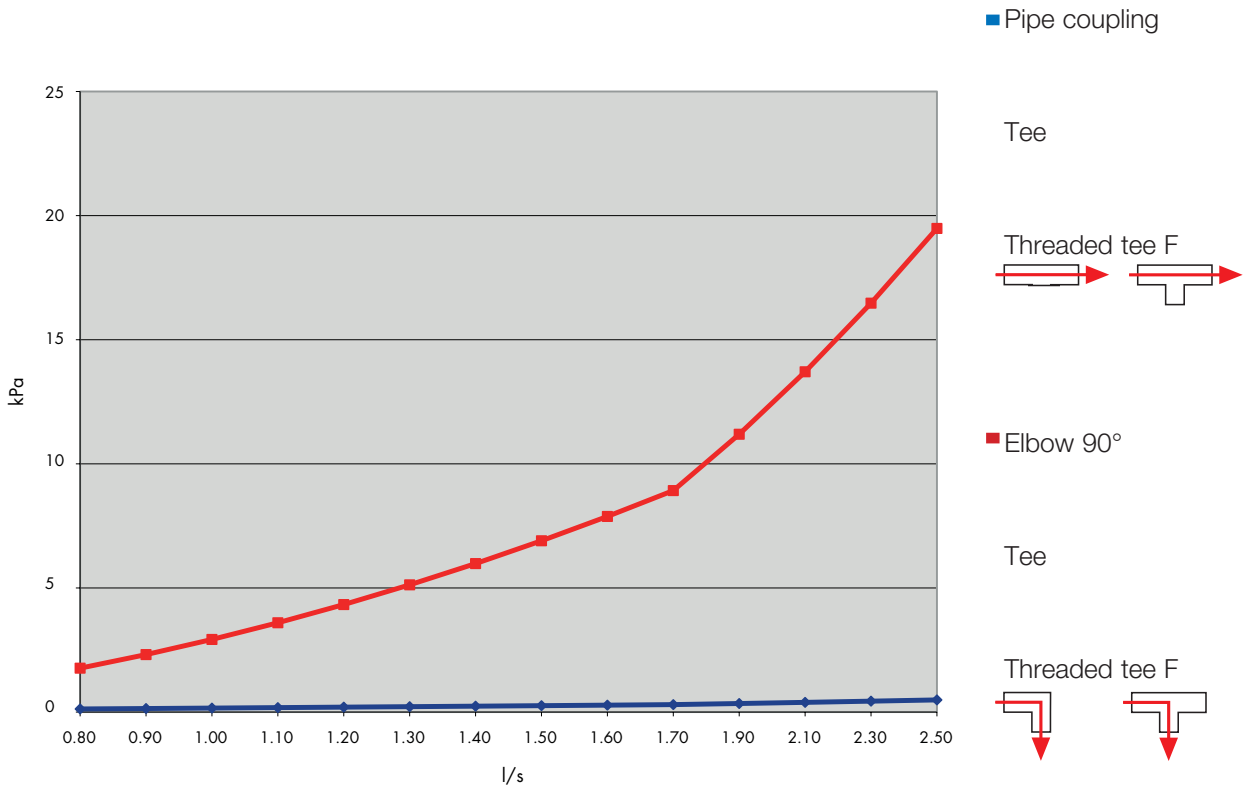
safety FITTINGS Ø 20 X 2 MM



safety FITTINGS Ø 26 X 3 MM



safety FITTINGS Ø 32 X 3 MM



Tools and Processing

Tools and Processing

BBS 32 – battery operated 18V: for pipes from Ø 16 mm up to 32 mm.
It can be connected with electrical supply 230V by a suitable transformer (art. 50447)

BBR 90 – battery operated 18V: for pipes from Ø 40 mm up to 63 mm. It can be connected with electrical supply 230V with a suitable transformer (art 50665)

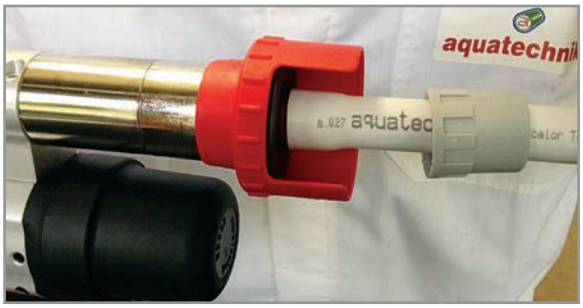
NB: technical features and servicing of the machines are available in their packages.

To install the **safety** fittings with the **multi-color** pipes, the installer should use the patented Aquatechnik tools.

The following illustrates the correct procedure for assembling the **safety** system.

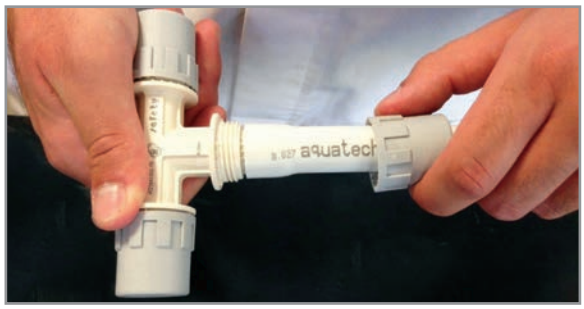
1 – Cut the pipe square using the Safety® system pipe cutter or other suitable tool.

2 – Slip the compression cap over the pipe.

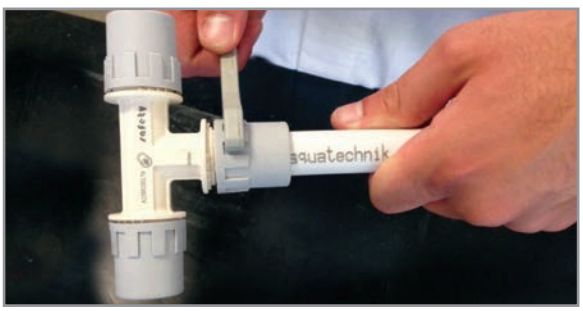


3 – Push the pipe up to the stop of the mechanical expander. Hold the trigger until the pipe is expanded (the pipe will be automatically released from the tool once the operation is completed).

4 – **safety** fittings are factory lubricated using a robotic application process and should not require the application of any lubricant.



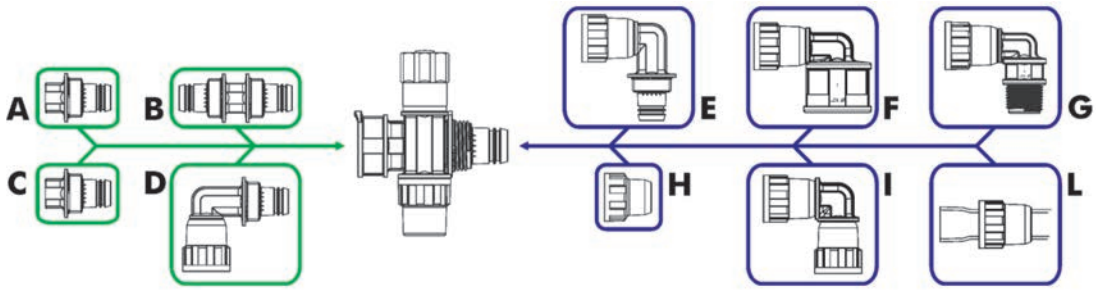
5 – Insert the **safety** fitting into the expanded pipe, pushing it up to the stop.



6 – Screw the compression cap up and lock the cap into position using the Safety® system pipe wrench tool.

ACCESSORIES AND CUSTOMISING OF SPECIAL SAFETY FITTING MODULES

The safety system is unique in that you can customise your installation to suit your specific needs simply by connecting the fittings together. Examples of this are below. Remember that the fittings are completely re-usable and can be disassembled and reconfigured as you see fit.



A – male cap
B – sleeve
C – ½" male thread reducer cap
D/E – male/female elbow
F – female/female threaded elbow
G – male/female threaded elbow
H – female cap
I – 90deg female/female elbow
L – **multi-calor**/multi-eco/polipert/PE-X* tube

* Note: the use of PE-X and PE-RT tubes with **safety** fittings is permitted only with a thickness equal to that of the **multi-calor** tubes. For more information consult the **Aquatechnik** technical service.

20632 – Threaded Tee Female Angle 90°

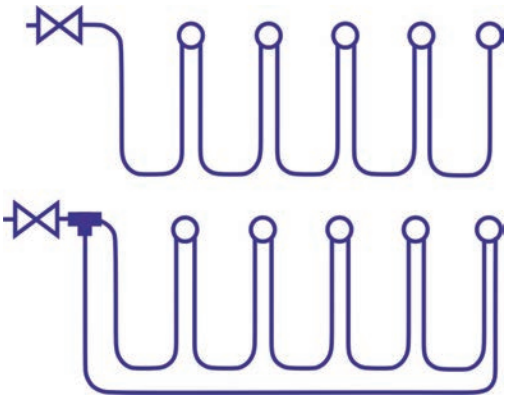
LEGIONELLA CONTROL IN PIPING SYSTEMS

To meet the growing demands of the national and international market with respect to the control of legionella bacteria in plumbing systems, and of the current regulations in force, Aquatechnik has studied a new fitting for water conveyance to be applied in series and in closed circuits.

The fitting is a 90° Tee with a female thread. The material is PPSU with a ½" alloy female thread. The item, thanks to its technical features, allows a high passage of flow till up to the last fixture point, minimising the stagnation of water in every part of the circuit. The patented **safety** system grants safe joints and rapidity of installation.

Moreover, the use of a 90° Tee allows you to create – with the diameter 16 mm – a greater number of sampling points in the distribution of water, by allowing both a money saving and a saving of scrap, as the variations of tube diameters and equipment necessary for its processing are reduced.

Finally, the construction of plumbing systems in series and with closed circuits (see figure), in association with the use of the fitting, grants a regular replacement of the water by reducing the risks of stagnation and granting the maximum hygiene.



Serie 21102 Ball Valve In PP-R Safety-Pol With Pipe Unions

The PP-R valves produced by Aquatechnik are bidirectional radial type and are distinguished by being made entirely of synthetic material.

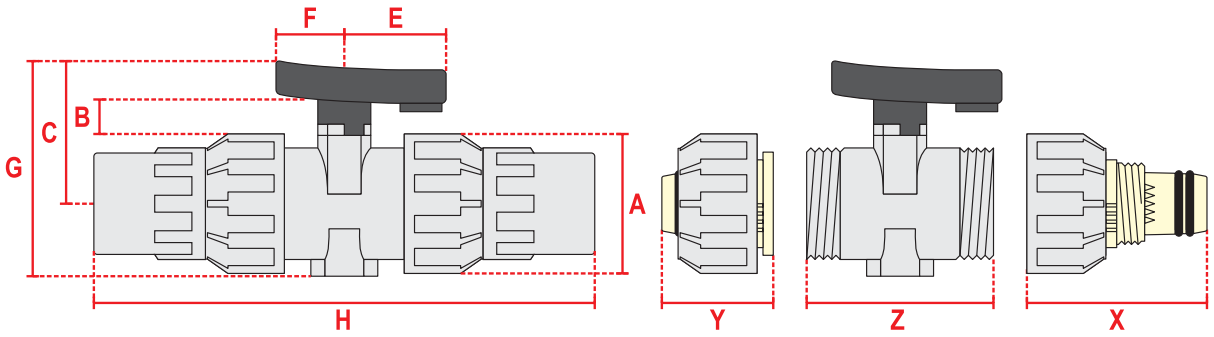
In fact, they consist of the valve body (ball valve included) and nuts made entirely of PP-R (polypropylene random copolymer), a pipe union for the connections using a PPSU system safety (polyphenylsulfone) and PA-M caps (modified polyamide). The connections are made using the patented safety socketing of the multi-layer pipe.

The above construction features allow the water conveyed to be guaranteed never to be in contact with metal parts if used in systems made with synthetic products such as the safety range. This feature guarantees a high degree of cleanliness of the water and prevents the water from being polluted with metal residue.

The PP-R valves are also distinguished by high manoeuvrability (low operating torque) and extreme operating safety, guaranteed by 100% testing of the production for the vacuum seal and low pressures.

Another feature lies in the possibility of assembling and disassembling the valve by extracting the entire central unit of the valve from the system, radially and in a simple and fast manner.

PRODUCT SPECIFICATIONS MEASUREMENTS (IN MM.)



Art.	Ø	DN	PN	A	B	C	E	F	G	H	X	Y	Z
21102	16	12	16	50	10	57	37	24	82	153	65	52	70
21106	20	15	16	50	10	57	37	24	82	157	66	53	70
21108	25	20	16	60	11	64	43	28	94	175	70	56	82
21110	32	25	16	68	13	73	50	31	107	187	73	59	86
21112	40	32	16	80	20	80	60	30	116	215	79	63	97
21114	50	40	16	96	22	92	68	35	140	252	90	73	103

TECHNICAL FEATURES

	Fitting Body	Pipe Unions	Caps	Ring Nut	Handle	O-ring
Material	PP-R	PPSU	PAM	PAM	PVC	EPDM
Colour	Grey	Ivory	Grey	Grey	Black	Black

Marking (body): company logo imprinted on the handle, code on base material, diameter (in mm and inches), DN.
Maximum operating temperature: 70°C
Maximum operating pressure: 8 bar (at 70°C)

FIELD OF USE

The Aquatechnik PP-R valves are used to intercept fluids at low temperatures, and are particularly recommended to be used when contact of fluid with metals is to be prevented. They are suitable for heating and cooling radiator and radiant panel systems, for civil and industrial use. To set up liquid carrier systems and/or of different substances, contact our technical department (1800 AQUATECHNIK, fax +61 2 9793 9544, email: admin@aquatechnik-australia.com.au).

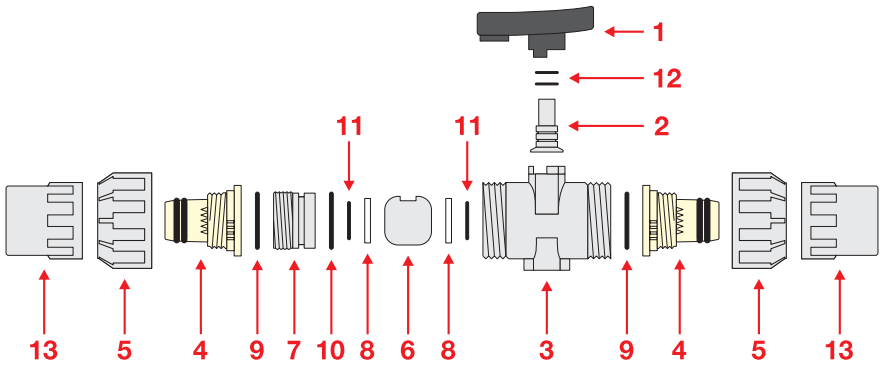
NOTES

- Storage must be in covered areas and protected from direct sunlight. Prolonged exposure causes a degenerative effect on the products.
- Thermoplastic materials are particularly sensitive to low operating temperatures (from +5°C and lower): this can lead to increased product tension and vulnerability. Violent shocks caused by objects or other on site cases can cause damage and breakage that is not attributable to the manufacturer. In winter seasons and in areas with liquid freezing periods, the pipes must be completely emptied or liquid anti-freezing liquids must be used.
- Every system built (water, sanitary, heating or other) must be tested in compliance with the law (ref. AS3500) before the permanent masonry is built. Partial or non implemented testing will render the warranty null and void.
- Do not install products that are damaged, engraved or ruined due to neglect.
- Strictly avoid contact of the pipe unions made of PPSU with MEC based products (methyl ethyl ketone), found in glues and thinners, so as to avoid the phenomenon of a chemical attack.

For more detailed information, please refer to catalogues and technical guides that can be downloaded from the company website www.aquatechnik-australia.com.au

INSTRUCTIONS FOR DISASSEMBLY AND REASSEMBLY

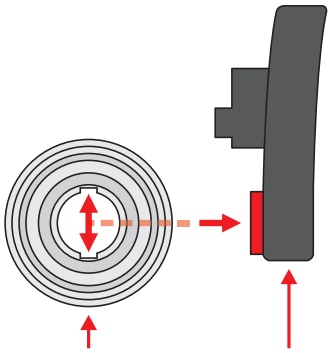
If necessary or in the case of maintenance, the valve can be assembled and disassembled by extracting the entire central unit of the valve from the system, radially and in a simple and fast manner.



Position	Components	Material
1	Handle	PVC
2	Rod	PP-R
3	Valve body	PP-R
4	Pipe union	PPSU
5	Ring nut	PAM
6	Ball	PP-R
7	Threaded support	PP-R

Position	Components	Material
8	Ball gasket	PTFE
9	Body O-ring	EPDM
10	Support O-ring	EPDM
11	Ball O-ring	EPDM
12	Rod O-ring	EPDM
13	Cap	PAM

DISASSEMBLING THE VALVE

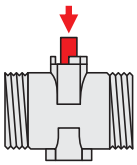


A) Unscrew the caps (13).
B) Unscrew the ring nuts (5) and remove the valve from the system to access the internal parts.
C) Set the valve in the fully open position.
D) Pull the handle (1) strongly from the control rod (2).
E) Unscrew the threaded support (7) from the valve body (3). For this purpose use the relevant spanner attached to the handle (1) by coupling it in the seats of the threaded support (7), by turning anti-clockwise.

Then, you can access all the internal parts of the valve, check the condition of the gaskets and replace any parts, if necessary. Note: in case of a leak between the ball (6) and the body (3), tighten the threaded support (7) with greater force.

DISASSEMBLING THE BALL (6)

A) Set the valve in the fully closed position.
B) Apply moderate pressure on the ball (6) from the inlet opposite the threaded support (7).



DISASSEMBLING THE CONTROL ROD (2)

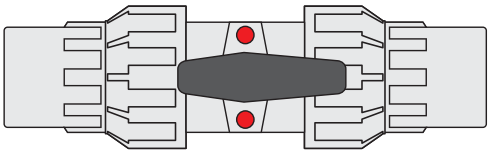
Exert moderate pressure towards the inside of the valve on the control rod (2) to force it out from the valve body (3).

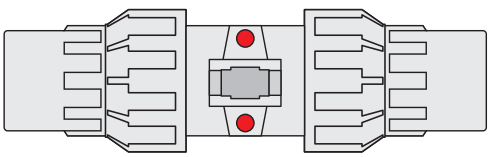
REASSEMBLY

Reassemble the valves by following the steps described above in inverse order, taking care to place the well-lubricated gaskets in their thoroughly cleaned seats. Use silicone lubricant.

CAUTION!! Do not over tighten the ring nut (5) so as to prevent the ball from blocking. Hold the ring nut (5) still when tightening the cap (13), so as to prevent tightening the ring nut (5) excessively and therefore blocking the ball (6).

VALVE DRIVE AND WALL MOUNTING





DRIVE: The Aquatechnik PP-R valves are designed for a servo motor to be assembled, which allows for motorised operation. Assemble the servo motor as follows:
A) remove the handle (1);
B) insert it in the servo motor and secure it to the valve using the relevant holes (shown in the figure at the side).

WALL MOUNTING: Use the two holes at the bottom of the valves to wall mount them (shown in the figure at the side) by inserting the relevant adapter into them (for more information please contact our technical department: 1800 AQUATECHNIK, fax +61 2 9793 9544, email: admin@aquatechnik-australia.com.au

Direct Junction for Multi-layer Pipes

The new fitting was conceived, manufactured and patented by Aquatechnik: it was designed to create attachment points on multi-layer pipes in a simple and quick way, thus removing the use of bulky and expensive reduced tees. The application of the new direct junction for multi-layer pipes allows creating thermal power stations, distribution of heating and domestic water networks, distribution manifolds in reduced spaces and in shorts times, also for compressed air.

It is recommended to be used outdoors and in false ceilings. It does not require special tools: you just need to use a simple cutter with a common drill.

The direct junction for multi-layer pipes can be applied on existing pipes or on previously installed distribution main lines, thus facilitating the creation of the distribution manifold and the application of the attachment points where necessary. Several laboratory tests allow comparing the sealing and the duration of this special component with the features of a common tee; in addition, the direct junction for multi-layer pipes can be dismantled, and so it is always recoverable.

ADVANTAGES

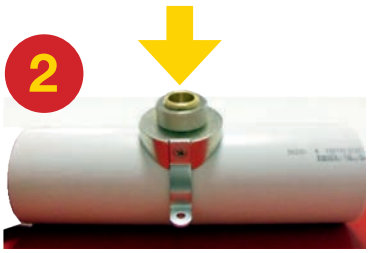
- Installation speed
- Reduced overall dimensions
- Possibility to perform junctions on existing pipes or after having laid the main supply lines
- Reduced necessary tools
- Economic savings with respect to the use of tees and reduced tees

DIMENSIONS

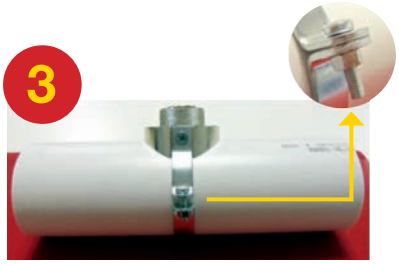
- Pipe 63 mm – junction ½" and ¾"

THE PROCESSING OPERATION IN 5 SIMPLE STEPS

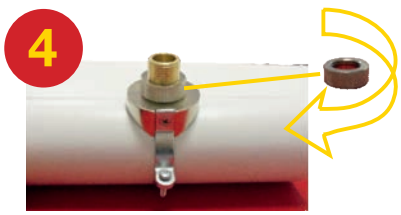
Drill the multi-layer pipe with the specific cutter and smooth down the edges of the hole with rubbing paper.



Place the fitting in the hole by paying attention that the gasket does not get damaged.



Screw the screws in the collar up to the end-of-travel to fasten the fitting to the pipe.



Screw the knurled nut up to the end: it will lock the fitting, thus adjusting the gasket in the correct work position.

Install the desired fitting in the tip.

It can be dismantled!

It is patented!

Coupling Tools

There are several Aquatechnik patented tools available for preparing the **safety** system in all available dimensions. Designed and produced by the mechanical section of **Aquatechnik**, they are protected by patents.

COUPLING TOOL BBR 90

Battery operated tool for pipe end expansion. Supplied with 18V battery, charger, grease and carry case.

Processing diameters: from 16 to 63 mm.

NB: For operating instructions and servicing information, refer to the guide that is supplied with the machine.

BATTERY CHARGER & BATTERY FOR BBR 90

230/240V input
18V output

NB: For operating instructions and servicing information, refer to the guide that is supplied with the machine.

MECHANICAL EXPANDERS FOR BBR 90

NB: For operating instructions and servicing information, refer to the guide that is supplied with the machine.

COUPLING TOOL BBS 32

Battery operated 18V.

Automatic tool to prepare pipe expansion for fittings.

Processing diameters: from mm. 16 up to mm. 32.

NB: For operating instructions and servicing information, refer to the guide that is supplied with the machine.

PIPE BENDING TOOL HTS 32
(for Ø 16-32 mm)

SWAN-NECK TOOL CPS 26
(for Ø 20-26 mm)

To allow simple processing of the systems, some useful accessories are available as detailed in the current price list. We describe briefly the most important ones:

- Fixed wrench to lock/unlock the caps.
- Mechanical expanders for the different diameters of the range.
- Pipe cutting shears.
- Jack wrench and adaptor for manual machines.
- Pipe bending machine with templates and counter-templates.
- Outer and inter pipe-bending spring.
- Extensible support tripod.
- Elastomeric adaptors.
- Transformer for BBS 32.
- Spare-part

Component Identification and Dimensions

Component Identification and Dimensions

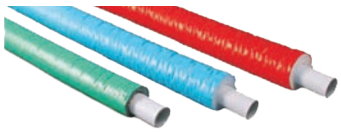
PIPES

Hot & Cold Water Supply Pipe

Code	Description
74154	Safety® system pipe straight lengths 4 metres x 16 mm
74156	Safety® system pipe straight lengths 4 metres x 20 mm
74158	Safety® system pipe straight lengths 4 metres x 26 mm
74160	Safety® system pipe straight lengths 4 metres x 32 mm
74162	Safety® system pipe straight lengths 4 metres x 40 mm
74164	Safety® system pipe straight lengths 4 metres x 50 mm
74166	Safety® system pipe straight lengths 4 metres x 63 mm

Code	Description
74004	Safety® system pipe roll 100 metres x 16 mm
74008	Safety® system pipe roll 100 metres x 20 mm
74010	Safety® system pipe roll 50 metres x 26 mm
74012	Safety® system pipe roll 50 metres x 32 mm

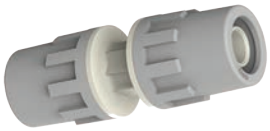
Water Pipe Insulation Conduit



Code	Description
74033	Safety® system pipe with insulation 25 metres x 16 mm
74034	Safety® system pipe with insulation 50 metres x 16 mm
74037	Safety® system pipe with insulation (green) 25 metres x 20 mm
74038	Safety® system pipe with insulation (green) 50 metres x 20 mm
74064	Safety® system pipe with insulation (blue) 50 metres x 16 mm
74068	Safety® system pipe with insulation (blue) 50 metres x 20 mm
74084	Safety® system pipe with insulation (red) 50 metres x 16 mm
74088	Safety® system pipe with insulation (red) 50 metres x 20 mm

FITTINGS

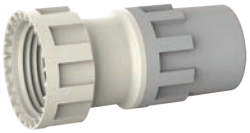
Straight Pipe Coupling (No.1)



Code	Description
20442	Straight pipe coupling 16 mm
20446	Straight pipe coupling 20 mm
20448	Straight pipe coupling 26 mm
20450	Straight pipe coupling 32 mm

Code	Description
20452	Straight pipe coupling 40 mm
20454	Straight pipe coupling 50 mm
20456	Straight pipe coupling 63 mm

Reducing Coupling (No. 1R)



Code	Description
20122	Reducing coupling 20 x 16 mm
20130	Reducing coupling 26 x 20 mm
20138	Reducing coupling 32 x 26 mm
20126	Reducing coupling 26 x 16 mm
20132	Reducing coupling 32 x 16 mm
20136	Reducing coupling 32 x 20 mm
20142	Reducing coupling 40 x 16 mm
20144	Reducing coupling 40 x 20 mm

Code	Description
20146	Reducing coupling 40 x 26 mm
20148	Reducing coupling 40 x 32 mm
20156	Reducing coupling 50 x 32 mm
20158	Reducing coupling 50 x 40 mm
20166	Reducing coupling 63 x 32 mm
20168	Reducing coupling 63 x 40 mm
20170	Reducing coupling 63 x 50 mm

Reducing Pipe Coupling (No. 1R)

Code	Description
20472	Reducing pipe coupling 20 x 16 mm
20480	Reducing pipe coupling 26 x 20 mm

Threaded Straight Female Connector (No. 2)

Code	Description
20062	Threaded straight female connector 16 mm x ½" (No. 2)
20066	Threaded straight female connector 20 mm x ½" (No. 2)
20070	Threaded straight female connector 20 mm x ¾" (No. 2)
20072	Threaded straight female connector ¾" x 26 mm (No. 2)
20073	Threaded straight female connector 1" x 26 mm (No. 2)
20076	Threaded straight female connector 1" x 32 mm (No. 2)
20078	Threaded straight female connector 1¼" x 40 mm (No. 2)
20082	Threaded straight female connector ½" x 16 mm with alloy thread (No. 2)
20086	Threaded straight female connector ½" x 20 mm with alloy thread (No. 2)
20088	Threaded straight female connector 1½" x 50 mm with alloy thread (No. 2)
20093	Threaded straight female connector 2" x 63 mm with alloy thread (No. 2)

Threaded Straight Male Connector (No. 3)

Code	Description
20002	Threaded straight male connector ½" x 16 mm (No. 3)
20006	Threaded straight male connector ½" x 20 mm (No. 3)
20010	Threaded straight male connector ¾" x 20 mm (No. 3)
20012	Threaded straight male connector ¾" x 26 mm (No. 3)
20013	Threaded straight male connector 1" x 26 mm (No. 3)
20016	Threaded straight male connector 1" x 32 mm (No. 3)
20018	Threaded straight male connector 1¼" x 40 mm (No. 3)
20022	Threaded straight male connector ½" x 16 mm with alloy thread (No. 3)
20026	Threaded straight male connector ½" x 20 mm with alloy thread (No. 3)
20028	Threaded straight male connector 1½" x 50 mm with alloy thread (No. 3)
20033	Threaded straight male connector 2" x 63 mm with alloy thread (No. 3)

Brass Connector Barb Male

Code	Description
39312	Brass connector barb male 16 mm
39314	Brass connector barb male 20 mm

Elbow (No.12)

Code	Description
20382	Elbow 16 mm
20386	Elbow 20 mm
20388	Elbow 26 mm
20390	Elbow 32 mm

Code	Description
20392	Elbow 40 mm
20394	Elbow 50 mm
20396	Elbow 63 mm

Male Elbow (No.13)

Code	Description
20282	Male elbow ½" x 16 mm
20286	Male elbow ½" x 20 mm
20288	Male elbow ¾" x 20 mm
20290	Male elbow ¾" x 26 mm
20296	Male elbow 1" x 32 mm
20322	Male elbow with alloy thread ½" x 16 mm
20326	Male elbow with alloy thread ½" x 20 mm

Component Identification and Dimensions

Female Elbow (No.14)

Code	Description
20222	Female elbow ½" x 16 mm (No. 14)
20226	Female elbow ½" x 20 mm (No. 14)
20230	Female elbow ¾" x 20 mm (No. 14)
20232	Female elbow ¾" x 26 mm (No. 14)
20238	Female elbow 1" x 32 mm (No. 14)
20262	Female elbow with alloy thread ½" x 16 mm (No. 14)
20266	Female elbow with alloy thread ½" x 20 mm (No. 14)

Female Elbow (No. 15) with Bracket

Code	Description
20202	Female threaded elbow with bracket and alloy thread ½" x 16 mm – (No. 15)
20206	Female threaded elbow BP with bracket and alloy thread ½" x 16 mm – (No. 15)
20212	Female threaded elbow with bracket ½" x 16 mm – (No. 15)
20206	Female threaded elbow with bracket ½" x 20 mm – (No. 15)

Threaded Male Elbow Brass (No. 19)

Code	Description
30352	Threaded male elbow brass BP 16 mm x ½" x 65 mm (No. 19)
30354	Threaded male elbow brass BP 16 mm x ½" x 90 mm (No. 19)
30356	Threaded male elbow brass BP 20 mm x ½" x 90 mm (No. 19)

Tee (No. 24)

Code	Description
20662	Tee 16 mm x 16 mm x 16 mm
20666	Tee 20 mm x 20 mm x 20 mm
20668	Tee 26 mm x 26 mm x 26 mm
20670	Tee 32 mm x 32 mm x 32 mm

Code	Description
20672	Tee 40 mm x 40 mm x 40 mm
20674	Tee 50 mm x 50 mm x 50 mm
20676	Tee 63 mm x 63 mm x 63 mm

Reduced Tee (No. 25 & No. 26)

Code	Description
20717	Reduced tee 20 x 16 x 16 mm
20720	Reduced tee 20 x 16 x 20 mm
20728	Reduced tee 26 x 20 x 26 mm
20735	Reduced tee 32 x 20 x 32 mm
20736	Reduced tee 32 x 26 x 32 mm
20725	Reduced tee 26 x 16 x 26 mm
20732	Reduced tee 32 x 16 x 32 mm
20740	Reduced tee 40 x 16 x 40 mm
20742	Reduced tee 40 x 20 x 40 mm
20744	Reduced tee 40 x 26 x 40 mm
20746	Reduced tee 40 x 32 x 40 mm

Code	Description
20750	Reduced tee 50 x 16 x 50 mm
20754	Reduced tee 50 x 20 x 50 mm
20756	Reduced tee 50 x 26 x 50 mm
20758	Reduced tee 50 x 32 x 50 mm
20760	Reduced tee 50 x 40 x 50 mm
20762	Reduced tee 63 x 16 x 63 mm
20766	Reduced tee 63 x 20 x 63 mm
20768	Reduced tee 63 x 26 x 63 mm
20770	Reduced tee 63 x 32 x 63 mm
20772	Reduced tee 63 x 40 x 63 mm
20774	Reduced tee 63 x 50 x 63 mm

Threaded Elbow F/F with Turning Cap

Code	Description
20332	Threaded female elbow F ½" x 16 mm
20336	Threaded female elbow F ½" x 20 mm
20337	Threaded female elbow F ¾" x 26 mm
20338	Threaded female elbow F 1" x 32 mm

Threaded Elbow M/F with Turning Cap

Code	Description
20342	Threaded male elbow F ½" x 16 mm
20344	Threaded male elbow F ½" x 16 mm
20346	Threaded male elbow F ½" x 16 mm
20348	Threaded male elbow F ½" x 16 mm

Elbow M/F with Turning Cap

Code	Description
20352	Elbow for Safety fittings M/F 16 mm
20356	Elbow for Safety fittings M/F 20 mm
20358	Elbow for Safety fittings M/F 26 mm
20360	Elbow for Safety fittings M/F 32 mm
20362	Elbow for Safety fittings M/F 40 mm

Elbow F/F with Turning Cap

Code	Description
20402	Elbow for Safety fittings F/F 16 mm
20406	Elbow for Safety fittings F/F 20 mm
20408	Elbow for Safety fittings F/F 26 mm
20410	Elbow for Safety fittings F/F 32 mm

Elbow 45°

Code	Description
20416	Elbow 45° 20 mm
20418	Elbow 45° 26 mm
20420	Elbow 45° 32 mm
20422	Elbow 45° 40 mm
20424	Elbow 45° 50 mm
20426	Elbow 45° 63 mm

Elbow 45° M/F with Turning Cap

Code	Description
20432	Elbow 45° for Safety fittings M/F 20 mm
20433	Elbow 45° for Safety fittings M/F 26 mm
20434	Elbow 45° for Safety fittings M/F 32 mm
20435	Elbow 45° for Safety fittings M/F 40 mm
20436	Elbow 45° for Safety fittings M/F 50 mm

Component Identification and Dimensions

Threaded Tee F

Code	Description
20542	Threaded Tee F 16 – F ½" – 16
20546	Threaded Tee F 20 – F ½" – 20
20550	Threaded Tee F 26 – F ¾" – 26
20556	Threaded Tee F 32 – F 1" – 32
20582	Threaded Tee F with alloy thread 16 – F ½" – 16
20586	Threaded Tee F with alloy thread 20 – F ½" – 20

Eccentric Threaded Tee F

Code	Description
20592	Eccentric threaded Tee F 16 – F ½" – 16
20596	Eccentric threaded Tee F 16 – F ½" – 16

Threaded Tee Female Angle 90°

Code	Description
20632	Threaded Tee female angle 90° with alloy thread and bracket F 16 – F½" – 16

Straight Coupling Nipples F/F with Turning Caps

Code	Description
20522	Straight coupling for Safety fittings F/F 16 mm
20526	Straight coupling for Safety fittings F/F 20 mm
20528	Straight coupling for Safety fittings F/F 26 mm
20530	Straight coupling for Safety fittings F/F 32 mm
20532	Straight coupling for Safety fittings F/F 40 mm
20534	Straight coupling for Safety fittings F/F 50 mm

Modular Manifold

Code	Description
21302	Single modular Manifold free-laying and walled-in – 20 – 16 – 20
21304	Single modular Manifold free-laying and walled-in – 26 – 16 – 26
21307	Single modular Manifold free-laying and walled-in – 26 – 20 – 26

Multi-rapid Manifold

Code	Description
21312	Single modular Manifold with shut off valve 20 – 16 – 20
21316	Single modular Manifold with shut off valve 26 – 16 – 26
21322	Single modular Manifold with shut off valve 32 – 16 – 32
21326	Single modular Manifold with shut off valve 32 – 20 – 32

Swan Neck Manifold

Code	Description
21782	Single modular swan neck Manifold free-laying and walled-in 20 – 16 – 20

Threaded Joint M/F in brass

Code	Description
30044	Threaded male joint for Safety fittings M ½" x 20 mm
30045	Threaded male joint for Safety fittings M ¾" x 26 mm
30046	Threaded male joint for Safety fittings M ¾" x 32 mm
30048	Threaded male joint for Safety fittings M 1" x 26 mm
30047	Threaded male joint for Safety fittings M 1" x 32 mm
30050	Threaded male joint for Safety fittings M 1¼" x 40 mm

Threaded Joint M in brass for Manifolds

Code	Description
30070	Threaded male joint for Safety fittings M 1" x 26 mm
30072	Threaded male joint for Safety fittings M 1¼" x 32 mm

Threaded Joint F/F in brass

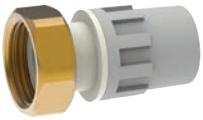
Code	Description
30106	Threaded female joint for Safety fittings F ½" x 20 mm
30107	Threaded female joint for Safety fittings F ½" x 26 mm
30108	Threaded female joint for Safety fittings F ¾" x 26 mm
30109	Threaded female joint for Safety fittings F ¾" x 32 mm
30110	Threaded female joint for Safety fittings F 1" x 32 mm
30111	Threaded female joint for Safety fittings F ½" x 32 mm

Stop End (No. 61)

Code	Description
20902	Stop male end 16 mm (No. 61)
20906	Stop male end 20 mm (No. 61)
20908	Stop male end 26 mm (No. 61)
20910	Stop male end 32 mm (No. 61)
20912	Stop male end 40 mm (No. 61)
20914	Stop male end 50 mm (No. 61)
20916	Stop male end 63 mm (No. 61)

Code	Description
20952	Stop female end 16 mm (No. 61)
20956	Stop female end 20 mm (No. 61)
20958	Stop female end 26 mm (No. 61)
20960	Stop female end 32 mm (No. 61)
20962	Stop female end 40 mm (No. 61)
20964	Stop female end 50 mm (No. 61)
20966	Stop female end 63 mm (No. 61)

Straight Pipe Union (No. 62)



Code	Description
20832	Straight tap connector F ¾" x 16 mm (No. 62)
20836	Straight tap connector F ¾" x 20 mm (No. 62)
20840	Straight tap connector F 1" x 26 mm (No. 62)
20844	Straight tap connector F 1¼" x 32 mm (No. 62)

Bent Pipe Union (No. 63)

Code	Description
20862	Straight tap connector F ¾" x 16 mm (No. 63)
20866	Straight tap connector F ¾" x 20 mm (No. 63)
20870	Straight tap connector F 1" x 26 mm (No. 63)
20874	Straight tap connector F 1¼" x 32 mm (No. 64)

Bath/Laundry/Shower Assembly

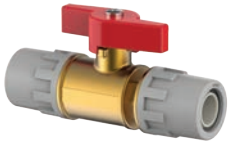
Code	Description
30292	Bath/Laundry Assembly
30282	Shower Assembly

Component Identification and Dimensions

Shut Off Valve

Code	Description
21206	Shut off valve with chrome cap 20 mm
21208	Shut off valve with chrome cap 26 mm
21236	Shut off valve with chrome handle 20 mm
21238	Shut off valve with chrome handle 26 mm
21266	Shut off valve with handwheel 20 mm
21268	Shut off valve with handwheel 26 mm

Ball Valve



Code	Description
21282	Ball valve 16 mm x 16 mm
21286	Ball valve 20 mm x 20 mm
21288	Ball valve 26 mm x 26 mm
21290	Ball valve 32 mm x 32 mm

Direct Junction

Code	Description
22812	Direct junction for multi-layer pipes M ½" – 63 mm
22814	Direct junction for multi-layer pipes M ¾" – 63 mm

TOOLS

Safety® System Pipe Cordless Expander Tool 16–32 mm "BBS 32"

Code	Description
51144	Safety® system pipe expander tool 16–32 mm heads

Safety® System Pipe Manual Expander Tool 16–20 mm "BMC 011"

Code	Description
50452	Safety® system pipe manual expander tool 16–20 mm heads

Safety System Pipe Cordless Expander Tool 16–63 mm "BBR 90"

Code	Description
51198	Safety System Pipe Cordless Expander Tool 16–63 mm heads

Safety® System Pipe Wrench

Code	Description
50600	Safety® system pipe wrench 16–20 mm
50602	Safety® system pipe wrench 26–32 mm

Safety® System Pipe Expander Head

Code	Description
50702	Safety® system pipe expander head 16 mm
50704	Safety® system pipe expander head 20 mm
50705	Safety® system pipe expander head 26 mm
50706	Safety® system pipe expander head 32 mm
50802	Safety® system pipe expander head (for use on PE-RT and PEX pipes) 16 mm
50804	Safety® system pipe expander head (for use on PE-RT and PEX pipes) 20 mm

Safety® System Pipe Cutter

Code	Description
50275	Safety® system pipe cutter 16–20 mm
50280	Safety® system pipe cutter 16–32 mm

Safety® System Manual Bending Tool

Code	Description
51082	Manual bending tool 16 mm
51086	Manual bending tool 20 mm

Safety® System Fittings Threading Tool

Code	Description
51240	Safety® system threading tool ½" (to repair PPSU threads)

SPARE PARTS AND CLIPS

Code	Description
22940	Spindle/handwheel 20 mm (replacement for 21266)
22942	Spindle/handwheel 26 mm (replacement for 21268)

22920	Chrome handle 20 mm (replacement for 21236)

22930	Spindle 20 mm (replacement for 21236)
22932	Spindle 20 mm (replacement for 21238)

39252	O ring for Safety® system fittings 16 mm
39256	O ring for Safety® system fittings 20 mm
39258	O ring for Safety® system fittings 26 mm
39260	O ring for Safety® system fittings 32 mm

39296	2 x pipe spacer clip 16 mm
39300	2 x pipe spacer clip 20 mm

27042	Pipe clip 16 mm
27044	Pipe clip 20 mm
27046	Pipe clip 26 mm

Certification

CERTIFICATE
OF CONFORMITY

SAI Global hereby grants:

Aquatechnik Group SpA

via P.F. CALVI 40, Magnago (MI), Italy

Watermark Certificate of Conformity - Level 1

Evaluated to:

AS 4176.2-2010 - Multilayer pipes for pressure applications - Multilayer piping systems for hot and cold water plumbing applications - Pipes (ISO 21003-2:2008, MOD)
& AS 4176.3-2010 - Multilayer pipes for pressure applications - Multilayer piping systems for hot and cold water plumbing applications - Fittings (ISO 21003-3:2008, MOD)

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Issued: 16 August 2016
Expires: 24 September 2020

Originally Certified: 25 September 2015
Current Certification: 25 July 2016

Paul Simpson
Global Policy Risk and Certification Manager

WaterMark™

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Aquatechnik Projects – Global

Above: Ca' Foscari University, Venice – Italy. Safety System DN16 – DN63

Right: Residence, Five Dock – Sydney, Australia. Safety System DN16 – DN32

Left: New York University, Abu Dhabi – United Arab Emirates. Safety System DN16 – DN63

Aquatechnik Projects – Global

Private Yacht, Viareggio – Italy.
Safety System DN16 – DN32

Hospital UMC, Nijmegen – the Netherlands.
Safety System DN16 – DN63

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Aquatechnik Projects – Global

Rabo Bank, Utrecht – the Netherlands.
Safety System DN16 – DN63

Residence, Caringbah South – Sydney, Australia.
Safety System DN16 – DN32

Aquatechnik Projects – Global

Industrial Complex, Bankstown – Sydney Australia. Hot and Cold Water, Safety System DN16 – DN32

Residence, Brighton-Le-Sands – Sydney Australia. Hot and Cold Water, Safety System DN16 – DN32

Bioterme Thermal Water Park – Slovenia. Hot and Cold Water, Safety System DN16 – DN63

San Gerado Hospital, Monza – Italy. Hot and Cold Water, Safety System DN16 – DN63

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Aquatechnik Projects – Global

Pisa Hospital,
Pisa – Italy.
Hot and Cold Water
Safety System
DN16 – DN63

Residence, Wuppertal, Westphalia – Germany.
Hot and Cold Water, Safety System DN16 – DN32

Mapei Stadium,
Reggio Emelia – Italy.
Sub Pitch Heating,
Safety System DN16 – DN63

Bahia Resort Centre,
480 Apartments – Algeria.
Hot and Cold Water,
Safety System DN16 – DN63

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