



Hot and Cold Water Distribution System (for size 32mm and below)

The hot and cold-water pipe shall be PEX-Aluminum-PEX Multi-layer pipes manufactured according to ISO 21003. The pipe is made up of an inner pipe of PEX, an aluminum layer butt-welded by laser and a cross-linked polyethylene outside layer. The associated fittings shall be MECHFIT one push, clamp ring self-permanent squeezing type. No tools are required for installation.

The pipe and fittings, as a system, shall be tested and compliance in accordance to ISO 21003 and SS 375. It shall be tested locally by an approved testing laboratory in compliance with the local water authority's stipulated requirements and approved for domestic hot and cold-water supply. The system must also be easily installed without any tools or welding machine.

Specification for Multi-layer (PEX-AL-PEX) Pipes

1) Operating conditions

- 95° C Maximum working temperature / 110° C Maximum specific temperature
- 10 bar at 25° C, 3 bar Maximum working pressure at 95° C.
- Chilled water service; a minimum temperature -40° C.

All of the above are subject to the system and equipment being installed in accordance with the current good practice standard. The pipe and fittings should be installed in accordance with the manufacturer's installation instructions and comply with the relevant local and national regulations.



Multilayer pipes

Working pressure according regression curves of ISO21003

Years	Temperature (° C)	Calculated P.(b)	Safety coef	Working P.(b)
50	20	27,86	1,16	24,04
50	40	23,00	1,16	19,85
50	60	18,40	1,16	15,88
50	80	14,15	1,16	12,21
50	95	11,24	1,12	10,00

2) Fitting Range

- 16-32mm fittings range to be clamp ring self-permanent squeezing type (MECHFIT)

3) Pipe Expansion

- $2,3 \times 10^{-5} (K - 1)$ Lineal expansion coefficient
- MultiPEX has a thermal expansion rate which is significantly lower than other plastic pipe-work systems.

4) Connection to Boilers

- MultiPEX should not be directly connected to boilers.

5) Bending Radius

- MultiPEX pipework 16-32mm can be formed into a bend by hand with a bending spring or a bending tool. Minimum bending radius must not be less than 5 x OD (Outer Diameter)



6) Fixing

- Fitting and equipment connections as well as the connection of measuring and control devices are to be installed torsion free. It is recommended to set the pipe support, if possible, in the proximity of the fitting and connections.

7) Fire

- MultiPEX complies with Class B2 of DIN 4102. It will burn but is inherently flame resistant.

8) Trace heating

- $R=0,004 \text{ m}^2 \text{ K/W}$ Thermal conductivity

SPECIFICATION OF MECHFIT ONE PUSH PRESS FITTINGS WITH MULTI-LAYER (PEX-AL-PEX) PIPES PLUMBING SYSTEM



9) Specification

Physic and Mechanical Properties

- 1,47 g/cm³ Density /

ITEM		UNIT	TEST PARAMETER	PROPERTY
Density		g/cm3	DIN 16892/DIN53479	0.94 and more
Tensile yielding strength	23°C	MPa (kgf/cm2)	DIN EN ISO 6259-1	16.0 and more (163 & more)
	80°C	MPa (kgf/cm2)		5.9 and more (60 & more)
percentage elongation after fracture	23°C	%		300~600
	80°C	%		300~700
elongation modulus	20°C	MPa (kgf/cm2)	DIN16892/DIN EN ISO 527-1	392~588 (4,000~6,000)
	80°C	MPa (kgf/cm2)		137~157 (1,400~1,600)
impact strength		N*cm/cm2	ASTM D256 <u>Charpy</u> Test	No broke
hardness			ASTM D2240 <u>Shore</u> Test	60~70
coefficient of thermal conductivity		W/m*K	ATSM C177	0.35~0.47
		(kcal/hm°C)		(0.3~0.4)
coefficient of expansion		10-4/°C	ASTM D696	1.4~2.3
softening temperature		°C	<u>Vicat</u> Point Test	118~133
melting point		°C		No fluxion
brittle temperature		°C	---	- 70°C



Technical Data for Multi-layer (PEX-AL-PEX) Pipes

	16 x 2	20 x 2	25 x 2.5	32 x 3
Outside pipe diameter, mm	16	20	25	32
Thickness pipe, mm	2	2	2.5	3
Internal pipe diameter, mm	12	16	20	26
Thickness of aluminum layer, mm	0.2	0.2	0.3	0.4
Allowable deviations along external diameter, mm	0.2	0.2	0.2	0.2
Allowable deviations along internal diameter, mm	-0.4	-0.4	-0.4	-0.4
Weight of 1 m pipe, kg/m	0.099	0.127	0.206	0.323
Internal volume of 1 (one) meter, l/m	0.113	0.201	0.314	0.531
Heat conduction coefficient, Watt/m*K	0.4	0.4	0.4	0.4
Coefficient of linear expansion, mm/m*K	0.025	0.025	0.025	0.025
Roughness of internal surface, mm	0.0004	0.0004	0.0004	0.0004
Maximum temperature, °C	95	95	95	95
Maximum operating temperature, °C	95	95	95	95
Operating pressure at temperature of +25 °C, bars	10	10	10	10
Minimum bending radius without internal spring, mm	80	100	125	160
Minimum bending radius with the use of internal spring	64	80	100	160
Gel content, %	>65	>65	>65	>65

SPECIFICATION OF MECHFIT ONE PUSH PRESS FITTINGS WITH MULTI-LAYER (PEX-AL-PEX) PIPES PLUMBING SYSTEM



Technical Data for MECHFIT One Push Press Fittings

<i>Standard: Compliance with EN1254-3, ISO 21003</i>			
Body Material: Super Engineering Plastic PPSU/PSU (Polysulfone)	Property	Quality (unit)	Test Method/Standard
	Melt Flow	9~15 g/min	ASTM D1238
	Impact Strength – Notched Izod	80.1 ≤ J/m	ASTM D256
	Heat Deflection Temperature	189~209 °C	ASTM D648 1.82MPa
Claim Ring 16, 20 (SK85: NISSHIN STEEL CO., LTD) 25 (S65C: JFE Steel Corporation)	Hardness (HRC) after coating	HRC48~51	Austempering (quench handling) before dacrotized coating
O-Ring: EPDM (E 8790-70: Parker)	Hardness	70 +/-5 Durometer A	ASTM D2240
	Tensile strength	≥ 9 MPa	ASTM D412
	Elongation at break	≥ 150 %	ASTM D412
	Density	1.12 +/- 0.03	ASTM D297
	Air oven ageing test	-5 ~ +3 Points	ASTM D573
	Hardness change	Maximum -20 %	125°C x 7 days
	Tensile strength rate	-30 ~ +10 %	
	Elongation at break rate		
	Compression Set	≤ 20	DIN 53517 125°C x 24hrs

System (Pipes & Fittings) Performance Data

	Test Methods/ Standard	Result
Long Term Hydrostatic Strength Test	BS7291 (10,000 hrs Pressure Test)	Pass
Resistance To Thermal Cycle	ISO 15875 (10 Bar @ 23 & 95°C for 5000 cycles)	No leakage
Internal Pressure	ISO 15875 (12.5 Bar @ 95°C for 1000 hrs continuously)	No leakage
Pull Pulsation Fatigue Cycle	6 Hz Pulse force of equivalent 6MPa for 2,000,000 cycle @ 23°C & 95°C	No leakage & deformation
Max Pressure Burst Test	-	Burst at 59 Bar
Max Pull Out Test	At 50°C	Max Load 3.4 KN
	At 23°C	Max Load 4.91 KN