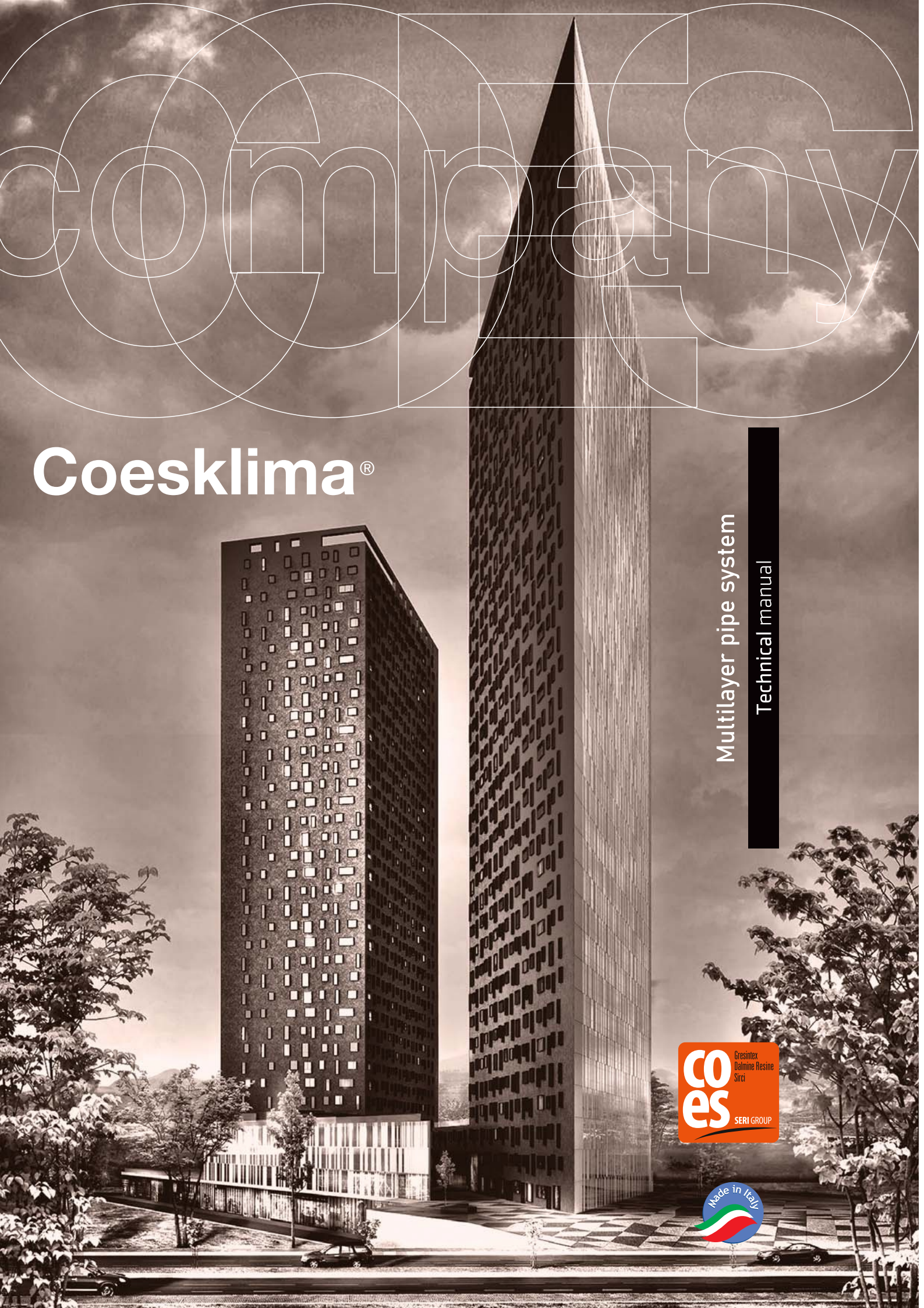
company

Coesklima®

Multilayer pipe system

Technical manual



Coes Gresintex Dalmine Resine Sirci SERI GROUP

Made in Italy

Coesklima®

Coesklima SuperK is suitable for hot water supply, heating, air conditioning and compressed air.
It consists of a multilayer pipe in PERT/AL/PERT from Ø 16 to 32mm

The multilayer pipe combines the advantages of plastic and aluminium in a single product: robust and resistant to cracking, corrosion and chemical agents; the aluminum core ensures durability, safety and impermeability to oxygen. The Coesklima Superk® system complies with Italian standard UNI ISO 21003 and it is perfectly suitable for the transportation of drinking water.

WIDE RANGE OF PIPES:

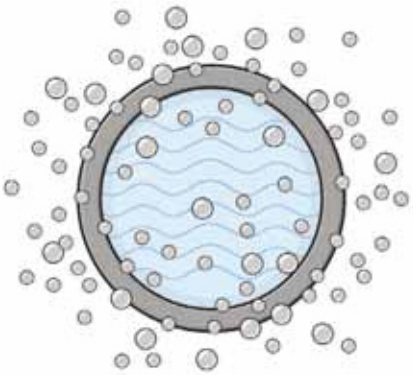
- **NAKED**
- **INSULATED**
- **POLAR INSULATION**

Oxygen diffusion

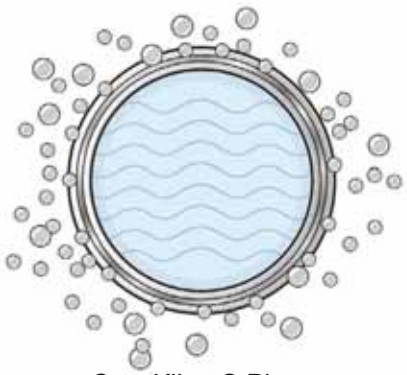
The aluminium intermediate layer avoids the permeabilisation of oxygen, a common problem in pipes made of plastic material, avoiding muddy sediments inside the pipe. Consequently, there is a lower probability of damage being caused to boilers, heat metres, fittings, steel pipes, etc. (Fig. 1).

Used in heating systems, plastic pipes are simultaneously subjected to thermal (T), mechanical (P) and time (t) stresses and are subjected to faster mechanical wear phenomena than a metal pipe. (Fig. 2).

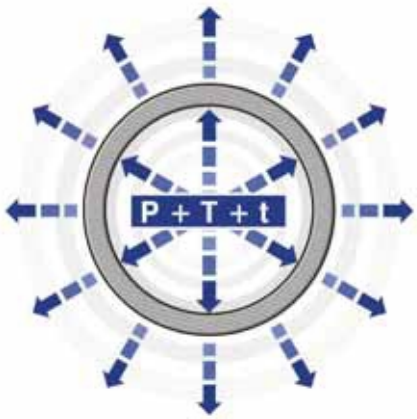
Fig.1



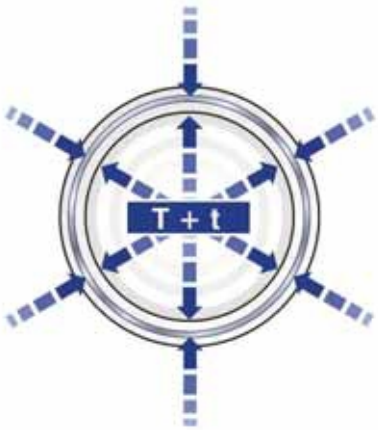
Pipe made of plastic material with wall that is permeable to gas



CoesKlima® Pipe



Pipe made of plastic material without aluminium pipe



CoesKlima® Pipe

Temperature / time / pressure effect

Non toxicity

Coesklima SuperK® pipe is suitable for the transportation of drinking water and liquid foodstuffs, complying with current regulations, both national and international.

Low pressure drop

The particular smoothness of pipe's inner surface, leads to a reduction in pressure drop. Furthermore, this condition means that there are no limestone deposits, allowing the Coesklima SuperK® pipe section to remain unaltered during service life.

TECHNICAL SPECIFICATIONS

Coesklima SuperK® pipe is manufactured using a particular 5 layer extrusion process.
It combines the chemical-physical and practical qualities of a plastic pipe and the dimensional stability and strength of a metal pipe in a single product.

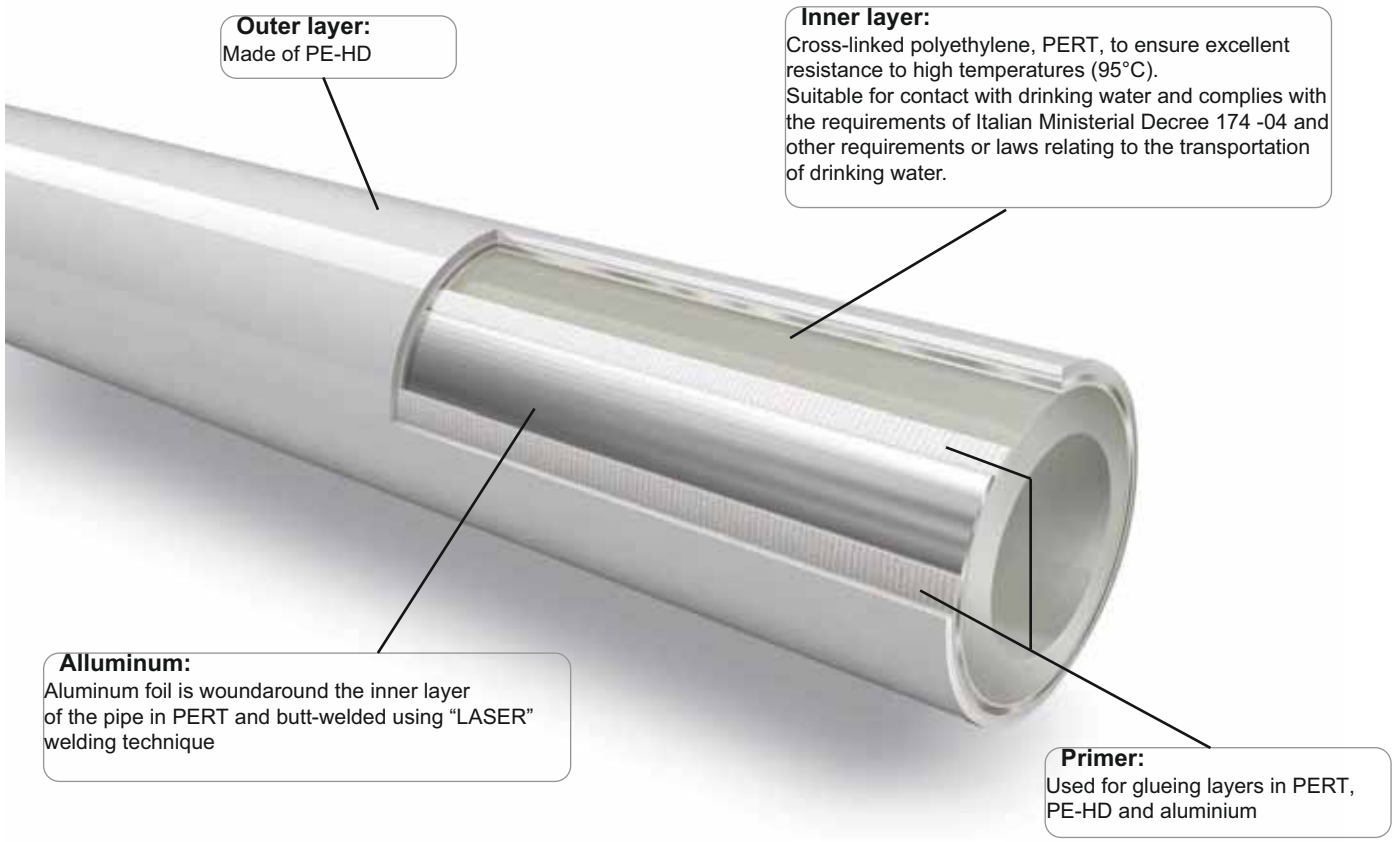
Pipe marking

Coesklima Superk® PERT-AL-PERT
sanitary/heat Ø x sp.– 10 bar–t max 95°C –

Product compliance with Italian DM n°174/2004 EN 21003 -DIN 472629 - national and international certifications Made in Italy - batch and date of manufacture, anti-counterfeiting code.

Range

From DN 16 to 75 mm.
Bare, Insulated pipe, “Polar” insulated and corrugated sheath pipe.



Range

Outer Diameter (mm)	16	20	20	25	26	32	40	50	63	75
Thickness (mm)	**2**	**2**	**2,25**	**2,5**	**3**	**3**	**4**	**4,5**	6	**7,5**
Inner diameter (mm)	12	16	15,5	20	20	26	32	41	51	60
AL thickness (mm)	**0,20**	**0,25**	**0,25**	**0,30**	**0,30**	**0,50**	**0,60**	**0,75**	**0,95**	**1,10**

TECHNICAL SPECIFICATIONS

Operating temperature (°C)	**0-70**
Peak temperature (°C)*	95
Max. operating pressure (Bar)	**10**
Thermal expansion coeff. (mm/m°C)	0,026
Internal roughness (n mm)	**0,007**
Thermal conductivity of the multilayer pipe (W/m°K)	0,40
Oxygen diffusion (m/i)	**0**
Manual bending radius (mm)	8-10 x Ø pipe

* For short periods

Malleability

The pipe is stable and flexible to allow shape adjustments during laying.
An appropriate bending spring, which avoids deformation or ovalisation of the pipe section, must be used to achieve particularly tight bend radii.

Durability and safety

The aluminium core allows the pressure of the heating fluid to be absorbed, thereby avoiding the premature aging of the plastic pipe.
Even the "creep", i.e. the elongationof the pipe due to temperatures, is prevented by the aluminium layer.

Expansion

The adhesive layer ensures durable adhesion between the plastic material and the aluminum. Despite different expansion coefficients, the pipe behaves like a single piece.
The aluminum pipe is critical to expansion, which is 0.026 mm/m°K (for more details see the installation section).

Corrosion

The inner layer in PE-Xb and outerlayer in PE-HD prevent any type of corrosion, whether chemical, electrochemical or natural.

Detectability

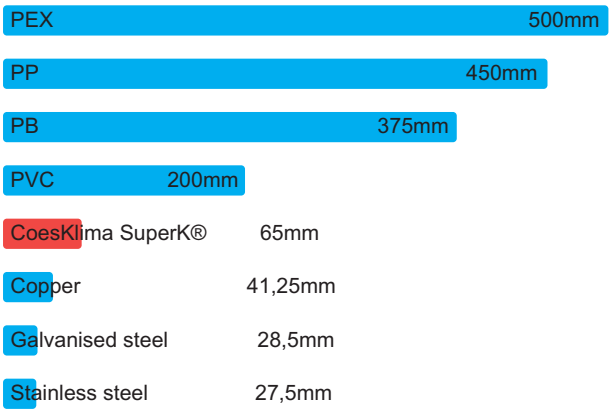
Coesklima SuperK® pipe can be located using a metal detector, so as to avoid any damage resulting from breakage.

Soundproofing

The inner and outer surfaces of a Coesklima SuperK® pipe are able to absorb and eliminate noise caused by vibrations and water hammering that usually occur in systems built with iron pipes.

Comparing a Coesklima Superk® pipe with other materials

Linear thermal expansion between 50m with Δt 50°C

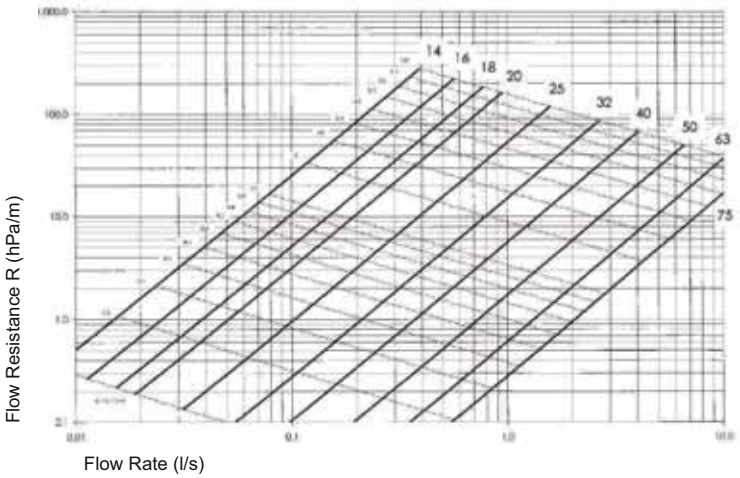


SYSTEM PLANNING AND EXECUTION

We recommend to take into account of any national provision or law. In Italy, the standard is UNI 9182.

Diagram of pressure drop of the Coesklima Superk®

The leakage values for Coesklima Superk® are indicated in the diagram (Fig. 1).



Pressure drop in Coesklima Superk®

Pressure drop coefficients (z) for Coesklima Superk®

	16x2	20x2,25	20x2	25x2,5	32x3	40x4	50x4,5	63x6	75x7,5
90° elbow	3.40	2.60	2.60	2.40	2.10	1.90	1.50	1.40	1.40
45° elbow	-	-	-	1.30	1.10	1.10	0.80	0.80	0.80
Reducer	1.30	1.00	1.00	0.90	0.80	0.80	0.60	0.60	0.50
TE fitting with flowconnector	4.00	3.10	3.10	2.80	2.40	2.30	1.80	1.70	1.70
TE fitting with flow interrupt	0.90	0.70	0.70	0.70	0.60	0.50	0.40	0.40	0.40
TE fitting with flow separation	3.50	2.80	2.80	2.50	2.10	2.00	1.60	1.50	1.50

The concentrated pressure drop values of Coesklima Superk® fittings are obtained using the following formula:

$$\Delta P = \zeta \bullet 5 \bullet V^2 \text{ (mbar)}$$

Δp = Pressure drop [mbar]
V² = Flow speed [m/s]
ζ = Pressure drop coefficient (see Table)
5 = Numeric constant

EXPANSION

In systems with visible pipes, the Coesklima SuperK® pipe is subjected to temperature variations and thermal expansion.
The phenomenon of expansion, comparable to that in metal pipes, must be taken into account during the installation of the system.
The expansion of the Coesklima SuperK®, pipe lenght varies proportionally with temperature.
The longitudinal expansion coefficient for Coesklima SuperK® pipes is:

0,026 mm/m°K

The variation in length of a pipe is calculated using the following formula:

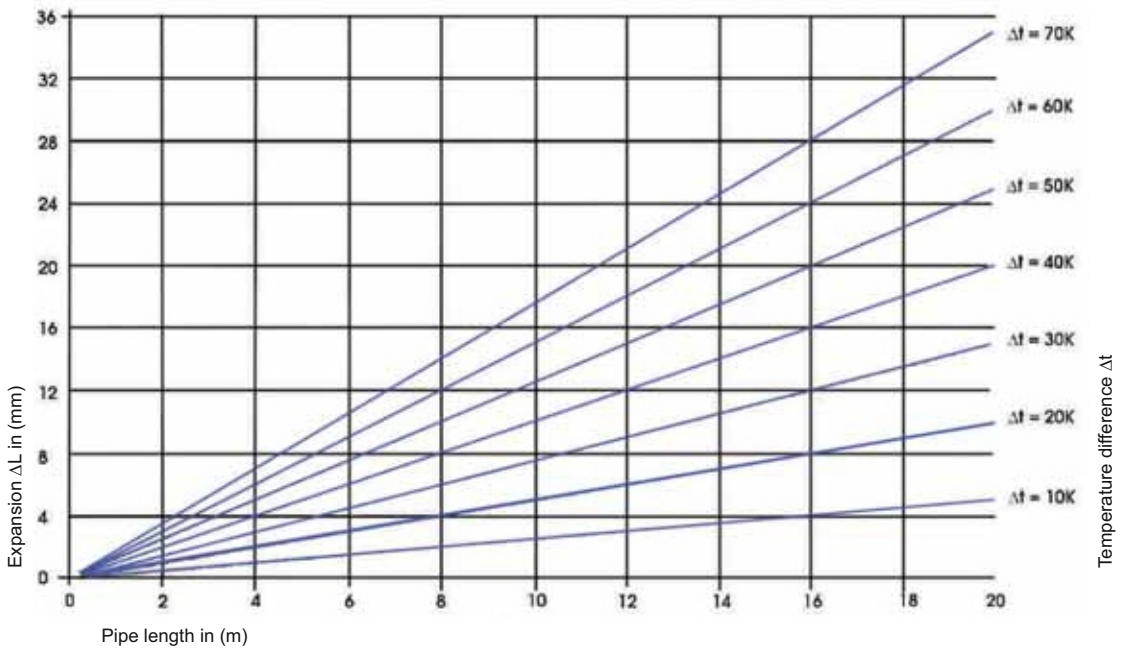
$$\Delta L = L \bullet \Delta t \bullet \alpha \text{ (mm)}$$

where:
ΔL = Linear thermal expansion (mm)
α = Longitudinal expansion coefficien mm/m°K
L = Pipe length (m)
Δt = Temperature difference °C

An example of the calculation of the variation in length ΔL:

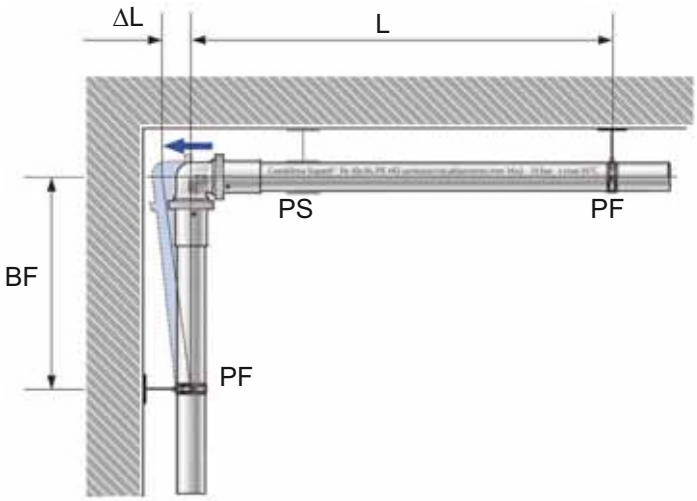
Pipe length = 16 meters
design temperature = + 19°C
Operating temperature = + 9°C
Δt = (19°C – 9°C) = 10°C
ΔL = (16 • 10 • 0.026) = 4,16 mm:

Diagram for determining the variation in length of the Coesklima Superk® pipe



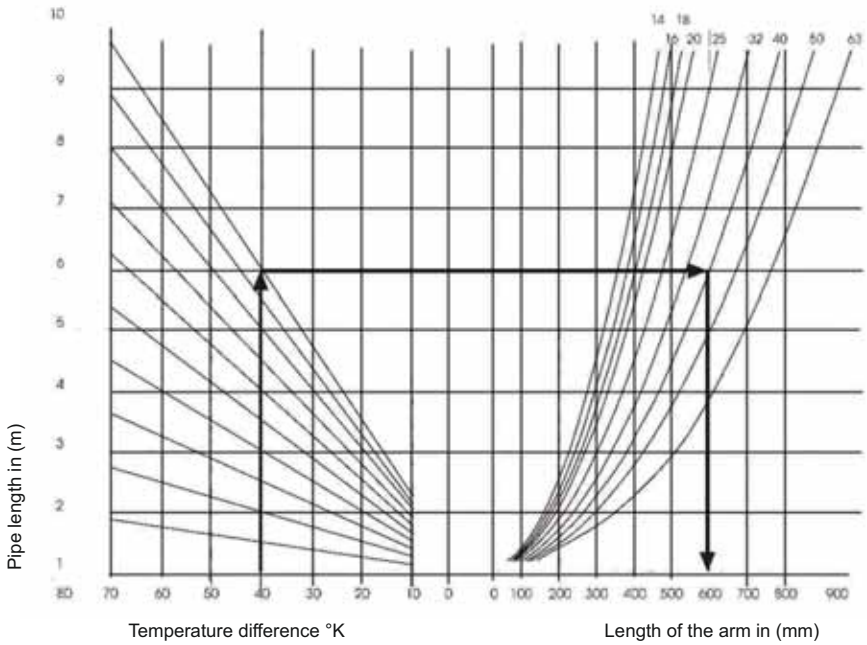
Compensation of expansions in systems with visible pipes

To compensate thermal expansion it is necessary toknow the location of all fixed points.
Compensation always takes place between two fixed points (PF) via a flexible arm (BF).



PF = Fixed point
BF = Arm
PS = Sliding point
ΔL = Expansion

Graphic determination of the arm length BF



An example of diagram reading:
Ambient temperature: 20 °C
Operating temperature: 60 °C
Temperature difference: 40 °C
Pipe section length L: 10m
Pipe size: 40 x 4 mm.
Required arm length BF = 600 mm.

UV exposure

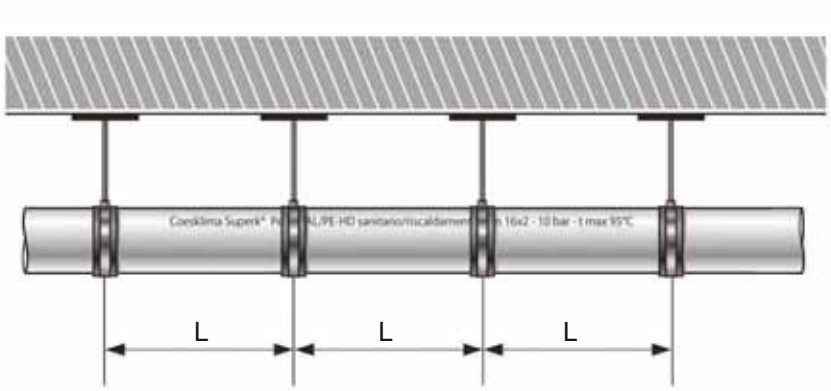
It is recommended not to install Coesklima Superk® pipes in places directly exposed to sunlight, without adequate protection.

LAYING INSTRUCTIONS

Aerial fixing of the pipes

In order to fasten the Coesklima SuperK® system in mid-air, the distance between supports varies depending on the diameter of the pipe.

Ø	L
16	1mt
20	1mt
25	1,5mt
32	2mt
40	2mt
50	2mt
63	2mt
75	2mt



N.B. Fastening of the pipes during installation must take into account expansion.

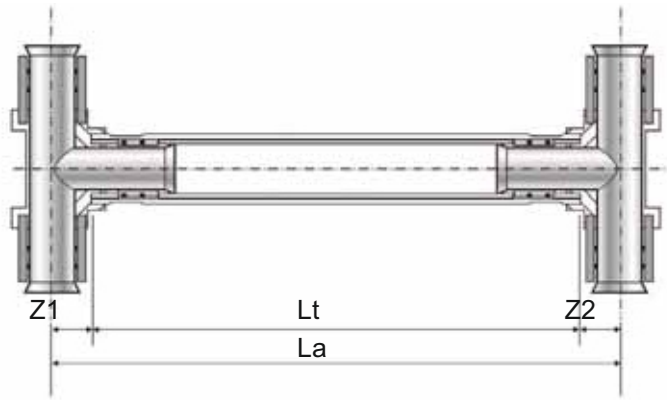
Mounting method with reference to the “Z” dimension

The “Z” dimension offers the pissibility of preparing the job with considerable advantages and easier laying. With the help of data relating to the "Z" measurement provided for all Coesklima SuperK® fittings, an installer can quickly identify the exact Lt length of the pipe between the fittings, without wasting material.
All the necessary tracks must be positioned along the axial line from centre to centre, e.g.:

Lt = La - Z1 - Z2

Lt = length of pipe section
Z1 e **Z2** = quotas stated, item by item, in the fittings technical tables

See price list.



An example of an installation with a Ø40 mm Pressfitting fitting

HYDRAULIC TEST

Sanitary system

All systems must undergo hydraulic testing.
Pipes must be filled with water and pressurised before grouting is completed.
A pressure gauge must be connected at the lowest point of the test system.
Use pressure gauges that allow the detection of changes in pressure of 0.1 bar.
Perform the test with a pressure of 15 bar, then reduce the pressure to the operating value.

Test pressure:	15 bar
Max operating pressure:	5 bar
Test duration:	2 hours
Test pressure variation:	≥ 0.2 bar

Radiator system

Close all of the shutdown devices located upline and downline of the radiators.
Open all of the manifold valves and perform the test With a max. pressure of 5 bars, then decrease the pressure to the working pressure value (2,5 bars).

Test pressure:	5 bar
Max. operating pressure:	2.5 bar
Test duration:	2 hours
Test pressure variation:	≥ 0.2 bar

Visually inspect all connections to check for any leaks.

Hydraulic test with K-Fit® fitting

During testing with pressure set at just 1.5 bar, in case of incomplete or incorrect pressing, the fitting leaks visibly. This is the best way of guaranteeing that the system is properly connected.

Caution: product selection and installation must comply with Italian Law 10/91, DPR n° 412/1993 and all other regulations in force; furthermore, the use of the Coesklima Superk® system is suitable for liquids that do not damage the materials used in the systm. If you have any questions, please contact COES Company S.r.l.'s Technical Department.

Pipes equipped with linings

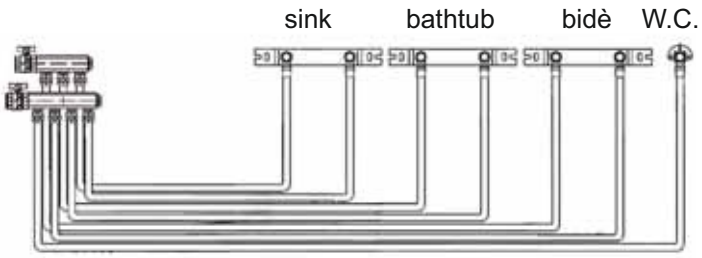
During the Coesklima Superk® pipe lining cutting phase, care must be taken not to damage the outer surface with cutters or blades of any kind, so as not to affect its physical-mechanical characteristics.

Coesklima SuperK® rappresents the alternative solution to traditional copper pipes for the following systems:

Sanitary

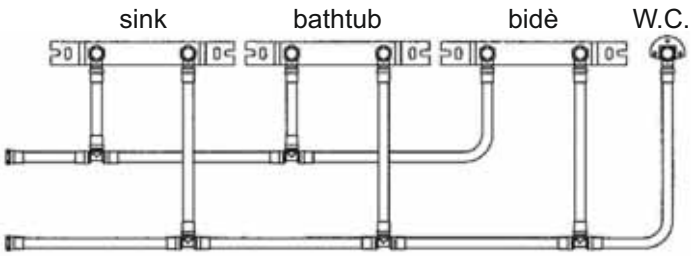
•with a distribution manifold

Each utility is individually connected to the manifold. Threaded terminal fittings are used to connect taps and fittings.



• In branching

Utilities are connected in series via TEE. Threaded terminal fittings are used to connect taps and fittings.

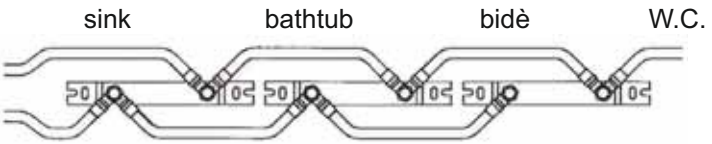


• In series –connection

This system is used for wall distribution systems. It can be prefabricated, mounted as a unit or as separate parts. As well as being used to connect taps and fittings, TEE fittings can be also used to connect other utilities.

Heating

• Conventional and radiant panel systems



Conditioning

• Cooled water

Irrigation

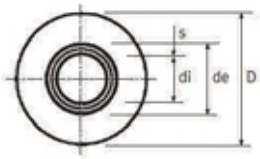
• Greenhouses and gardens

Compressed air systems

Pipe diameter comparative table Coesklima Superk® with copper pipes

Ø Coesklima Superk® Pipe		Ø Copper pipe
16x2	=	14x1
20x2	=	18x1
20x2,25	=	18x1
25x2,5	=	22x1,5
26x3	=	22x1,5
32x3	=	28x1,5
40x4	=	32x1,5
50x4,5	=	42x1,5
63x6	=	54x1,5
75x7,5	=	63x1,5

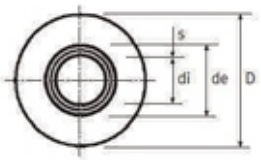
MULTILAYER PIPE WITH OXYGEN BARRIER. FOR SANITARY AND HEATING SYSTEM, FLOOR RADIATING PANEL AND FAN-COIL SYSTEMS (Max working temperature: 95°C)



code	de	di	s		
FP7KRS160H	16	12	2	100	1800
FP7KRS160L	16	12	2	200	1800
FP7KRS160M	16	12	2	500	2500
FP7KRE220H	20	16	2	100	1100
FP7KRS200H	20	15,5	2,25	100	1100
FP7KRS200L•	20	15,5	2,25	200	1600
FP7KRS250G	25	20	2,5	50	500
FP7KRE260G	26	20	3	50	600
FP7KRS320G	32	26	3	50	500

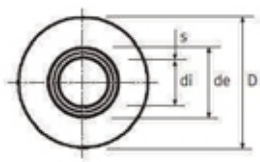
• On order only

MULTILAYER PIPE WITH OXYGEN BARRIER. IN 5 mt BARS. FOR SANITARY, HEATING AND FAN-COIL SYSTEM. (Max temperature: 95°C)



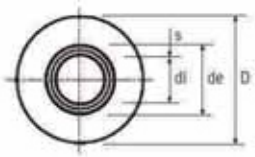
code	de	di	s		
FP7KBA1605	16	12	2	125	-
FP7KBA2205	20	16	2	80	-
FP7KBA2005	20	15,5	2,25	80	-
FP7KBA2505	25	20	2,5	50	-
FP7KBA2605	26	20	3	50	-
FP7KBA3205	32	26	3	35	-
FP7KBA4005	40	32	4	40	-
FP7KBA5005	50	41	4,5	30	-
FP7KBA6305	63	51	6	15	-
FP7KBA7505	75	60	7,5	5	-

MULTILAYER PIPE WITH OXYGEN BARRIER. THE PIPE IN PRE-INSULATED WITH A SHEATH IN CLOSED-CELL PE FOAM. FOR SANITARY AND HEATNG SYSTEMS. (Max temperature: 95°C). INSULATING MATERIAL THERMAL CONDUCTIVITY: =0,040W/mk



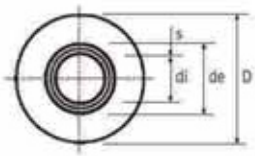
code	de	di	S	D	insulation thickness*		
FP7KIS160G	16	12	2	28	6	50	750
FP7KIE220G6	20	16	2	32	6	50	400
FP7KIE220G	20	16	2	40	10	50	400
FP7KIS200G6	20	15,5	2,25	32	6	50	400
FP7KIS200G	20	15,5	2,25	40	10	50	400
FP7KIS250G	25	20	2,5	45	10	50	400
FP7KIE260G	26	20	3	46	10	50	400
FP7KIS320B	32	26	3	52	10	25	225

MULTILAYER PIPE WITH OXYGEN BARRIER. THE PIPE IS PRE-INSULATED WITH A BLU/RED +SHEATH IN CLOSED-CELL PE FOAM. FOR SANITARY AND HEATING SYSTEMS.
(Max working temperature: 95°C). INSULATING MATERIAL THERMAL CONDUCTIVITY: =0,040W/mk



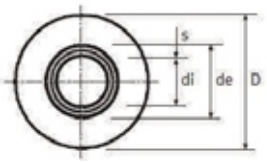
code	de	di	S	D	insulation thickness*		
FP7KISB160G	16	12	2	28	6	50	750
FP7KISR160G	16	12	2	28	6	50	750
FP7KIEB220G6	20	16	2	32	6	50	400
FP7KIER220G6	20	16	2	32	6	50	400
FP7KIEB260G	26	20	3	46	10	50	400
FP7KIER260G	26	20	3	46	10	50	400
FP7KISB320B	32	26	3	52	10	25	225
FP7KISR320B	32	26	3	52	10	25	225

MULTILAYRE PIPE WITH OXYGEN BARRIER. THE PIPE IS PRE-INSULATED WITH A CORRUGATED BLU/RED SHEATH. FOR SANITARY AND HEATING SYSTEMS.
(Max working temperature: 95°C).



code	de	di	S		
FP7KCR160G	16	12	2	50	750
FP7KCB160G	16	12	2	50	750
FP7KCR220G	20	16	2	50	700
FP7KCB220G	20	16	2	50	700
FP7KCR200G	20	15,5	2,25	50	700
FP7KCB200G	20	15,5	2,25	50	700
FP7KCR260G	26	20	3	50	650
FP7KCB260G	26	20	3	50	650

MULTILAYER PIPE WITH OXYGEN BARRIER. THE PIPE IN PRE-INSULATED POLAR WITH A SHEATH IN CLOSED-CELL PE FOAM. FOR REFRIGERATED WATER SYSTEMS. (Max temperature: 95°C). INSULATING MATERIAL THERMAL CONDUCTIVITY: =0,040W/mk



code	de	di	S	D	insulation thickness*		
FP7KPO160G	16	12	2	36	10	50	450
FP7KPE220G	20	16	2	46	13	50	400
FP7KPO200B	20	15,5	2,25	40	13	25	250
FP7KPO250B	25	20	2,5	51	13	25	225
FP7KPE260G	26	20	3	51	13	50	350
FP7KPO320B	32	26	3	52	13	25	200

POLAR PIPE USE CONDITIONS
– Ambient temperature = 263÷35 °C
– Water temperature = 5÷9 °C
– Humidity = 60%

Coesklima®

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