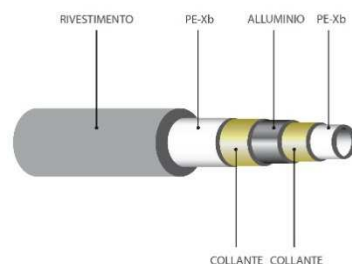


Product specifications

APE MULTILAYER (PE-xB/Al/PE-xB) is an insulated multilayer pipe for heating and cooling applications. This pipe consists of a double inner and outer layer of crosslinked polyethylene PE-xB (silane method - B) bound by a special adhesive to a longitudinally welded (TIG butt welded) intermediate aluminium alloy layer and a closed cell polyethylene foam insulating sheath (PE-LD) protected by a scratch resistant PE-LD layer. The pipe is highly shapeable, provides a complete barrier to oxygen, ensures total hygiene and high corrosion resistance since fluids come in contact only with the inner PE-xB layer.

Maximum operating temperature: 95°C. Maximum peak temperature: 110°C. Max pressure at 95°C: 10 bar. Oxygen permeability: 0 mg/l. Roughness: 7 µm. UNI EN ISO 21003 and DIN 4726 compliant.

Sheath thermal conductivity at 40°C: 0.04 W/mK. The thickness of the pipe insulating layers are compliant with D.P.R. no. 412 1993. The insulated pipe is approved according to the Ministerial Decrees June 26, 1984 and September 3, 2001. Reaction to fire Class BL-s2, d0.



Dimensional characteristics

Codes	UOM code	9MR02 1620---	9MR03 1820----	9MR03 2020---	9MR04 2630---	9MR45 3230---
Outer Diameter	mm	16	18	20	26	32
Sheath thickness for heating	mm	6	6	6 - 9	9	9
Diameter pipe + sheath (heating)	mm	28	30	32 - 38	44	50
Sheath thickness for cooling	mm	10	10	13	13	13
Diameter pipe + sheath (cooling)	mm	36	38	46	52	58
Aluminium thickness	mm	0.2	0.3	0.3	0.4	0.45
Roll length	m	50F, 100F	50F, 100F	50F, 50SF	50F	25F

Technical Specifications

Volume of water	l/m	0.113	0.154	0.201	0.314	0.531
Internal roughness	µm	7				
Sheath thermal conductivity at 40°C	W/mK	0.0397				
Sheath density	kg/m ³	35 to 45				
Degree of crosslinking	%	> 65%				
Oxygen permeability	mg/l	0				
Colour		Gray for heating; red and blue for domestic use (Ø16, Ø20); white for cooling				

Technical specifications

Pipe material		PE-xB/Al/PE-xB Multilayer pipe
Sheath material		closed-cell polyethylene foam PE-LD
Scratch-resistant finish layer		closed-cell polyethylene foam PE-LD
Field of application		Plumbing in civil, industrial and commercial applications.
Fluid		Potable water, technical water, and water glycol (*).
Continuous use temperature	°C	95
Max. peak temperature	°C	110
Minimum operating temperature (*)	°C	-30
Maximum operating pressure at 95°C	bar	10
Maximum operating pressure at 20°C	bar	30
Duration at 95°C and 10 bar	years	50
Resistance to diffusion of water vapour	μ	5482
Reaction to fire (UNI EN 13823)		B _L -s2,d0
Presence of HCFC - CFC		No
Storage		Avoid prolonged exposure to direct sunlight
Minimum bend radius (**)		5 times the diameter

(*) Reference is made to a sheathed pipe and the use of a suitable water glycol mix.

(**) Take the thickness of the sheath into account when bending a pipe with a bender.
e.g.: Ø16 sheath: total thickness = 28 mm, use bender with Ø 26 profile.

RECOMMENDATIONS: Avoid outdoor installation and/or in unheated environments.

Marking



Classification of service conditions UNI – EN ISO 21003

Application class	Design temperature Td [°C]	Time b at Td [years]	T max [°C]	Time at T max [years]	T mal [°C]	Time at T mal [h]	Typical field of application
1 (*)	60	49	80	1	95	100	Hot water supply (60°C)
2 (*)	70	49	80	1	95	100	Hot water supply (70°C)
4 (**)	20 + 40 + 60	2,5 20 25	70	2,5	100	100	Underfloor heating and low-temperature radiators
5 (**)	20 + 60 + 80	14 25 10	90	1	100	100	High-temperature radiators

(*) A country may select either class 1 or 2 in conformity with its national regulations.

(**) Where more than one design temperature for time and associated temperature appears for any class, they should be aggregated.

Regression curves diameter 16x2

The curves shown below (Figure 1) show the life of the APE Multilayer pipe at the various pressures of use when changing operating temperatures.

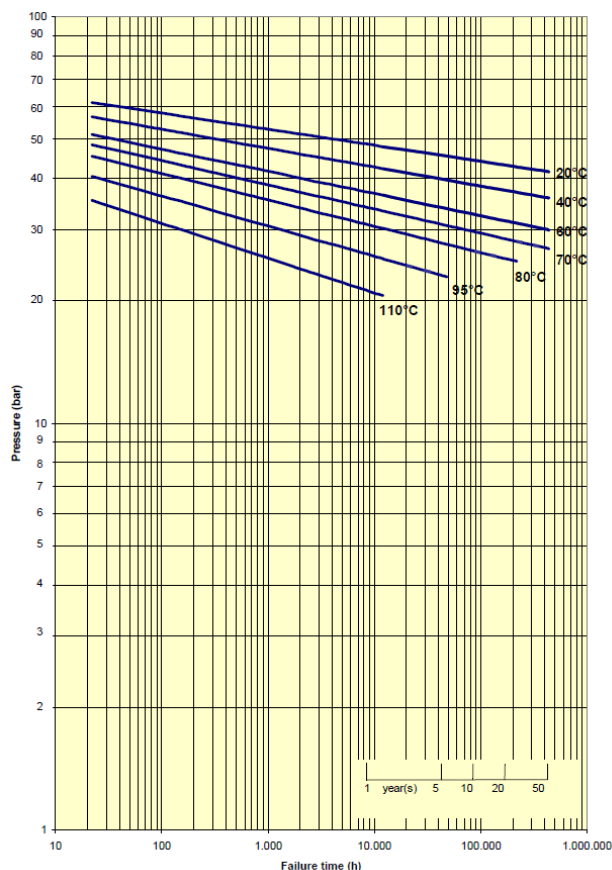


Figure 1

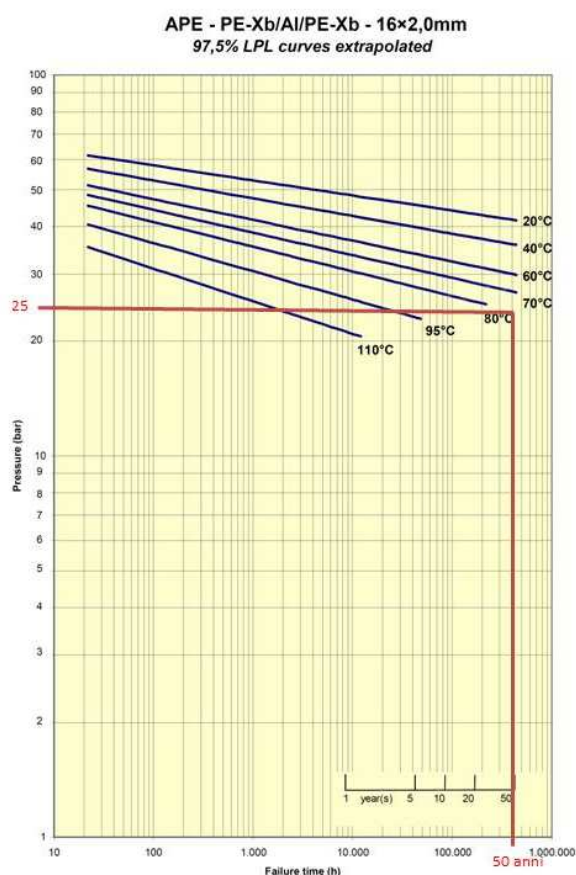


Figure 2

Figure 2 (produced by an accredited institution) shows an example of aging of the APE multilayer pipe. This example demonstrates how to work at a pressure of **25 bar** and at a temperature of **60 °C** the multilayer pipe lasts over 50 years, this is possible thanks to the use of polyethylene crosslinked, such performances are not obtainable using non-crosslinkable polyethylenes or PERT.

Chart of load loss
T water 10°C

Outer diameter	16	18	20	26	32	40	50	63
Thickness	2	2	2	3	3	4	4,5	4,5
Inner diameter	12	14	16	20	26	32	41	54
v (m/s)	Flow rate (l/h) Load loss (mm c.a.*/m)							
0,1	41	55	72	113	191	290	475	824
	2,43	2,01	1,70	1,28	0,93	0,71	0,52	0,37
0,2	81	111	145	226	382	579	951	1649
	8,18	6,75	5,71	4,32	3,11	2,40	1,76	1,25
0,3	122	166	217	339	573	869	1426	2473
	16,63	13,72	11,61	8,78	6,33	4,88	3,58	2,54
0,4	163	222	290	452	765	1158	1901	3298
	27,52	22,69	19,21	14,53	10,47	8,07	5,92	4,20
0,5	204	277	362	565	956	1448	2376	4122
	40,66	33,54	28,38	21,47	15,47	11,93	8,75	6,20
0,6	244	333	434	679	1147	1737	2852	4947
	55,95	46,14	39,05	29,54	21,28	16,42	12,04	8,54
0,7	285	388	507	792	1338	2027	3327	5771
	73,27	60,43	51,14	38,69	27,87	21,50	15,77	11,18
0,8	326	443	579	905	1529	2316	3802	6596
	92,56	76,33	64,60	48,88	35,21	27,16	19,93	14,12
0,9	366	499	651	1018	1720	2606	4278	7420
	113,74	93,81	79,39	60,06	43,27	33,38	24,49	17,35
1	407	554	724	1131	1911	2895	4753	8245
	136,77	112,80	95,46	72,22	52,03	40,14	29,44	20,87
1,1	448	610	796	1244	2102	3185	5228	9069
	161,60	133,28	112,79	85,33	61,47	47,42	34,79	24,66
1,2	489	665	869	1357	2294	3474	5703	9894
	188,18	155,20	131,34	99,37	71,59	55,22	40,51	28,71
1,3	529	720	941	1470	2485	3764	6179	10718
	216,47	178,53	151,09	114,31	82,35	63,52	46,60	33,03
1,4	570	776	1013	1583	2676	4053	6654	11543
	246,45	203,25	172,01	130,14	93,75	72,32	53,05	37,60
1,5	611	831	1086	1696	2867	4343	7129	12367
	278,07	229,34	194,08	146,84	105,78	81,60	59,86	42,43
1,6	651	887	1158	1810	3058	4632	7605	13192
	311,32	256,76	217,29	164,40	118,43	91,36	67,02	47,50
1,7	692	942	1230	1923	3249	4922	8080	14016
	346,17	285,50	241,61	182,80	131,69	101,58	74,52	52,82
1,8	733	998	1303	2036	3440	5212	8555	14841
	382,58	315,53	267,02	202,03	145,54	112,27	82,36	58,37
1,9	774	1053	1375	2149	3632	5501	9031	15665
	420,55	346,84	293,52	222,08	159,98	123,41	90,53	64,17
2	814	1108	1448	2262	3823	5791	9506	16490
	460,05	379,42	321,09	242,93	175,01	135,00	99,04	70,19

*1 mm c.a. = 9.806 Pa

T water 60°C

Outer diameter	16	18	20	26	32	40	50	63
Thickness	2	2	2	3	3	4	4,5	4,5
Inner diameter	12	14	16	20	26	32	41	54
v (m/s)	Flow rate (l/h) Load loss (mm c.a.*/m)							
0,1	41	55	72	113	191	290	475	824
	1,85	1,53	1,29	0,98	0,71	0,54	0,40	0,28
0,2	81	111	145	226	382	579	951	1649
	6,24	5,14	4,35	3,29	2,37	1,83	1,34	0,95
0,3	122	166	217	339	573	869	1426	2473
	12,68	10,46	8,85	6,70	4,82	3,72	2,73	1,93
0,4	163	222	290	452	765	1158	1901	3298
	20,98	17,30	14,64	11,08	7,98	6,16	4,52	3,20
0,5	204	277	362	565	956	1448	2376	4122
	31,00	25,57	21,64	16,37	11,79	9,10	6,67	4,73
0,6	244	333	434	679	1147	1737	2852	4947
	42,65	35,18	29,77	22,52	16,23	12,52	9,18	6,51
0,7	285	388	507	792	1338	2027	3327	5771
	55,86	46,07	38,99	29,50	21,25	16,39	12,03	8,52
0,8	326	443	579	905	1529	2316	3802	6596
	70,56	58,20	49,25	37,26	26,84	20,71	15,19	10,77
0,9	366	499	651	1018	1720	2606	4278	7420
	86,72	71,52	60,52	45,79	32,99	25,45	18,67	13,23
1	407	554	724	1131	1911	2895	4753	8245
	104,27	86,00	72,78	55,06	39,67	30,60	22,45	15,91
1,1	448	610	796	1244	2102	3185	5228	9069
	123,20	101,61	85,99	65,06	46,87	36,15	26,52	18,80
1,2	489	665	869	1357	2294	3474	5703	9894
	143,46	118,32	100,13	75,76	54,58	42,10	30,88	21,89
1,3	529	720	941	1470	2485	3764	6179	10718
	165,04	136,11	115,19	87,15	62,78	48,43	35,53	25,18
1,4	570	776	1013	1583	2676	4053	6654	11543
	187,89	154,96	131,14	99,22	71,48	55,14	40,45	28,67
1,5	611	831	1086	1696	2867	4343	7129	12367
	212,00	174,84	147,97	111,95	80,65	62,21	45,64	32,35
1,6	651	887	1158	1810	3058	4632	7605	13192
	237,35	195,75	165,66	125,34	90,29	69,65	51,10	36,21
1,7	692	942	1230	1923	3249	4922	8080	14016
	263,91	217,66	184,20	139,36	100,40	77,45	56,81	40,27
1,8	733	998	1303	2036	3440	5212	8555	14841
	291,68	240,56	203,58	154,03	110,96	85,59	62,79	44,50
1,9	774	1053	1375	2149	3632	5501	9031	15665
	320,62	264,43	223,78	169,31	121,97	94,09	69,02	48,92
2	814	1108	1448	2262	3823	5791	9506	16490
	350,73	289,26	244,80	185,21	133,43	102,92	75,50	53,51

Compliance

- DVGW Certificate - DW-8231CN0175
- KIWA certificate - K66359101
- KOMO certificate - K66915101
- UNI EN ISO 21003
- DIN 4726
- Ministerial Decree No. 174/2004