



English version

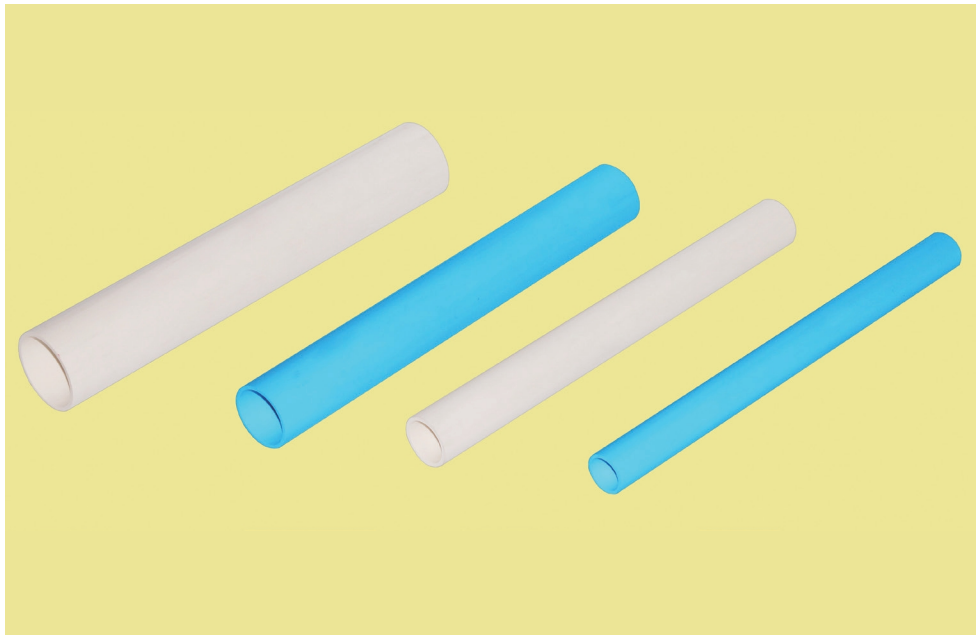


Jacques Jumeau

Technology of components used in heating.

Chapter 35

Comparison of PVC pipe dimensions in Europe and the USA



Comparison of PVC pipe dimensions in Europe and the USA

Comparison of PVC, CPVC and U-PVC pipe diameters between US and European standards

Compared standards

- ISO 4422 Tubes and fittings in un-plasticized polyvinyl chloride (PVC-U) for water supply (replaced by EN 1452)
- EN 1452-2 Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure. Un-plasticized polyvinyl chloride (PVC-U). Part 2 : tubes
- ASTM D1785 Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- ASTM F441 Standard Specification for Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe, Schedules 40 and 80.

Current uses of PVC pipes are multiple. Unlike metal tubes, they are not intended to be threaded, but to receive, by interlocking and gluing, male or female threaded connections, or bends, sleeves, tees etc. which are glued. They can also be fitted with metal or plastic fittings that are mounted by tightening a compressed outer gasket. In this type of application, the outer diameter is the most important characteristic, and this diameter remains constant for a nominal dimension, while the wall thickness, and therefore the inside diameter, varies according to the required pressure resistance. Selecting an appropriate wall thickness will give the pressure resistance. The European and American standards differ for the definition of the pressure resistance: In Europe it is the PN marking which gives the pressure resistance in Bars for a range of diameters and for an ambient temperature of 25°C, and to USA, the wall thickness is given by the schedule, and the pressure resistance is then calculated for each diameter. Since PVC and its derivatives have low temperature resistance, high derating coefficients are needed when the ambient temperature or the temperature of the liquid rises.

Dimensions and pressure resistance

Europe								
Outside diameter (mm)	Wall thickness (mm)				Inside diameter (mm)			
	PN6	PN10	PN16	PN25	PN6	PN10	PN16	PN25
20	Not existing	Not existing	1.5	2.3	-	-	17	15.4
25	Not existing	Not existing	1.9	2.8	-	-	21.2	19.4
32	Not existing	1.6	2.4	3.6	-	28.8	27.2	24.8
40	1.5	1.9	3.0	4.5	37	36.2	34	31
50	1.6	2.4	3.7	5.6	46.8	45.2	42.6	38.8
63	2	3	4.7	7.1	59	57	53.6	48.8
75	2.3	3.6	5.5	Not existing	70.4	67.8	64	-
90	2.8	4.3	6.6	Not existing	84.4	81.4	76.8	-

* The ISO 1452-2 standard has also defined PN8 and PN12,5 classes which are little used and are not included in this table.

USA							
Nominal diameter of the pipe (inches)	Outside diameter	Schedule 40			Schedule 80*		
		Wall thickness (in mm)	Inside diameter (mm)	Nominal pressure PSI (Bars)	Wall thickness (in mm)	Inside diameter (mm)	Nominal pressure PSI (Bars)
1/2"	21.34	2.77	15.8	600 (41)	3.73	13.9	850 (59)
3/4"	26.67	2.87	20.96	480 (33)	3.91	18.8	690 (48)
1"	33.40	3.38	26.64	450 (31)	4.55	24.3	630 (43)
1"1/4	42.16	3.56	35.08	370 (26)	4.85	32.5	520 (36)
1"1/2	48.26	3.68	40.94	330 (23)	5.08	38.1	470 (32)
2"	60.32	3.91	52.48	280 (19)	5.54	49.3	400 (28)
2"1/2	73.02	5.16	62.68	300 (21)	7.01	59	420 (29)
3"	88.90	5.49	77.92	260 (18)	7.62	73.7	370 (26)

* ASTM D1785 has also defined a Schedule 120 class for PVC pipe, which is not included in this table.

Comparison of PVC pipe dimensions in Europe and the USA

Pressure resistance derating factor upon temperature

PVC (American standards)			CPVC (American standards)			U-PVC (European standards)		
Operating temperature		De-rating factor	Operating temperature		De-rating factor	Operating temperature		De-rating factor
°C	°F		°C	°F		°C	°F	
22.8	73	1	22.8	73	1	10	50	1
26.7	80	0.88	26.7	80	1	15	59	1
32.2	90	0.75	32.2	90	0.91	20	68	1
37.8	100	0.62	37.8	100	0.82	25	77	1
43.3	110	0.51	43.3	110	0.72	30	86	0.9
48.9	120	0.40	48.9	120	0.65	35	95	0.8
54.4	130	0.31	54.4	130	0.57	40	104	0.7
60	140	0.22	60	140	0.50	45	113	0.63
65.6	150	-	65.6	150	0.42	50	122	*
71.1	160	-	71.1	160	0.40	60	140	*
76.7	170	-	76.7	170	0.29	70	158	*
82.2	180	-	82.2	180	0.25	80	176	-
93.3	200	-	93.3	200	0.20	90	194	-

* The producer and the end-user can come to agreement on the possibilities of use for temperatures above 45 °C on a case-by-case basis. (ISO 1452-2)