

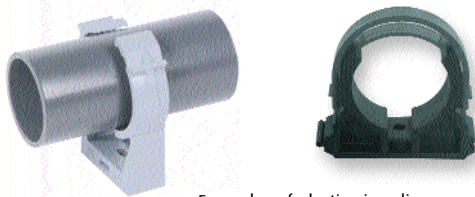
System design

Pipe supports and routing



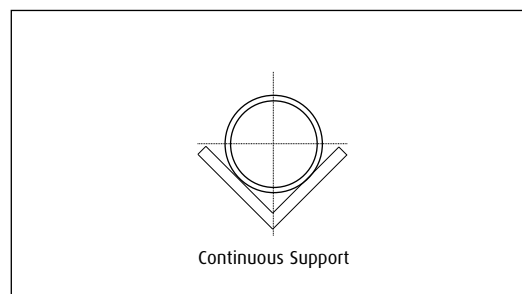
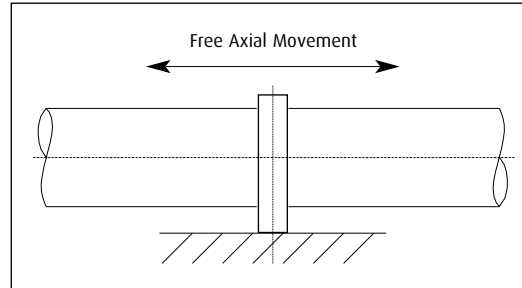
Plastic pipes have tensile strengths that are lower than those of metal pipes, therefore they will usually require additional support. In addition, the support centres for the material will be influenced by the operating and ambient temperature, the density of the fluid being transported, and the diameter and wall thickness of the pipe.

Brackets for plastic pipe should be designed to restrict lateral movement but allow the axial movement that may occur due to expansion and contraction. They should be free of snags and sharp edges that may potentially damage the pipe. Plastic pipe clips are manufactured specifically for this application, and should be used wherever possible.



Examples of plastic pipe clips

When installing small diameter plastic piping or if the piping is exposed to high operating or ambient temperature conditions it may be more cost effective to provide continuous support. U or V section metal channel is the most common method of providing a solution for this requirement.



Support centres for each material are shown on the following pages. Where the fluid density exceeds 1g/cm^3 , more support will be necessary. This table gives a guide to the adjustment factor for bracket spacing within the range 1g/cm^3 to 2g/cm^3 .

Fluid density g/cm^3	Adjustment factor
1.00	1.00
1.25	0.96
1.50	0.92
1.75	0.88
2.00	0.84

Pipe routing

An important factor to consider in above ground plastic pipe installations is the selection of a pipe route that avoids the risk of impact damage from external sources. Fork-lift trucks in particular can damage the pipe or pull piping from supports. Where appropriate, clear warning signs should be used advising contractors not to climb on installed plastic piping.

Particular care should also be taken to avoid routing plastic piping into areas where there may be an unusually high heat load, for example directly under glazed roof panels, at heater outlets or adjacent to hot machinery. Some plastics are susceptible to stress cracking when exposed to oils, therefore care should be taken in areas where oil may be deposited on the pipe, such as next to engineering machinery or air compressors. Where chemicals are in use, susceptible piping materials should be routed away from possible contamination.

Heavy equipment

Above ground heavy equipment such as valves or strainers should be supported independently so as not to place a stress load on to the plastic pipe. An ideal solution for flanged equipment is to use metal valve support plates in place of standard backing rings on the plastic flanges. These can be securely fixed to adjacent masonry or steelwork.

Pipe support centres

PVC-U - ASTM Dimensions

DN inch	Pipe support intervals in metres at:									
	Schedule 40					Schedule 80				
	15°C	25°C	40°C	50°C	60°C	15°C	25°C	40°C	50°C	60°C
/"	1.2	1.1	1.1	0.6	0.6	1.2	1.2	1.1	0.8	0.6
3/8"	1.2	1.2	1.1	0.8	0.6	1.4	1.4	1.2	0.8	0.8
1/2"	1.4	1.4	1.2	0.8	0.8	1.5	1.4	1.4	0.9	0.8
3/4"	1.5	1.4	1.2	0.8	0.8	1.7	1.5	1.4	0.9	0.8
1"	1.7	1.5	1.4	0.9	0.8	1.8	1.7	1.5	1.1	0.9
1 1/8"	1.7	1.7	1.5	0.9	0.9	1.8	1.8	1.7	1.1	0.9
1 1/4"	1.8	1.7	1.5	1.1	0.9	2.0	1.8	1.7	1.1	1.1
1 1/2"	1.8	1.7	1.5	1.1	0.9	2.1	2.0	1.8	1.2	1.1
2"	2.1	2.0	1.8	1.2	1.1	2.3	2.3	2.0	1.4	1.2
2 1/2"	2.1	2.1	1.8	1.2	1.1	2.4	2.3	2.1	1.4	1.2
3"	2.3	2.1	2.0	1.4	1.1	2.7	2.4	2.1	1.4	1.2
4"	2.4	2.3	2.1	1.4	1.1	2.9	2.7	2.3	1.7	1.4
5"	2.6	2.4	2.3	1.5	1.4	3.0	2.9	2.7	1.8	1.4
6"	2.7	2.6	2.4	1.5	1.4	3.4	3.2	2.9	2.0	1.7
8"	3.0	2.7	2.6	1.7	1.5	3.7	3.4	3.0	2.1	1.8
10"	3.5	3.4	3.0	2.1	1.8	4.0	3.7	3.2	2.3	2.0
12"	3.7	3.4	3.0	2.1	1.8	4.1	4.0	3.4	2.4	2.1
14"	3.8	3.5	3.2	2.3	2.0	4.3	4.1	3.5	2.6	2.3
16"	4.0	3.7	3.4	2.4	2.1	4.4	4.3	3.7	3.4	2.7
18"	4.3	3.8	3.5	3.0	2.6	4.7	4.4	3.8	3.5	2.9
20"	4.6	4.0	3.8	3.4	2.9	5.2	4.6	4.3	3.8	3.2
24"										

PVC-U - BS Dimensions

DN inch	Pipe support intervals in metres at:				
	20°C	30°C	40°C	50°C	60°C
3/8"	0.7	0.7	0.6	0.5	0.4
1/2"	0.8	0.8	0.7	0.6	0.5
3/4"	0.9	0.9	0.8	0.6	0.5
1"	1.0	1.0	0.9	0.9	0.6
1 1/8"	1.1	1.1	0.9	0.7	0.6
1 1/4"	1.2	1.1	1.0	0.8	0.7
1 1/2"	1.4	1.3	1.1	0.9	0.7
2"	1.6	1.5	1.4	1.1	0.9
2 1/2"	1.9	1.7	1.6	1.3	1.0
3"	2.1	1.9	1.7	1.4	1.1
4"	2.3	2.1	1.9	1.6	1.2
5"	2.5	2.3	2.1	1.8	1.4
6"	2.8	2.6	2.3	2.0	1.5
8"	3.1	2.8	2.5	2.1	1.7
10"	3.2	3.0	2.7	2.2	1.8
12"	3.4	3.2	2.8	2.4	1.9
14"	3.6	3.4	3.0	2.6	2.0
16"	3.8	3.6	3.2	2.7	2.1
18"	4.2	3.9	3.5	2.9	2.3
24"					

These PVC-U pipe support intervals are for BS 3505 Class C pipe. For other pipe classes multiply the support intervals by the following factors:

Class B	0.90
Class D	1.16
Class E	1.21

PVC-U - Metric Dimensions

DN mm	OD mm	Pipe support intervals in metres at:				
		20°C	30°C	40°C	50°C	60°C
10	16	0.7	0.7	0.6	0.5	0.4
15	20	0.8	0.8	0.7	0.6	0.5
20	25	0.9	0.9	0.8	0.6	0.5
25	32	1.0	1.0	0.9	0.9	0.6
32	40	1.1	1.1	0.9	0.7	0.6
40	50	1.2	1.1	1.0	0.8	0.7
50	63	1.4	1.3	1.1	0.9	0.7
65	75	1.4	1.3	1.1	0.9	0.7
80	90	1.6	1.5	1.4	1.1	0.9
100	110	1.9	1.7	1.6	1.3	1.0
125	140	2.1	1.9	1.7	1.4	1.1
150	160	2.3	2.1	1.9	1.6	1.2
200	225	2.5	2.3	2.1	1.8	1.4
250	280	2.8	2.6	2.3	2.0	1.5
300	315	3.1	2.8	2.5	2.1	1.7

These PVC-U pipe support intervals are for PN10 pipe. For other pipes multiply the support intervals by the following factors:

PN6	0.90
PN12.5	1.16
PN16	1.21

Pipe support centres

PVC-C - ASTM Dimensions

Pipe support intervals in metres at:

DN inch	Schedule 40					Schedule 80				
	20°C	40°C	60°C	70°C	80°C	20°C	40°C	60°C	70°C	80°C
1/2"	1.5	1.4	1.2	0.8	0.8	1.7	1.4	1.4	0.9	0.8
3/4"	1.5	1.4	1.2	0.8	0.8	1.7	1.5	1.4	0.9	0.8
1"	1.7	1.5	1.4	0.9	0.8	1.8	1.7	1.5	1.1	0.9
1 1/4"	1.7	1.7	1.5	0.9	0.9	2.0	1.8	1.7	1.1	0.9
1 1/2"	1.8	1.7	1.5	1.1	0.9	2.1	1.8	1.7	1.1	1.1
2"	1.8	1.7	1.5	1.1	0.9	2.1	2.0	1.8	1.2	1.1
2 1/2"	2.1	2.0	1.8	1.2	1.1	2.4	2.3	2.0	1.4	1.2
3"	2.1	2.1	1.8	1.2	1.1	2.4	2.3	2.1	1.4	1.2
4"	2.3	2.1	2.0	1.4	1.2	2.6	2.6	2.1	1.4	1.2
6"	2.6	2.3	2.1	1.5	1.4	3.0	2.7	2.4	1.7	1.4
8"	2.9	2.6	2.3	1.7	1.5	3.4	3.0	2.7	1.8	1.7
10"	3.2	2.9	2.4	1.8	1.7	3.5	3.2	2.9	2.0	1.8
12"	3.5	3.0	2.6	2.0	1.8	3.8	3.5	3.2	2.3	2.0
14"	3.7	3.0	2.7	2.4	1.8	4.6	3.8	3.4	2.9	2.4
16"	4.0	3.4	2.9	2.6	2.1	4.9	4.1	3.7	3.0	2.6

ABS

DN inch	DN mm	Pipe support intervals in metres at:		
		20°C	40°C	60°C
3/8"	16	0.8	0.5	0.4
1/2"	20	0.9	0.6	0.5
3/4"	25	1.0	0.7	0.6
1"	32	1.1	0.8	0.7
1 1/4"	40	1.2	0.9	0.7
1 1/2"	50	1.3	1.0	0.7
2"	63	1.4	1.1	0.8
2 1/2"	75	1.5	1.2	0.8
3"	90	1.6	1.2	0.9
4"	110	1.8	1.3	1.0
5"	125	1.9	1.4	1.0
6"	140	2.0	1.5	1.1
8"	160	2.1	1.6	1.2
10"	200	2.2	1.7	1.3
12"	225	2.3	1.8	1.5
14"	250	2.5	2.0	1.7
16"	280	2.7	2.2	1.9
18"	315	2.9	2.4	2.1

These ABS pipe support intervals are for Class C and PN10 pipe. For other pipe classes multiply the support intervals by the following factors:

Class D	1.05
Class E	1.10

PE80 - SDR11

DN mm	OD mm	Pipe support intervals in metres at:				
		20°C	30°C	40°C	50°C	60°C
10	16	0.5	0.5	0.5	0.4	0.4
15	20	0.6	0.6	0.5	0.5	0.4
20	25	0.7	0.6	0.6	0.6	0.5
25	32	0.8	0.8	0.7	0.7	0.6
32	40	0.9	0.9	0.8	0.8	0.7
40	50	1.0	1.0	0.9	0.9	0.8
50	63	1.2	1.2	1.1	1.0	0.9
65	75	1.4	1.3	1.2	1.1	1.0
80	90	1.5	1.5	1.4	1.3	1.2
100	110	1.7	1.6	1.5	1.5	1.3
110	125	1.8	1.7	1.6	1.6	1.4
125	140	1.9	1.9	1.8	1.7	1.5
150	160	2.1	2.0	1.9	1.8	1.6
160	180	2.2	2.1	2.0	1.9	1.8
180	200	2.3	2.2	2.1	2.0	1.9
200	225	2.5	2.4	2.3	2.2	2.1
225	250	2.6	2.5	2.4	2.3	2.1
250	280	2.8	2.7	2.6	2.4	2.2
300	315	2.9	2.8	2.7	2.6	2.4
350	355	3.1	3.0	2.9	2.8	2.6
400	400	3.3	3.2	3.1	2.9	2.7

These PE pipe support intervals are for PE80 SDR11 pipe. For other pipes multiply the support intervals by the following factors:

SDR 33	0.75
SDR 17	0.91
SDR 7.4	1.07

There are no valid creep modulus curves available for PE100 at the moment, therefore it is recommended that the values for PE80 be increased by a factor of 1.10.

Pipe support centres



PP-H - SDR11

DN mm	OD mm	Pipe support intervals in metres at:						
		20°C	30°C	40°C	50°C	60°C	70°C	80°C
10	16	0.7	0.6	0.6	0.6	0.6	0.5	0.5
15	20	0.7	0.7	0.7	0.6	0.6	0.6	0.6
20	25	0.8	0.8	0.8	0.7	0.7	0.7	0.7
25	32	1.0	0.9	0.9	0.9	0.9	0.8	0.8
32	40	1.1	1.1	1.1	1.0	1.0	0.9	0.9
40	50	1.3	1.2	1.2	1.2	1.1	1.1	1.0
50	63	1.5	1.4	1.4	1.4	1.3	1.3	1.2
65	75	1.6	1.5	1.5	1.4	1.4	1.3	1.3
80	90	1.7	1.6	1.6	1.5	1.5	1.4	1.4
100	110	1.9	1.8	1.8	1.7	1.6	1.5	1.4
110	125	2.0	2.0	1.9	1.8	1.7	1.6	1.5
125	140	2.1	2.1	2.0	1.9	1.8	1.7	1.6
150	160	2.3	2.2	2.1	2.0	1.9	1.8	1.7
160	180	2.4	2.3	2.2	2.1	2.0	1.9	1.8
180	200	2.5	2.4	2.3	2.2	2.1	2.0	1.9
200	225	2.7	2.6	2.5	2.4	2.3	2.2	2.0
225	250	2.8	2.7	2.6	2.5	2.4	2.3	2.2
250	280	3.0	2.9	2.8	2.7	2.6	2.5	2.3
300	315	3.2	3.1	3.0	2.9	2.7	2.6	2.5
350	355	3.4	3.3	3.2	3.0	2.9	2.8	2.6
400	400	3.6	3.5	3.4	3.2	3.1	2.9	2.8

These PP pipe support intervals are for PP-H SDR11 pipe. For other pipes multiply the support intervals by the following factors:

SDR 33	0.75
SDR 17	0.91
SDR 7.4	1.07

For PP-R pipes, multiply the support intervals by the following factors:

SDR 33	0.55
SDR 17	0.70
SDR 11	0.75
SDR 7.4	0.80

PVDF - SDR21 (16-50mm), SDR33 (63-400mm)

DN mm	OD mm	Pipe support intervals in metres at:								
		20°C	30°C	40°C	50°C	60°C	70°C	80°C	100°C	120°C
10	16	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4
15	20	0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.5
20	25	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5
25	32	1.1	1.1	1.0	1.0	0.9	0.9	0.8	0.7	0.6
32	40	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.7
40	50	1.4	1.4	1.3	1.2	1.2	1.1	1.0	0.9	0.8
50	63	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.0	0.8
65	75	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.1	0.9
80	90	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.1	1.0
100	110	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.3	1.1
110	125	1.9	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.2
125	140	2.0	2.0	1.9	1.8	1.8	1.7	1.6	1.5	1.3
150	160	2.2	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.4
160	180	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.6	1.4
180	200	2.4	2.4	2.3	2.2	2.1	2.0	1.9	1.7	1.5
200	225	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.8	1.6
225	250	2.7	2.6	2.5	2.4	2.3	2.2	2.1	1.9	1.7
250	280	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.0	1.8
300	315	3.0	3.0	2.9	2.8	2.6	2.5	2.4	2.2	1.9
350	355	3.2	3.1	3.0	2.9	2.8	2.7	2.5	2.3	2.0
400	400	3.4	3.3	3.2	3.1	3.0	2.8	2.7	2.4	2.1

These PVDF pipe support intervals are for SDR33 pipes and for SDR21 pipes in diameters from 16 to 50mm. For SDR21 pipes in diameters larger than 50mm, multiply the support intervals by 1.08.

Note that the tables above show support intervals for pipes handling fluids. For pipes handling gases with a density of $<0.01\text{g/cm}^3$, it is possible to increase the support intervals shown in the tables by approximately 25% for thinner wall pipes and by approximately 50% for heavier wall pipes.