D. Minimum and Maximum Fill Over Pipes

The following tables provide acceptable minimum and maximum earthfill heights over the pipe for several different types of pipe materials.

Table 1. Minimum Gauge for Corrugated Metal Pipe (CMP) *(Reference 1)*

Diameter, in.	Acceptable Fill Height, ft		Minimum Gauge CMP			
	Minimum	Maximum	Steel (corrugations)		Aluminum (corrugations)	
			2 2/3 x ½ in.	3 x 1 in.	2 2/3 x ½ in.	3 x 1 in.
≤18	2	25	16	16	16	16
21	2	25	16	16	16	16
24	2	23	16	16	16	16
	>23	25	16	16	12	16
30	2	18	16	16	14	16
	>18	25	16	16	12	16
36	2	15	16	16	14	16
	>15	25	16	16	12	16
42	2	22	16	16	12	16
	>22	23	16	16	10	16
	>23	24	16	16	---	16
	>24	25	14	16	---	14
48	2	19	16	16	12	16
	>19	20	16	16	10	16
	>20	21	16	16	---	16
	>21	23	14	16	---	14
	>23	25	12	16	---	14
54	2	17	14	16	12	16
	>17	18	14	16	10	16
	>18	20	14	16	---	14
	>20	23	12	16	---	14
	>23	25	12	16	---	12
60	2	16	12	16	10	16
	>16	20	12	16	---	14
	>20	23	12	16	---	12
	>23	25	10	16	---	12
66	2	15	10	16	---	16
	>15	19	10	16	---	14
	>19	22	10	16	---	12
	>22	25	---	16	---	12

Table 1. Minimum Gauge for Corrugated Metal Pipe (CMP) *(Reference 1)*

Diameter, in.	Acceptable Fill Height, ft		Minimum Gauge CMP			
	Minimum	Maximum	Steel (corrugations)		Aluminum (corrugations)	
			2 2/3 x ½ in.	3 x 1 in.	2 2/3 x ½ in.	3 x 1 in.
72	2	13	10	16	---	16
	>13	17	10	16	---	14
	>17	20	10	16	---	12
	>20	24	---	16	---	10
	>24	25	---	14	---	10
78	2	16	---	16	---	14
	>16	22	---	16	---	12
	>22	25	---	14	---	10

Table 2. Minimum Thickness for Welded Steel Pipe *(Reference 1)*

Pipe Diameter, in	Acceptable Fill Height, ft		Minimum Pipe Wall Thickness, in
	Minimum	Maximum	
≤10	2	30	0.187
12	2	25	0.187
14, 16	2	30	0.25
18	2	23	0.25
	>23	25	0.375
20	2	18	0.25
	>18	25	0.375
24	2	12	0.25
	>12	25	0.375
30	2	8	0.25
	>8	18	0.375
	>18	25	0.5
36	2	6	0.25
	>6	12	0.375
	>12	23	0.5
42	2	5	0.25
	>5	9	0.375
	>9	16	0.5
48	2	4	0.25
	>4	7	0.375
	>7	12	0.5

Table 3. Minimum Acceptable PVC Pipe *(Reference 1)*

Nominal Pipe Diameter, in	Acceptable Fill Height, ft		Minimum Acceptable PVC Type[1]	
	Minimum	Maximum	Schedule	Standard Dimension Ratio (SDR)
4	2	10	40	26
	>10	16	40	21
	>16	21	40	---
	>21	25	80	---
6	2	10	40	26
	>10	12	40	21
	>12	16	80	21
	>16	25	80	---
8	2	10	40	26
	>10	16	80	21
	>16	25	80	---
10	2	8	40	21
	>8	16	80	21
	>16	24	80	---
12 -14	2	7	40	26
	>7	10	80	26
	>10	16	80	21
	>16	22	80	---
16	2	7	40	26
	>7	10	80	26
	>10	16	80	21
	>16	21	80	---
18	2	7	40	26
	>7	10	80	26
	>10	16	80	21
	>16	20	80	---
20	2	6	40	26
	>6	10	80	26
	>10	16	80	21
	>16	20	80	---

Table 3. Minimum Acceptable PVC Pipe *(Reference 1)*

Nominal Pipe Diameter, in	Acceptable Fill Height, ft		Minimum Acceptable PVC Type[1]	
	Minimum	Maximum	Schedule	Standard Dimension Ratio (SDR)
24	2	<3	---	26
	3	6	40	26
	>6	10	80	26
	>10	16	80	21
	>16	19	80	---
30 - 36	2	10	---	26
	>10	16	---	21

[1] Polyvinyl Chloride Pipe, PVC 1120 or PVC 1220, conforming to ASTM D-1785 or ASTM D-2241.

Table 4. Corrugated Plastic Tubing[2] (CPT) *(References 1,2,3)*

Trench Width, in	Max Fill Height, ft	Maximum Diameter CPT (in) per Installation Type	
		Tile Machine	Open Trench
12	any	8”	6”
16	8.4	12”	10”
20	6.8	15”	12”
24	6.0	18”	18”
28	5.6	24”	18”
32	5.3	24”	24”

[2]Single wall corrugated polyethylene (PE) pipe conforming to ASTM F405 or F667

References:

1. USDA-NRCS, National Engineering Handbook, Part 636, Chapter 52, Structural Design of Flexible Conduits.

2. American Society of Agricultural and Biological Engineers. 2008. Standard ASAE EP480. Design of Subsurface Drains in Humid Areas.

3. Spangler, M.G. and R.L. Handy. 1982. Soil Engineering. 4th Edition.