

BROADBAND ACOUSTIC RESONATOR ARRAY

Version 5, October 16, 2020

By Meredith Cargill

Dayton RS100

Driver resonance	95.55 Hz	Fs
One octave above resonance	191.1 Hz	
Longest resonator	49.95 in 4.16 ft	FITS PIPE 7 TO Fs
Pipe inner diameter	0.685 in	
Pipe cross-section	0.369 sq in	πR^2
Adjust cut length compared to design length	0 in	

n=number of 1/12 of an octave from the lowest resonance

- Pipes 1-18, increment n by 1
- Pipes 19-24, increment n by 2
- Pipes 25-30, increment n by 3 or 4

pipe #	n	design length	cut length	wave length	frequency	volume
1	0	50.0	50.0	199.8	67.6	18.4 0 octave
2	1	47.1	47.1	188.6	71.6	17.4
3	2	44.5	44.5	178.0	75.8	16.4
4	3	42.0	42.0	168.0	80.4	15.5
5	4	39.6	39.6	158.6	85.1	14.6
6	5	37.4	37.4	149.7	90.2	13.8
7	6	35.3	35.3	141.3	95.55	13.0 0.5 octaves
8	7	33.3	33.3	133.4	101.2	12.3
9	8	31.5	31.5	125.9	107.3	11.6
10	9	29.7	29.7	118.8	113.6	10.9
11	10	28.0	28.0	112.1	120.4	10.3
12	11	26.5	26.5	105.8	127.6	9.8
13	12	25.0	25.0	99.9	135.1	9.2 1 octave
14	13	23.6	23.6	94.3	143.2	8.7
15	14	22.3	22.3	89.0	151.7	8.2
16	15	21.0	21.0	84.0	160.7	7.7
17	16	19.8	19.8	79.3	170.3	7.3
18	17	18.7	18.7	74.8	180.4	6.9 1.5 octaves
19	19	16.7	16.7	66.7	202.5	6.1
20	21	14.9	14.9	59.4	227.3	5.5
21	23	13.2	13.2	52.9	255.1	4.9
22	25	11.8	11.8	47.1	286.3	4.3
23	27	10.5	10.5	42.0	321.4	3.9
24	29	9.4	9.4	37.4	360.8	3.4 2.5 octaves
25	32	7.9	7.9	31.5	429.0	2.9
26	35	6.6	6.6	26.5	510.2	2.4
27	39	5.3	5.3	21.0	642.8	1.9

28	43	4.2	4.2	16.7	809.9	1.5
29	47	3.3	3.3	13.2	1020.4	1.2
30	52	2.5	2.5	9.9	1362.1	0.9 4.3 octaves

Total feet of pipe: 56.8

Total volume of pipes: 251.1 cu in
 Other interior volume 3 cu in
 Total interior volume 254.1 cu in
 0.15 cu ft
 4.17 liters

For equivalent test box:

Interior height 6.33 in
 Interior width 6.33 in
 Interior depth 6.34 in
 Box volume 254.0 cu in

Box resonances (cube) 1066.4 Hz
 2132.7 3199.1
 4265.4 5331.8
 6398.1 7464.5

Ratio of crossover point to lowest resonator fundamental 3.387
 Crossover point for above array 228.9 Hz