

AEROVENT

SOUND POWER LEVELS

BAUB - Airfoil Utility Blowers



Aerovent, a Twin City Fan Company, certifies that the fans shown herein are licensed to bear the AMCA Seal for Air and Sound. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

The calculated sound power levels from these ratings are in decibels, referenced to 10-12 watts. Calculated per AMCA Standard 301.

For Air Performance refer to Catalog 760.



BAUB Sound Calculations

The published sound power levels (L_w) have been determined by laboratory tests in accordance with AMCA Standard 300-96 and carry the AMCA Seal for BAUB fans. The sound power levels shown are decibel (dB) levels referenced to 10^{-12} watts calculated per AMCA Standard 301. We have listed sound power levels for the eight octave bands with frequency range as shown below.

OCTAVE BAND	1	2	3	4	5	6	7	8
FREQUENCY CENTER	45 to 90	90 to 180	180 to 355	355 to 710	710 to 1400	1400 to 2800	2800 to 5600	5600 to 11200
CENTER FREQUENCY	63	125	250	500	1000	2000	4000	8000

L_w for the fans can be easily obtained using the Aerovent Fan Selector® program. L_w can also be obtained using the specific sound power level method described below:

$$\text{Sound Power Level of a fan } (L_w) = \\ \text{Specific Sound Power Level } (L_{wk}) + \text{Capacity Fraction } (M)$$

Use of this method will be illustrated by the following example:

Calculate sound power levels for:

Size 27 BAUB SP 3.1" w.g.
CFM. 13,030 RPM. 1,500 RPM

1. How to determine L_{wk}

We have published values for L_{wk} at various speeds and operating points on pages 3 through 5.

The operating point is a ratio of design CFM to the wide open volume (WOV). The WOV equals to CFM for a given RPM at zero static pressure. WOV can be calculated by multiplying fan RPM by the factors (R_f) shown in the table. Thus, WOV volume for 1,500 RPM = $10.837 \times 1,500 = 16,256$ CFM.

Therefore, the operating point falls at 80% ($13,030 \div 16,256 \times 100\%$) of the WOV. Referring to the inlet L_{wk} table for Size 27 BAUB, the specific sound power levels can be read as follows:

L_{wk} inlet = 40 42 43 31 28 27 22 16

SIZE	Rf FOR BAUB
122	0.8
135	1.233
150	1.469
165	2.251
182	3.318
200	4.367
222	6.013
245	8.028
270	10.837
300	14.866
330	19.786

2. How to determine M

The value of M can be taken from the tables on page 6 once Total Pressure (TP) is calculated.

M can also be calculated using the formula, $M = 10 \log_{10}(\text{CFM}) + 20 \log_{10} \text{TP}$, where $\text{TP} = ((\text{CFM} \div \text{OA}) \div 4005)^2 + \text{SP} = ((13,030 \div 4.19) \div 4005)^2 + 3.1 = 3.70$

Thus, for 13,030 CFM and 3.1" SP, M is 53.

3. Combining L_{wk} and M gives sound power levels.

Octave Band	1	2	3	4	5	6	7	8
L_{wk} =	40	42	43	31	28	27	22	16
M =	53	53	53	53	53	53	53	53
L_w (L_{wi}) at inlet =	93	95	96	84	81	80	75	69

Inlet L_{wk} Values (for BAUB)

Sizes 27, 30 & 33

Sizes 36

RPM	% WOV	OCTAVE BAND							
		1	2	3	4	5	6	7	8
3000	90	46	46	49	51	35	34	31	28
	80	40	40	44	46	29	28	26	22
	70	39	39	43	45	28	27	25	21
	60	35	35	39	41	25	24	23	18
	50	35	35	39	41	25	24	23	18
2700	90	46	46	50	50	35	34	31	27
	80	40	40	45	45	29	28	25	21
	70	39	39	44	44	28	27	25	20
	60	35	35	40	40	25	24	22	17
	50	35	35	40	40	25	24	22	17
2400	90	46	46	51	47	35	33	30	26
	80	40	40	46	41	29	28	25	20
	70	39	39	45	40	28	27	24	19
	60	35	35	41	37	24	24	22	16
	50	35	35	41	37	24	24	22	16
2100	90	46	46	51	43	35	33	30	25
	80	40	41	46	38	29	27	24	19
	70	39	40	45	36	28	26	23	18
	60	35	35	41	33	24	24	21	15
	50	35	35	41	33	24	24	21	15
1800	90	46	48	51	39	35	32	29	23
	80	40	42	46	33	29	27	23	17
	70	39	41	45	32	27	26	22	16
	60	35	37	41	28	24	24	20	13
	50	35	37	41	28	24	24	20	13
1500	90	45	47	48	37	34	32	28	22
	80	40	42	43	31	28	27	22	16
	70	39	41	42	29	27	26	21	15
	60	35	37	38	26	24	23	19	13
	50	35	37	38	26	24	23	19	13
1200	90	43	44	43	37	34	32	27	19
	80	39	39	37	31	28	27	22	15
	70	38	38	35	29	27	26	21	14
	60	34	34	32	27	25	24	19	12
	50	34	34	32	27	25	24	19	12
900	90	42	42	41	34	34	31	24	15
	80	38	36	35	27	29	26	20	11
	70	37	35	34	26	28	25	19	10
	60	33	31	31	24	25	23	17	9
	50	33	31	31	24	25	23	17	9
600	90	42	42	37	34	32	28	19	10
	80	37	35	31	28	28	23	15	6
	70	36	34	30	27	27	22	14	5
	60	32	31	27	25	24	20	12	4
	50	32	31	27	25	24	20	12	4
300	90	42	37	34	32	28	19	10	0
	80	35	31	28	28	23	15	6	-3
	70	34	30	27	27	22	14	5	-4
	60	31	27	25	24	20	12	4	-5
	50	31	27	25	24	20	12	4	-5

RPM	% WOV	OCTAVE BAND							
		1	2	3	4	5	6	7	8
2100	90	44	44	44	47	41	35	34	31
	80	36	36	41	36	29	28	25	19
	70	34	35	40	34	28	27	23	18
	60	31	32	35	30	23	22	19	15
	50	31	32	35	30	23	22	19	15
1800	90	44	45	47	38	34	33	29	22
	80	36	38	41	33	29	28	23	17
	70	34	36	40	31	28	27	22	16
	60	31	33	35	27	22	21	17	14
	50	31	33	35	27	22	21	17	13
1500	90	44	46	47	36	34	33	30	27
	80	36	39	41	30	29	27	22	16
	70	34	38	40	29	27	26	21	15
	60	31	34	35	25	23	20	16	10
	50	31	34	35	25	23	20	16	10
600	90	43	46	38	34	34	34	27	21
	80	39	41	33	29	29	22	17	10
	70	39	40	32	28	28	21	16	10
	60	42	37	31	26	25	19	14	9
	50	42	37	31	26	25	19	14	9
300	90	46	38	34	34	27	21	14	7
	80	41	33	29	22	17	10	0	4
	70	40	32	28	28	21	16	10	3
	60	37	31	26	25	19	14	9	3
	50	37	31	26	25	19	14	9	3
100	90	35	33	30	24	17	10	3	-4
	80	30	28	25	19	13	7	0	-6
	70	29	27	24	18	12	6	0	-7
	60	28	24	22	16	11	5	0	-6
	50	28	24	22	16	11	5	0	-6

- The calculated sound power levels from these ratings are in decibels, referenced to 10^{-12} watts calculated per AMCA Standard 301.
- Values shown are for inlet L_{wi} sound power levels for: Installation Type B: free inlet, ducted outlet. Ratings do not include the effects of duct end correction.

M Capacity Fraction

CFM	TOTAL PRESSURE AT DENSITY																		
	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2
100	8	11	14	16	18	19	20	22	24	26	28	30	31	32	33	34	35	36	36
150	10	13	16	18	19	21	22	24	25	28	30	31	33	34	35	36	37	37	38
200	11	14	17	19	21	22	23	25	27	29	31	33	34	35	36	37	38	39	39
300	13	16	19	21	22	24	25	27	28	31	33	34	36	37	38	39	40	40	41
500	15	18	21	23	24	26	27	29	31	33	35	37	38	39	40	41	42	43	43
750	17	20	23	25	26	28	29	31	32	35	37	38	40	41	42	43	44	44	45
1000	18	21	24	26	28	29	30	32	34	36	38	40	41	42	43	44	45	46	46
1500	20	23	26	28	29	31	32	34	35	38	40	41	43	44	45	46	47	47	48
2000	21	24	27	29	31	32	33	35	37	39	41	43	44	45	46	47	48	49	49
3000	23	26	29	31	32	34	35	37	38	41	43	44	46	47	48	49	50	50	51
5000	25	28	31	33	34	36	37	39	41	43	45	47	48	49	50	51	52	53	53
7500	27	30	33	35	36	38	39	41	42	45	47	48	50	51	52	53	54	54	55
10000	28	31	34	36	38	39	40	42	44	46	48	50	51	52	53	54	55	56	56
15000	30	33	36	38	39	41	42	44	45	48	50	51	53	54	55	56	57	57	58
20000	31	34	37	39	41	42	43	45	47	49	51	53	54	55	56	57	58	59	59
30000	33	36	39	41	42	44	45	47	48	51	53	54	56	57	58	59	60	60	61
50000	35	38	41	43	44	46	47	49	51	53	55	57	58	59	60	61	62	63	63
75000	37	40	43	45	46	48	49	51	52	55	57	58	60	61	62	63	64	64	65
100000	38	41	44	46	48	49	50	52	54	56	58	60	61	62	63	64	65	66	66
150000	40	43	46	48	49	51	52	54	55	58	60	61	63	64	65	66	67	67	68
200000	41	44	47	49	51	52	53	55	57	59	61	63	64	65	66	67	68	69	69

CFM	TOTAL PRESSURE AT DENSITY																		
	7	8	9	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
100	37	38	39	40	42	43	44	45	46	47	48	48	49	50	50	51	51	52	52
150	39	40	41	42	43	45	46	47	48	49	49	50	51	51	52	52	53	53	54
200	40	41	42	43	45	46	47	48	49	50	51	51	52	53	53	54	54	55	55
300	42	43	44	45	46	48	49	50	51	52	52	53	54	54	55	55	56	56	57
500	44	45	46	47	49	50	51	52	53	54	55	55	56	57	57	58	58	59	59
750	46	47	48	49	50	52	53	54	55	56	56	57	58	58	59	59	60	60	61
1000	47	48	49	50	52	53	54	55	56	57	58	58	59	60	60	61	61	62	62
1500	49	50	51	52	53	55	56	57	58	59	59	60	61	61	62	62	63	63	64
2000	50	51	52	53	55	56	57	58	59	60	61	61	62	63	63	64	64	65	65
3000	52	53	54	55	56	58	59	60	61	62	62	63	64	64	65	65	66	66	67
5000	54	55	56	57	59	60	61	62	63	64	65	65	66	67	67	68	68	69	69
7500	56	57	58	59	60	62	63	64	65	66	66	67	68	68	69	70	70	71	71
10000	57	58	59	60	62	63	64	65	66	67	68	68	69	70	70	71	71	72	72
15000	59	60	61	62	63	65	66	67	68	69	69	70	71	71	72	72	73	73	74
20000	60	61	62	63	65	66	67	68	69	70	71	71	72	73	73	74	74	75	75
30000	62	63	64	65	66	68	69	70	71	72	72	73	74	74	75	75	76	76	77
50000	64	65	66	67	69	70	71	72	73	74	75	75	76	77	77	78	78	79	79
75000	66	67	68	69	70	72	73	74	75	76	76	77	78	78	79	79	80	80	81
100000	67	68	69	70	72	73	74	75	76	77	78	78	79	80	80	81	81	82	82
150000	69	70	71	72	73	75	76	77	78	79	79	80	81	81	82	82	83	83	84
200000	70	71	72	73	75	76	77	78	79	80	81	81	82	83	83	84	84	85	85



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