

U.S. FAN INTERNATIONAL®

USBI Series Sound Power Levels



U.S. FAN INTERNATIONAL®

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Licensed to bear the AMCA Seal for Sound and Air Performance

**USS81A
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U.S. FAN INTERNATIONAL® certifies that the USBI Series fans shown herein are licensed to bear the AMCA Seal. 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. For air performance data refer to catalog USC81.

INTRODUCTION

This catalog is a supplement to catalog USC81.

This catalog uses procedures in accordance with AMCA Standards. The sound power level ratings shown are in decibels, referred 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.

In order to use this catalog the user must understand two concepts, that of specific sound power and VP/SP as follows:

Specific sound power is the means by which a fan's overall sound can be reduced to a set of base numbers which still represent the "signature" of the original fan. This is provided in the form of decibels produced from a fan delivering one CFM at one inch pressure over a frequency range of eight octave bands. In order to predict the sound of another geometrically similar fan, the specific sound power level spectrum for that type of fan and its operating point location on the fan curve is found. The acoustic energy corresponding to the new fan is added back into the "base signature". This acoustic energy is called the "capacity fraction (L_{wf})". Therefore, the general equation is:

$L_{wi} = L_{wki} + L_{wf}$ Where:
 L_{wi} = Inlet sound power of fan
 L_{wki} = Inlet specific sound power for a particular fan design
 L_{wf} = Capacity fraction which is $10 \log$ (CFM) + $20 \log$ (pressure)

The specific sound power of a fan changes with operating point location on the fan curve. Therefore, a means must be devised to identify the specific sound power levels which correspond to the operating point for which sound is being desired. This is done using the term VP/SP in that regardless of speed, fan size or density, the VP/SP ratio remains constant and defines the same corresponding operating point for the base fan as well as the new fan.

The capacity fraction (L_{wf}) and VP/SP ratio can easily be found using Tables I and II. It is important to note that the VP/SP ratio requires both the VP and SP values to be at the same density. The acoustic energy (capacity fraction - L_{wf}) is a function of the TP at the actual operating conditions of the new fan. Therefore, use the TP corresponding to the actual operating conditions in Table II or you will obtain the wrong values of sound power.

SAMPLE CALCULATION

A size 37DW fan must deliver 38,475 CFM ($18.16 \text{ m}^3/\text{s}$) at 6 inches wg (1490 Pa) static pressure. The fan must perform at an altitude of 7000 feet (2134 m) with air entering the fan inlet at 150°F (66°C).

1. DETERMINE THE AERODYNAMIC RATING

The aerodynamic rating is found using the procedures found on page 11 of catalog USC81. The final rating at actual operating conditions are:

38,475 CFM ($18.16 \text{ m}^3/\text{s}$), 6 inches wg SP (1490 Pa), 1329 RPM, 46.7 HP (34.82 kW).

2. DETERMINE THE VP/SP RATIO

From page 43 of catalog USC81, the inlet velocity may be calculated using the inlet area at the top of the page. The inlet area is 16.60 sq. ft. (1.542 m^2).

$$\text{Inlet velocity} = \frac{38475 \text{ CFM} (18.16 \text{ m}^3/\text{s})}{16.6 \text{ sq. ft.} (1.542 \text{ m}^2)}$$

$$= 2318 \text{ FPM} (11.78 \text{ m/s})$$

From Table I for 2318 ft./min., the Velocity Pressure is .33 inches wg., by interpolation, for standard air density. For conditions other than standard, Velocity Pressure must be converted by the same factor as Static Pressure in the example on page 11 of USC81.

$$VP = \frac{.33 \text{ inches wg.}}{15} = .22 \text{ inches wg.}$$

Then for a Static Pressure of 6 inches wg. the VP/SP ratio is .04.

3. DETERMINE THE CAPACITY FRACTION (L_{wf})

The Capacity Fraction (L_{wf}) is given in Table II as a function of air flow (CFM) and Total Pressure (inches). Total Pressure is the sum of Velocity Pressure and Static Pressure, or 6.22 inches wg. By interpolation in Table II between 30,000 and 50,000 CFM, and 6 and 6.5 inches wg. Total Pressure, 38,475 CFM at 6.22 inches wg. has a Capacity Fraction of 62 dB.

4. DETERMINE THE SPECIFIC SOUND POWER (L_{wki}) FOR THE FAN SIZE AND SPEED DESIRED.

The size 37DW fan will run at 1329 RPM and operate at a VP/SP ratio of .04. For the nearest VP/SP and interpolating for speed in the Sound Power Table determine the values of L_{wki} .

For a speed of 1329 RPM and a VP/SP ratio of .05, the values of L_{wki} are:

	OCTAVE BAND							
	1	2	3	4	5	6	7	8
L_{wkiB}	41	35	41	33	29	24	18	13
-ERC	-4	-2	0	0	0	0	0	0
L_{wkiL}	37	33	41	33	29	24	18	13
(B = Base Fan L = Larger Fan)								

5. DETERMINE INLET SOUND POWER LEVELS (L_{wi}) dB re 10^{-12} Watts

	OCTAVE BAND							
	1	2	3	4	5	6	7	8
L_{wki}	37	33	41	33	29	24	18	13
L_{wf}	62	62	62	62	62	62	62	62
L_{wi}	99	95	103	95	91	86	80	75

VP/SP RATIO TA BLE I
Standard Conditions

Velocity * Pres- sure (in. wg.)	Static Pres sure (in. wg.)																
	1/2	3/4	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	7	8
600	.02	.09	.06	.04	.04	.03	.03	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
800	.04	.16	.11	.08	.06	.05	.05	.04	.03	.03	.02	.02	.01	.01	.01	.01	.01
1000	.06	.25	.17	.12	.10	.08	.07	.06	.05	.04	.03	.02	.02	.02	.01	.01	.01
1200	.09	.36	.24	.18	.14	.12	.10	.09	.07	.06	.04	.04	.03	.03	.02	.02	.01
1400	.12	.49	.33	.24	.20	.16	.14	.12	.10	.08	.06	.05	.04	.03	.03	.02	.01
1600	.16	.64	.43	.32	.26	.21	.18	.16	.13	.11	.08	.06	.05	.04	.04	.03	.02
1800	.20	.81	.54	.40	.32	.27	.23	.20	.16	.13	.10	.08	.07	.06	.05	.04	.03
2000	.25	1.00	.67	.50	.40	.33	.29	.25	.20	.17	.12	.10	.08	.07	.06	.05	.04
2200	.30		.80	.60	.48	.40	.34	.30	.24	.20	.15	.12	.10	.09	.08	.07	.06
2400	.36		.96	.72	.57	.48	.41	.36	.29	.24	.18	.14	.12	.10	.09	.08	.07
2600	.42			.84	.67	.56	.48	.42	.34	.28	.21	.17	.14	.12	.11	.09	.08
2800	.49			.98	.78	.65	.56	.49	.39	.33	.24	.20	.16	.14	.12	.11	.10
3000	.56				.90	.75	.64	.56	.45	.37	.28	.22	.19	.16	.14	.12	.11
3200	.64				1.00	.85	.73	.64	.51	.43	.32	.26	.21	.18	.16	.14	.13
3400	.72					.96	.82	.72	.58	.48	.36	.29	.24	.21	.18	.16	.14
3600	.81						.92	.81	.65	.54	.40	.32	.27	.23	.20	.18	.16
3800	.90							.90	.72	.60	.45	.36	.30	.26	.23	.20	.18
4000	1.00							1.00	.80	.67	.50	.40	.33	.29	.25	.22	.20
4200	1.10								.88	.73	.55	.44	.37	.31	.28	.24	.22
4400	1.21								.97	.80	.60	.48	.40	.34	.30	.27	.24
4600	1.32									.88	.66	.53	.44	.38	.33	.29	.26
4800	1.44									.96	.72	.57	.48	.41	.36	.32	.29

* Velocity Pres sures are given for Stan dard Air at .075 lbs./cu. ft.

CAPACITY FRACTION (L_{wt}) TA BLE II

CFM	Total Pres sure at Operating Con ditions (in. wg.)																											
	1/2	3/4	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	7	8	9	10	12	14	16	18					
100	8	11	14	16	18	19	20	22	24	26	28	30	31	32	33	34	35	36	36	37	38	39	40	42	43	44	45	
150	10	13	16	18	19	21	22	24	25	28	30	31	33	34	35	36	37	37	38	39	40	41	42	43	45	46	47	
200	11	14	17	19	21	22	23	25	27	29	31	33	34	35	36	37	38	39	39	40	41	42	43	45	46	47	48	
300	13	16	19	21	22	24	25	27	28	31	33	34	36	37	38	39	40	40	41	42	43	44	45	46	48	49	50	
500	15	18	21	23	24	26	27	29	31	33	35	37	38	39	40	41	42	43	44	45	46	47	49	50	51	52		
750	17	20	23	25	26	28	29	31	32	35	37	38	40	41	42	43	44	44	45	46	47	48	49	50	52	53	54	
1000	18	21	24	26	28	29	30	32	34	36	38	40	41	42	43	44	45	46	46	47	48	49	50	52	53	54	55	
1500	20	23	26	28	29	31	32	34	35	38	40	41	43	44	45	46	47	47	48	49	50	51	52	53	55	56	57	
2000	21	24	27	29	31	32	33	35	37	39	41	43	44	45	46	47	48	49	49	50	51	52	53	55	56	57	58	
3000	23	26	29	31	32	34	35	37	38	41	43	44	46	47	48	49	50	50	51	52	53	54	55	56	58	59	60	
5000	25	28	31	33	34	36	37	39	41	43	45	47	48	49	50	51	52	53	53	54	55	56	57	59	60	61	62	
7500	27	30	33	35	36	38	39	41	42	45	47	48	50	51	52	53	54	54	55	56	57	58	59	60	62	63	64	
10000	28	31	34	36	38	39	40	42	44	46	48	50	51	52	53	54	55	56	56	57	58	59	60	62	63	64	65	
15000	30	33	36	38	39	41	42	44	45	48	50	51	53	54	55	56	57	57	58	59	60	61	62	63	65	66	67	
20000	31	34	37	39	41	42	43	45	47	49	51	53	54	55	56	57	58	59	59	60	61	62	63	65	66	67	68	
30000	33	36	39	41	42	44	45	47	48	51	53	54	56	57	58	59	60	60	61	62	63	64	65	66	68	69	70	
50000	35	38	41	43	44	46	47	49	51	53	55	57	58	59	60	61	62	63	63	64	65	66	67	69	70	71	72	
75000	37	40	43	45	46	48	49	51	52	55	57	58	60	61	62	63	64	64	65	66	67	68	69	70	72	73	74	
100000	38	41	44	46	48	49	50	52	54	56	58	60	61	62	63	64	65	66	66	67	68	69	70	72	73	74	75	
150000	40	43	46	48	49	51	52	54	55	58	60	61	63	64	65	66	67	67	68	69	70	71	72	73	75	76	77	
200000	41	44	47	49	51	52	53	55	57	59	61	63	64	65	66	67	68	69	69	70	71	72	73	75	76	77	78	
250000	42	45	48	50	51	53	54	56	58	60	62	64	65	66	67	68	69	70	70	71	72	73	74	76	77	78	79	
300000	43	46	49	51	52	54	55	57	58	61	63	64	66	67	68	69	70	70	71	72	73	74	75	76	78	79	80	

IN LET SPE CIFIC SOUND POWER LEVELS IN DECI BELS RE FERRED TO 10⁻¹² WATTS (L_{wk})

12SW - 16SW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
600	47	46	38	35	31	24	18	12	49	48	41	38	33	27	20	14	53	51	45	42	37	30	23	16	56	54	48	46	42	34	27	19	57	56	50	48	43	36	28	21
800	47	46	39	36	33	27	20	14	50	48	42	39	36	30	23	16	53	52	46	43	40	33	26	19	57	55	50	47	44	37	30	22	58	57	51	49	46	39	31	24
1000	50	47	43	37	34	29	23	16	53	49	45	40	37	32	25	18	56	52	49	44	41	36	29	22	60	56	52	48	45	40	32	25	61	57	54	49	47	41	34	26
1200	53	47	46	38	35	31	24	18	55	49	48	41	38	33	27	20	58	53	51	45	42	37	30	23	62	56	54	48	46	42	34	27	63	57	56	50	48	43	36	28
1500	56	47	46	39	36	33	26	20	58	49	48	42	39	36	29	22	61	53	51	45	43	40	33	26	65	56	55	49	47	44	37	29	66	57	57	51	48	46	38	31
1800	56	49	46	41	37	34	28	22	59	51	49	44	40	37	31	24	62	55	52	47	43	41	34	27	65	58	55	51	47	45	39	31	67	59	57	53	49	47	40	33
2100	56	51	47	44	37	34	29	23	59	53	49	46	40	37	32	26	62	57	52	49	44	41	36	29	66	60	56	53	48	45	40	33	67	61	57	55	50	47	42	34
2400	56	53	47	46	38	35	31	24	59	55	49	48	41	38	33	27	62	59	53	51	45	42	37	30	66	62	56	54	48	46	42	34	67	63	57	56	50	48	43	36
3000	55	56	47	46	39	36	33	26	59	58	49	48	42	39	36	29	62	61	53	51	45	43	40	33	66	65	56	55	49	47	44	37	67	66	57	57	51	48	46	38
3600	55	56	49	46	41	37	34	28	59	59	51	49	44	40	37	31	62	62	55	52	47	43	41	34	66	65	58	55	51	47	45	39	67	67	59	57	53	49	47	40
4200	55	56	51	47	44	37	34	29	59	59	53	49	46	40	37	32	62	62	57	52	49	44	41	36	66	66	60	56	53	48	45	40	67	67	61	57	55	50	47	42
4800	55	56	53	47	46	38	35	31	59	59	55	49	48	41	38	33	62	62	59	53	51	45	42	37	66	66	62	56	54	48	46	42	67	67	63	57	56	50	48	43

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 12	ERC	11	6	3	1	0	0	0	0
13		11	6	2	1	0	0	0	0
15		10	5	2	1	0	0	0	0
16		10	5	2	0	0	0	0	0

18SW - 22SW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
400	47	44	38	33	29	24	18	12	44	47	40	35	31	26	19	13	52	50	43	37	34	29	22	15	56	54	48	42	40	34	26	18	57	55	49	44	41	35	26	18
600	50	46	41	36	31	27	21	16	47	47	43	37	32	29	22	16	54	50	46	40	35	31	26	18	57	54	50	44	40	36	29	21	59	56	52	47	42	37	29	22
800	52	48	44	39	33	29	24	19	50	48	46	40	34	31	25	19	56	51	49	42	36	33	28	21	59	55	52	46	41	38	32	24	61	57	54	48	43	39	32	26
1000	54	49	47	40	35	31	26	21	56	49	49	42	35	33	28	21	58	51	52	44	37	35	30	23	60	55	55	48	41	39	34	27	63	58	57	51	44	43	38	29
1200	55	51	48	43	37	32	28	24	57	52	49	45	38	34	30	24	59	54	52	47	40	37	32	26	61	57	56	51	44	40	37	30	63	60	58	54	47	44	40	32
1500	54	53	49	45	39	34	30	25	57	54	50	48	41	36	32	27	59	57	53	51	43	38	35	29	61	59	57	54	47	42	39	33	63	62	59	57	50	45	42	36
1800	53	55	49	47	41	35	32	27	56	57	51	51	43	37	35	29	58	60	54	54	46	39	37	32	60	62	57	57	50	43	41	36	63	65	60	59	52	46	44	39
2100	53	55	52	47	44	36	33	28	55	58	54	51	46	39	35	31	57	60	57	54	49	40	37	34	59	62	60	57	53	45	41	38	62	64	62	60	55	47	44	41
2400	52	54	55	48	47	37	34	30	54	56	57	51	49	40	35	32	56	59	59	53	52	41	37	36	58	61	62	57	56	47	41	40	61	63	64	60	58	48	44	42
3000	51	54	57	48	50	39	34	31	53	56	59	50	52	41	35	33	55	58	61	53	55	43	37	37	58	61	64	57	59	48	41	41	60	63	66	59	61	50	43	44
3600	50	53	56	49	49	41	35	32	53	55	58	51	52	43	37	34	55	58	60	54	54	45	39	37	58	61	64	58	59	50	42	41	60	62	65	60	61	52	45	44
4200	49	52	55	50	48	42	36	33	52	55	57	52	51	44	38	35	54	57	60	54	54	47	40	38	57	60	63	58	58	52	44	42	59	62	65	60	60	54	46	45

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 18	ERC	11	6	3	1	0	0	0	0
20		10	6	2	1	0	0	0	0
22		10	5	2	1	0	0	0	0

IN LET SPE CIFIC SOUND POWER LEVELS IN DECI BELS RE FERRED TO 10⁻¹² WATTS (L_{wk})

24SW - 27SW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
400	51	43	40	38	33	26	19	12	51	43	40	38	33	26	19	12	51	43	40	38	33	26	19	12	53	45	41	40	35	27	20	13	55	47	43	42	37	29	22	14
600	49	50	42	39	36	30	23	16	49	50	42	39	36	30	23	16	49	50	42	39	36	30	23	16	51	52	43	41	38	32	24	17	53	54	45	43	40	34	26	19
800	48	51	43	40	38	33	26	19	48	51	43	40	38	33	26	19	48	51	43	40	38	33	26	19	50	53	45	41	40	35	27	20	51	55	47	43	42	37	29	22
1000	49	50	47	41	39	34	28	21	49	50	47	41	39	34	28	21	49	50	47	41	39	34	28	21	51	52	49	42	40	36	30	22	52	53	51	44	42	39	32	24
1200	50	49	50	42	39	36	30	23	50	49	50	42	39	36	30	23	50	49	50	42	39	36	30	23	51	51	52	43	41	38	32	24	53	53	54	45	43	40	34	26
1500	51	48	51	43	40	38	32	25	51	48	51	43	40	38	32	25	51	48	51	43	40	38	32	25	53	50	53	44	41	39	34	27	54	52	55	46	43	42	36	29
1800	52	49	51	45	40	38	34	27	52	49	51	45	40	38	34	27	52	49	51	45	40	38	34	27	53	50	52	47	42	40	36	29	55	52	54	49	44	42	38	31
2100	52	50	50	48	41	39	35	29	52	50	50	48	41	39	35	29	52	50	50	48	41	39	35	29	53	51	51	49	43	40	37	30	55	53	53	51	45	43	39	33
2400	52	50	49	50	42	39	36	30	52	50	49	50	42	39	36	30	52	50	49	50	42	39	36	30	53	51	51	52	43	41	38	32	55	53	53	54	45	43	40	34
3000	52	51	48	51	43	40	38	32	52	51	48	51	43	40	38	32	52	51	48	51	43	40	38	32	53	53	50	53	44	41	39	34	55	54	52	55	46	43	42	36

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 24	ERC	6	3	1	0	0	0	0	0
27		6	2	1	0	0	0	0	0

30SW - 81SW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
200	34	30	25	21	18	15	11	8	38	34	29	24	19	14	10	5	43	38	35	29	23	17	11	5	47	43	39	34	27	21	15	8	50	46	44	38	31	25	18	12
400	38	34	30	25	21	18	15	11	42	38	34	29	24	19	14	10	47	43	38	35	29	23	17	11	51	47	43	39	34	27	21	15	53	50	46	44	38	31	25	18
600	35	40	31	28	23	20	17	13	39	44	35	33	27	22	17	12	44	49	40	37	32	26	20	15	48	52	44	42	38	31	24	18	51	54	47	45	42	35	28	22
800	37	38	34	30	25	21	18	15	40	42	38	34	29	24	19	14	45	47	43	38	35	29	23	17	49	51	47	43	39	34	27	21	52	53	50	46	44	38	31	25
1000	39	37	37	30	27	22	19	16	42	40	41	35	31	26	20	16	47	45	46	39	36	31	25	19	51	49	50	43	41	36	29	23	54	52	52	47	45	40	33	27
1200	41	35	40	31	28	23	20	17	44	39	44	35	33	27	22	17	49	44	49	40	37	32	26	20	53	48	52	44	42	38	31	24	56	51	54	47	45	42	35	28
1500	42	36	39	33	29	25	21	18	45	39	43	37	34	29	23	18	50	44	48	42	38	34	28	22	54	48	52	46	42	39	33	27	57	52	54	49	46	43	37	30
1800	42	38	37	35	30	26	22	19	45	41	41	40	34	30	25	20	50	46	46	45	39	35	30	24	54	50	50	48	43	40	35	28	57	53	53	51	46	44	39	32
2100	42	40	36	38	30	27	22	19	45	43	40	42	35	32	26	21	50	48	45	47	39	36	31	25	54	52	49	50	43	41	36	30	57	55	52	53	47	45	41	33
2400	42	41	35	40	31	28	23	20	45	44	39	44	35	33	27	22	50	49	44	49	40	37	32	26	54	53	48	52	44	42	38	31	57	56	51	54	47	45	42	35
3000	42	42	36	39	33	29	25	21	45	45	39	43	37	34	29	23	50	50	44	48	42	38	34	28	54	54	48	52	46	42	39	33	57	57	52	54	49	46	43	37

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 30	ERC	5	2	1	0	0	0	0	0
33		5	2	0	0	0	0	0	0
37		4	2	0	0	0	0	0	0
40		4	1	0	0	0	0	0	0
49		3	1	0	0	0	0	0	0
54		2	1	0	0	0	0	0	0
60		2	1	0	0	0	0	0	0
66		2	0	0	0	0	0	0	0
77		2	0	0	0	0	0	0	0
81		1	0	0	0	0	0	0	0

IN LET SPE CIFIC SOUND POWER LEVELS IN DECI BELS RE FERRED TO 10⁻¹² WATTS (L_{wk})

12DW-16DW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
600	44	43	37	36	30	24	18	12	47	46	42	40	33	26	19	12	51	50	46	44	38	30	23	15	55	54	50	48	42	34	26	18	56	55	51	49	44	35	27	19
800	47	43	39	37	32	26	20	14	49	47	43	41	36	29	22	15	53	51	47	45	41	33	26	18	56	55	51	49	45	38	30	21	57	56	52	51	46	39	31	22
1000	51	44	41	37	34	28	22	16	53	47	45	41	38	32	25	17	56	51	49	46	42	36	28	20	59	55	53	50	47	40	32	24	60	56	54	51	48	42	33	25
1200	54	44	43	37	36	30	24	18	55	47	46	42	40	33	26	19	58	51	50	46	44	38	30	23	61	55	54	50	48	42	34	26	62	56	55	51	49	44	35	27
1500	56	46	43	38	37	32	26	20	57	49	47	43	41	36	29	22	60	52	51	47	45	40	33	25	63	56	55	51	49	45	37	29	63	57	56	52	51	46	38	30
1800	54	49	44	40	37	33	27	21	56	51	47	44	41	37	31	23	60	55	51	48	46	42	35	27	63	58	55	52	50	46	39	31	64	59	56	53	51	47	40	32
2100	52	52	44	41	37	35	29	23	55	54	47	45	41	38	32	25	59	57	51	49	46	43	36	29	63	60	55	53	50	47	41	33	64	60	56	54	51	48	42	34
2400	51	54	44	43	37	36	30	24	54	55	47	46	42	40	33	26	58	58	51	50	46	44	38	30	63	61	55	54	50	48	42	34	64	62	56	55	51	49	44	35
3000	49	56	46	43	38	37	32	26	53	57	49	47	43	41	36	29	58	60	52	51	47	45	40	33	63	63	56	55	51	49	45	37	65	64	57	56	52	51	46	38
3600	49	54	49	44	40	37	33	27	53	56	51	47	44	41	37	31	58	59	55	51	48	46	42	35	63	63	58	55	52	50	46	39	65	64	59	56	53	51	47	40
4200	49	52	52	44	41	37	35	29	53	55	54	47	45	41	38	32	58	59	57	51	49	46	43	36	63	63	60	55	53	50	47	41	65	64	60	56	54	51	48	42
4800	49	51	54	44	43	37	36	30	53	54	55	47	46	42	40	33	58	58	58	51	50	46	44	38	63	63	61	55	54	50	48	42	65	64	62	56	55	51	49	44

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 12	ERC	11	6	3	1	0	0	0	0
13		11	6	2	1	0	0	0	0
15		10	5	2	1	0	0	0	0
16		10	5	2	0	0	0	0	0

18DW-22DW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
400	44	38	34	29	25	19	14	9	47	41	37	32	27	21	15	9	50	45	40	36	31	24	17	10	54	49	44	41	35	27	20	12	55	50	45	42	36	28	21	13
600	50	43	36	32	27	22	17	12	52	46	39	35	30	24	18	12	53	49	43	39	34	28	21	14	57	53	47	43	39	32	24	17	58	54	48	44	40	33	25	17
800	55	44	38	34	29	25	19	14	56	47	41	37	32	27	21	15	57	50	45	40	36	31	24	17	60	54	49	44	41	35	27	20	60	55	50	45	42	36	28	21
1000	58	46	41	35	31	26	21	16	58	49	44	38	34	29	23	17	59	51	47	41	38	33	26	19	62	55	51	45	42	37	30	22	62	56	52	46	43	38	31	23
1200	59	50	43	36	32	27	22	17	60	52	46	39	35	30	24	18	61	54	49	43	39	34	28	21	63	57	53	47	43	39	32	24	63	58	54	48	44	40	33	25
1500	61	54	44	38	33	29	24	19	61	55	47	41	36	32	26	20	62	56	50	44	40	36	30	23	64	59	54	49	44	40	34	27	65	60	55	50	45	42	36	28
1800	62	57	44	39	34	30	25	20	62	58	47	42	37	33	28	22	64	58	50	46	41	37	32	25	65	61	54	50	45	42	36	29	66	61	55	51	46	43	38	30
2100	62	58	47	41	35	31	26	21	62	59	50	44	38	34	29	23	64	60	52	48	42	38	33	26	65	62	55	52	46	42	38	30	66	63	56	53	47	43	39	32
2400	62	59	50	43	36	32	27	22	62	60	52	46	39	35	30	24	64	61	54	49	43	39	34	28	65	63	57	53	47	43	39	32	66	63	58	54	48	44	40	33
3000	62	61	54	44	38	33	29	24	62	61	55	47	41	36	32	26	64	63	56	50	44	40	36	30	65	64	59	54	49	44	40	34	66	65	60	55	50	45	42	36
3600	62	62	57	44	39	34	30	25	62	62	58	47	42	37	33	28	64	64	58	50	46	41	37	32	65	65	61	54	50	45	42	36	66	66	61	55	51	46	43	38

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 18	ERC	8	4	2	0	0	0	0	0
20		8	4	1	0	0	0	0	0
22		7	3	1	0	0	0	0	0

IN LET SPE CIFIC SOUND POWER LEVELS IN DECI BELS RE FERRED TO 10⁻¹² WATTS (L_{wk})

24DW-27DW																																								
RPM	VP/SP = .05								VP/SP = .1								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
400	56	46	45	37	34	23	18	13	56	48	45	38	33	24	18	13	58	52	48	41	35	26	21	16	61	56	50	44	38	30	23	19	66	61	50	50	38	39	26	22
600	58	51	47	39	36	26	21	15	57	52	47	40	35	27	21	16	59	55	51	44	38	30	24	18	62	59	53	47	40	34	26	21	67	64	53	52	41	41	29	24
800	59	56	49	42	38	29	24	17	58	55	49	43	37	30	25	19	59	57	53	46	41	33	27	20	63	62	56	50	43	38	29	23	69	67	56	53	45	43	32	26
1000	60	60	50	44	40	33	28	19	59	59	51	45	41	34	28	20	58	59	55	48	43	37	30	22	63	64	58	52	46	40	32	25	70	70	60	54	49	45	35	27
1200	60	61	53	46	41	35	29	21	59	59	54	47	42	36	30	23	57	60	56	51	45	39	33	24	63	65	60	54	48	43	34	27	70	71	63	56	50	46	38	29
1500	59	62	56	47	42	38	31	24	58	60	57	49	44	40	32	25	56	60	58	53	47	41	35	27	62	65	62	56	50	45	37	29	68	71	66	58	51	48	41	31
1800	59	62	58	49	43	39	33	26	57	60	58	51	45	41	34	27	56	59	59	55	49	43	37	29	61	64	64	58	52	47	40	32	67	70	67	60	53	49	43	34
2100	59	62	60	51	45	41	35	28	57	60	59	53	48	43	36	30	56	59	60	57	51	46	40	32	61	64	65	60	54	49	43	35	67	70	70	62	56	51	46	37
2400	58	61	62	54	47	43	37	31	56	59	60	55	50	45	38	32	56	59	61	59	53	48	42	34	61	64	66	62	56	51	45	38	67	70	72	64	58	53	49	40
3000	57	60	63	56	48	44	38	33	56	59	62	57	51	46	40	34	56	59	62	61	55	50	44	37	61	64	67	64	58	52	47	40	68	71	74	68	60	55	51	43

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 24	ERC	9	5	2	1	0	0	0	0
27		8	4	1	0	0	0	0	0

30DW-81DW																																								
RPM	VP/SP = .05								VP/SP = .01								VP/SP = .2								VP/SP = .4								VP/SP = .8							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
200	35	30	26	20	14	10	5	1	39	35	31	24	18	13	7	2	44	40	36	30	23	17	11	5	48	44	41	35	28	21	14	8	50	46	44	37	30	23	16	10
400	39	35	30	26	20	14	10	5	43	39	35	31	24	18	13	7	48	44	40	36	30	23	17	11	52	48	44	41	35	28	21	14	54	50	46	44	37	30	23	16
600	35	41	32	29	23	17	13	8	39	45	36	34	28	22	16	11	43	49	41	39	34	27	21	15	47	54	45	43	39	31	25	18	50	56	47	46	42	34	27	20
800	37	39	35	30	26	20	14	10	40	43	39	35	31	24	18	13	44	47	44	40	36	30	23	17	48	52	48	44	41	35	28	21	50	54	50	46	44	37	30	23
1000	39	37	38	31	28	22	16	11	42	41	42	36	32	26	20	15	46	45	47	40	37	32	25	19	50	49	51	45	42	37	30	23	52	52	54	47	45	40	32	25
1200	41	35	41	32	29	23	17	13	43	39	45	36	34	28	22	16	47	43	49	41	39	34	27	21	52	47	54	45	43	39	31	25	54	50	56	47	46	42	34	27
1500	41	36	40	34	30	25	19	14	44	39	44	38	35	30	24	18	48	43	48	43	40	36	29	23	52	48	53	47	44	41	34	27	54	50	55	50	46	43	36	29
1800	41	38	38	37	31	27	21	15	44	41	42	41	35	31	25	19	48	45	46	45	40	37	31	24	52	49	51	50	44	42	36	29	54	51	53	52	47	44	38	31
2100	41	39	37	39	31	28	22	16	44	42	40	43	36	33	27	21	48	46	45	47	40	38	32	26	52	50	49	52	45	42	37	30	54	53	51	54	47	45	40	33
2400	41	41	35	41	32	29	23	17	44	43	39	45	36	34	28	22	48	48	43	49	41	39	34	27	52	52	47	54	45	43	39	31	54	54	50	56	47	46	42	34

SUB TRACT ERC VALUE FOR SIZE SE LECTED

	OCTAVE BAND	1	2	3	4	5	6	7	8
Size 30	ERC	5	2	1	0	0	0	0	0
33		5	2	0	0	0	0	0	0
37		4	2	0	0	0	0	0	0
40		4	1	0	0	0	0	0	0
49		3	1	0	0	0	0	0	0
54		2	1	0	0	0	0	0	0
60		2	1	0	0	0	0	0	0
66		2	0	0	0	0	0	0	0
77		2	0	0	0	0	0	0	0
81		1	0	0	0	0	0	0	0



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