

U.S. FAN INTERNATIONAL®

Industrial Fan USM Series Sound Power Levels



U.S. FAN INTERNATIONAL®

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**USS84A
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INTRODUCTION

This catalog is a supplement to catalog USC84 for Series USM fans.

This catalog uses procedures in accordance with AMCA Standards. Tests have been conducted using AMCA Standard 300, Figure #2, Fan Inlet Sound Testing. Sound power level ratings are in decibels, referred to 10^{-12} watts calculated per the 1991 ASHRAE Handbook, HVAC Applications, Section 42.7. Values shown are for inlet sound power levels (L_{wi}) for installation type 'C', ducted in let, free 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:

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

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. Because it is necessary that SP values be known at standard conditions in order to use catalog USC84, it is convenient to determine the VP/SP ratio at standard conditions using Table I. However, the acoustic energy (capacity fraction - L_{wf}) is a function of the SP at the actual operating conditions of the new fan. Therefore, use the SP corresponding to the actual operating conditions in Table II or you will obtain the wrong values of sound power.

SAMPLE CALCULATION

The sample calculation which follows is a continuation of the sample selection located in catalog USC84, Series USM fans.

A USMM37 fan must deliver 29,960 CFM ($14.14 \text{ m}^3/\text{s}$) at 6.0" wg (1490 Pa) SP, 500°F (260°C) and 2500 feet (762 m) elevation.

1. DETERMINE THE AERO DYNAMIC RATING

The aerodynamic rating is found using the procedures found in catalog USC84. The final rating at actual operating conditions is:

29,960 CFM ($14.14 \text{ m}^3/\text{s}$), 6.0" wg (1490 Pa) Static Pressure, 747 RPM, 45.7 HP (34.08 kW) 500°F (260°C), 2500 feet (762 m).

2. DETERMINE THE VP/SP RATIO

The inlet area for a USMM37 can be found in catalog USC84 or from Page 3 of this catalog. The inlet area is 7.22 ft^2 ($.6708 \text{ m}^2$).

$$\text{Inlet velocity} = \frac{29,960 (14.14 \text{ m}^3/\text{s})}{7.22 \text{ ft}^2 (.6708 \text{ m}^2)}$$

$$= 4150 \text{ ft/min (21.08 m/s)}$$

The SP at standard conditions is 12.0" wg (2980 Pa).

From Table I, for 4155 ft/min and 12" wg, the VP/SP is .09.

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

The static pressure at the actual operating conditions is 6.0" wg. From Table II, for 29,960 CFM and 6.0" wg, the L_{wf} is 60 dB.

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

For a USMM37 and a VP/SP of .09, by interpolation the values are:

OC TAVE BAND

BFI	1	2	3	4	5	6	7	8
1	39	39	35	34	31	28	22	20

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

OC TAVE BAND

	1	2	3	4	5	6	7	8
L_{wki}	39	39	35	34	31	28	22	20
L_{wf}	+60	60	60	60	60	60	60	60
L_{wo}	99	99	95	94	91	88	82	80

B. A USMM37 has 6 blades in the wheel. For a speed of 747 RPM, From Table III the BFI belongs in the First Octave Band.

C. Add the BFI to the Spectrum:

OC TAVE BAND

No.	1	2	3	4	5	6	7	8
L_{wi}	99	99	95	94	91	88	82	80
BFI	+1							
L_{wi}	100	99	95	94	91	88	82	80

dB re 10^{-12} Watts.

VP/SP RATIO TABLE I
Standard Conditions

Velocity	Static Pressure																																							
	1/4	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	20	22	24	26	28	30	32	34	36	38	40					
600	.09	.06	.04	.03	.03	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01																						
800	.16	.11	.08	.06	.05	.05	.04	.03	.03	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01																					
1000	.25	.17	.12	.10	.08	.07	.06	.05	.04	.03	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01																			
1200	.36	.24	.18	.14	.12	.10	.09	.07	.06	.04	.04	.03	.03	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01																	
1400	.49	.33	.24	.20	.16	.14	.12	.10	.08	.06	.05	.04	.03	.03	.03	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01											
1600	.64	.43	.32	.26	.21	.18	.16	.13	.11	.08	.06	.05	.05	.04	.04	.03	.03	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01								
1800	.81	.54	.40	.32	.27	.23	.20	.16	.13	.10	.08	.07	.06	.05	.04	.04	.03	.03	.03	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01					
2000	1.00	.67	.50	.40	.33	.29	.25	.20	.17	.12	.10	.08	.07	.06	.05	.05	.04	.04	.03	.03	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01			
2200		.80	.60	.48	.40	.34	.30	.24	.20	.15	.12	.10	.09	.08	.07	.06	.05	.05	.05	.04	.04	.03	.03	.03	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01			
2400		.96	.72	.57	.48	.41	.36	.29	.24	.18	.14	.12	.10	.09	.08	.07	.06	.06	.05	.04	.04	.04	.03	.03	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01			
2600			.84	.67	.56	.48	.42	.34	.28	.21	.17	.14	.12	.11	.09	.08	.07	.06	.06	.05	.05	.04	.04	.03	.03	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01			
2800			.98	.78	.65	.56	.49	.39	.33	.24	.20	.16	.14	.12	.11	.10	.09	.08	.07	.06	.05	.05	.04	.03	.03	.03	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01			
3000				.90	.75	.64	.56	.45	.37	.28	.22	.19	.16	.14	.12	.11	.10	.09	.08	.07	.06	.06	.05	.04	.04	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02	.01	.01			
3200				1.00	.85	.73	.64	.51	.43	.32	.26	.21	.18	.16	.14	.13	.12	.11	.10	.09	.08	.07	.06	.05	.05	.04	.04	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02			
3400					.96	.82	.72	.58	.48	.36	.29	.24	.21	.18	.16	.14	.13	.12	.11	.10	.09	.08	.07	.06	.05	.05	.04	.04	.03	.03	.03	.03	.02	.02	.02	.02	.02			
3600						.92	.81	.65	.54	.40	.32	.27	.23	.20	.18	.16	.15	.13	.12	.12	.10	.09	.08	.07	.06	.05	.04	.04	.04	.03	.03	.03	.03	.02	.02	.02	.02			
3800						.90	.72	.60	.45	.36	.30	.26	.23	.20	.18	.16	.15	.14	.13	.11	.10	.09	.08	.06	.06	.05	.05	.04	.04	.03	.03	.03	.03	.03	.03	.02	.02			
4000						1.00	.80	.67	.50	.40	.33	.29	.25	.22	.20	.18	.17	.15	.14	.12	.11	.10	.08	.07	.06	.06	.05	.05	.04	.04	.03	.03	.03	.03	.03	.03	.02			
4200							.88	.73	.55	.44	.37	.31	.28	.24	.22	.20	.18	.17	.16	.14	.12	.11	.09	.08	.07	.06	.06	.05	.05	.04	.04	.04	.03	.03	.03	.03	.03			
4400							.97	.80	.60	.48	.40	.34	.30	.27	.24	.22	.20	.19	.17	.15	.13	.12	.10	.09	.08	.07	.06	.05	.05	.04	.04	.04	.04	.03	.03	.03	.03			
4600								.88	.66	.53	.44	.38	.33	.29	.26	.24	.22	.20	.19	.16	.15	.13	.11	.09	.08	.07	.07	.06	.05	.05	.05	.05	.04	.04	.04	.03	.03			
4800								.96	.72	.57	.48	.41	.36	.32	.29	.26	.24	.22	.21	.18	.16	.14	.12	.10	.09	.08	.07	.07	.06	.06	.05	.05	.04	.04	.04	.04	.04			
5000									.78	.62	.52	.45	.39	.35	.31	.28	.26	.24	.22	.19	.17	.16	.13	.11	.10	.09	.08	.07	.06	.06	.06	.05	.05	.05	.04	.04	.04			
5200									.84	.67	.56	.48	.42	.37	.34	.31	.28	.26	.24	.21	.19	.17	.14	.12	.11	.09	.08	.08	.07	.06	.06	.06	.05	.05	.05	.04	.04			
5400										.91	.73	.61	.52	.45	.40	.36	.33	.30	.28	.26	.23	.20	.18	.15	.13	.11	.10	.09	.08	.08	.07	.06	.06	.06	.05	.05	.05			
5600									.98	.78	.65	.56	.49	.43	.39	.36	.33	.30	.28	.24	.22	.20	.16	.14	.12	.11	.10	.09	.08	.08	.07	.07	.06	.06	.05	.05	.05			
5800										.84	.70	.60	.52	.47	.42	.38	.35	.32	.30	.26	.23	.21	.17	.15	.13	.12	.10	.10	.09	.08	.07	.07	.06	.06	.06	.05	.05			
6000										.90	.75	.64	.56	.50	.45	.41	.37	.35	.32	.28	.25	.22	.19	.16	.14	.12	.11	.10	.09	.09	.08	.07	.07	.07	.06	.06	.06			

CAPACITY FRACTION (L_{wf}) TABLE II

CFM	Static Pressure at Operating Conditions																																							
	1/4	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	20	22	24	26	28	30	32	34	36	38	40					
	1/4	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	20	22	24	26	28	30	32	34	36	38	40					
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	46	47	48	48	49	50	50	51	51	52	52		
	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	48	49	50	51	51	52	52	53	53	54		
	200	11	14	17	19	21	22	23	25	27	29	31	33	34	35	36	37	38	39	40	41	42	43	45	46	47	48	49	50	51	51	52	53	53	54	54	55	55		
300	13	16	19	21	22	24	25	27	28	31	33	34	36	37	38	39	40	41	42	43	44	45	46	48	49	50	51	52	52	53	54	54	55	55	56	56	57	57		
	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	53	54	55	55	56	57	57	58	58	59	59		
	750	17	20	23	25	26	28	29	31	32	35	37	38	40	41	42	43	44	45	46	47	48	49	50	52	53	54	55	56	56	57	58	58	59	59	60	60	61		
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	56	57	58	58	59	60	60	61	61	62	62		
	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	58	59	59	60	61	61	62	62	63	64		
	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	59	60	61	61	62	63	64	64	65	65		
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	61	62	62	63	64	64	65	65	66	66	67		
	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	63	64	65	65	66	67	67	68	68	69		
	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	65	66	66	67	68	68	69	70	70	71		
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	66	67	68	68	69	70	70	71	71	72	72		
	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	68	69	70	71	72	72	73	73	74			
	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	69	70	71	71	72	73	73	74	74	75		
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	71	72	72	73	74	75	75	76	76	77			
	50000	35	38	41	43	44	46	47	49	51	53	55	57	58	59	60	61	62	63	64	65	66	67	69	70	71	72	73	74	75	75	76	77	77	78	78	79			
	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	75	76	76	77	78	78	79	80	80	81		
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	76	77	78	78	79	80	80	81	81	82	82		
	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	78	79	79	80	81	81	82	83	84			
	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	79	80	81	81	82	83	83	84	85			

TABLE III BLADE FREQUENCY INCREMENT(BFI)LOCATOR

NO. BLDS	FAN SPEED (RPM)				
4		1350	2700	5325	
5		1080	2160	4260	8520
6	M	900	1800	3550	7100
7		772	1543	3043	6086
8	MB	675	1350	2663	5325
9		600	1200	2367	4733
10		540	1080	2130	4260
11		491	982	1936	3873
12		450	900	1775	3550
	1	2	3	4	
OC TAVE BAND					

Example: A USMM37 Wheel has six blades. For a speed of 747 RPM, the BFI falls in the first Oc tave Band. A USMMB has eight blades. At 747 RPM the BFI falls in the second Oc tave Band.

SERIES USM FAN DATA												
Size	Wheel Diameter		INLET				OUTLET				# BLADES	
			DIA.		AREA		DIM		AREA		M/MR	A/MB
	IN	mm	IN	mm	FT ²	m ²	IN	mm	FT ²	m ²		
05	8 5⁄8	219	5	127	.136	.0126	4.750 4.250	121 108	0.14	.0130	6	8
07	12 1⁄4	311	7	178	.253	.0235	6.875 6.280	175 160	0.27	.0251	6	8
09	15 1⁄2	394	9	229	.360	.0334	8.560 7.870	217 200	0.43	.0399	6	8
11	19 3⁄8	486	11	279	.615	.0571	10.370 9.620	263 244	0.65	.0604	6	8
13	22 3⁄8	575	13	330	.869	.0807	12.180 11.370	309 289	0.92	.0855	6	8
15	26 3⁄8	664	15	381	1.16	.1078	14.310 12.870	363 327	1.23	.1143	6	8
17	29 3⁄8	752	17	432	1.51	.1403	16.310 14.500	414 368	1.58	.1468	6	8
19	33	838	19	483	1.87	.1737	18.060 16.370	459 416	1.96	.1821	6	8
21	36 1⁄2	927	21	533	2.29	.2127	19.810 18.120	503 460	2.41	.2239	6	8
23	40	1016	23	584	2.76	.2564	21.680 19.870	551 505	2.89	.2685	6	8
26	45 3⁄8	1146	26	660	3.55	.3298	24.310 22.370	617 568	3.68	.3419	6	8
29	50 1⁄2	1283	29	737	4.38	.4069	27.370 24.870	695 632	4.61	.4283	6	8
33	57 1⁄2	1461	33	838	5.72	.5314	31.060 28.500	789 724	5.98	.5556	6	8
37	64 3⁄8	1635	37	940	7.22	.6708	34.620 32.000	879 813	7.49	.6958	6	8
41	71 1⁄4	1810	41	1041	8.80	.8175	35.310 38.620	897 981	9.19	.8538	6	8
45	78 1⁄4	1988	45	1143	10.73	.9968	38.750 42.310	984 1075	11.07	1.028	6	8
49	85 1⁄4	2165	49	1245	12.76	1.185	42.125 46.125	1070 1172	13.15	1.222	6	8

In let Spe cific Sound Power Level w/o ERC (Lwki)

Size USMM05									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	47	51	52	51	44	43	36	28
.04	1	45	49	49	49	39	38	32	25
.08	1	47	51	52	51	42	41	34	28
.15	3	49	51	52	51	44	43	36	29
.30	5	51	54	54	54	46	45	38	33
.60	6	54	56	56	56	50	49	41	36
1.20	7	59	61	61	61	56	54	46	41
2.50	8	65	67	67	67	62	61	53	48
5.00	11	69	73	73	73	67	65	58	53

Size USMM19 - USMM49									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	39	39	35	34	31	28	22	20
.04	1	38	38	34	33	30	27	22	19
.08	1	39	39	35	34	31	28	22	20
.15	2	41	41	37	36	33	30	23	20
.30	3	44	43	43	41	38	35	28	24
.60	4	48	50	46	44	41	39	32	28
1.20	5	54	55	53	51	48	46	39	36
2.50	5	59	60	58	56	53	51	44	41
5.00	6	63	64	62	60	57	55	48	45

Size USMM07 - USMM11									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	41	42	43	43	41	39	33	29
.04	1	40	40	41	40	38	36	31	26
.08	2	41	42	43	42	40	38	32	28
.15	3	43	43	44	44	43	41	35	31
.30	3	45	46	47	47	45	44	39	34
.60	3	49	50	51	52	51	50	45	40
1.20	4	53	54	55	56	56	55	50	45
2.50	5	58	59	61	61	61	61	56	52
5.00	6	64	63	65	65	65	65	60	55

Size USMMR05									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	46	50	50	51	44	43	36	28
.04	1	44	48	48	49	39	38	32	25
.08	1	46	50	51	51	42	41	34	28
.15	3	48	50	51	51	44	43	36	29
.30	5	50	53	53	54	46	45	38	33
.60	6	53	55	55	56	50	49	41	36
1.20	7	58	60	60	61	56	54	46	41
2.50	8	64	66	66	67	62	61	53	48
5.00	11	68	72	72	73	67	65	58	53

Size USMM13 - USMM17									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	41	41	39	37	34	30	25	23
.04	1	40	40	38	35	31	28	23	20
.08	1	40	40	39	36	33	29	24	22
.15	2	42	42	41	39	37	33	26	23
.30	3	44	43	43	43	41	37	31	27
.60	4	48	48	47	47	46	43	37	33
1.20	4	55	55	54	53	52	49	43	39
2.50	5	60	60	59	58	57	54	48	44
5.00	6	64	64	63	62	61	58	52	48

Size USMMR07 - USMMR11									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	40	41	42	43	41	39	33	29
.04	1	39	39	40	40	38	36	31	26
.08	2	40	41	42	42	40	38	32	28
.15	3	42	42	43	44	43	41	35	31
.30	3	44	45	46	47	45	44	39	34
.60	3	48	49	50	52	51	50	45	40
1.20	4	52	53	54	56	56	55	50	45
2.50	5	57	58	61	61	61	61	56	52
5.00	6	63	62	64	65	65	65	60	55

Inlet Specific Sound Power Level w/o ERC (Lwki)

Size USMMR13 - USMMR17									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	40	40	38	37	34	30	25	23
.04	1	39	39	37	35	31	28	23	20
.08	1	39	39	38	36	33	29	24	22
.15	2	41	41	40	39	37	33	26	23
.30	3	43	42	42	43	41	37	31	27
.60	4	47	47	46	47	46	43	37	33
1.20	4	54	54	53	53	52	49	43	39
2.50	5	59	59	58	58	57	54	48	44
5.00	6	63	63	62	62	61	58	52	48

Size USMMB07 - USMMB11									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	4	40	42	42	42	41	37	29	25
.04	3	38	40	41	40	39	36	27	23
.08	4	40	42	42	42	41	37	29	25
.15	5	42	43	43	44	44	41	32	28
.30	6	45	46	46	47	48	47	38	32
.60	6	48	49	50	52	53	50	44	38
1.20	6	52	53	54	55	57	56	48	42
2.50	6	58	60	62	63	65	64	57	51
5.00	6	61	64	66	68	70	68	62	56

Size USMMR19 - USMMR49									
6 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	38	38	34	34	31	28	22	20
.04	1	37	37	33	33	30	27	22	19
.08	1	38	38	34	34	31	28	22	20
.15	2	40	40	36	36	33	30	23	20
.30	3	44	42	42	41	38	35	28	24
.60	5	52	49	45	44	41	39	32	28
1.20	5	53	54	52	51	48	46	39	36
2.50	5	58	59	57	56	53	51	44	41
5.00	6	62	63	61	60	57	55	48	45

Size USMMB13 - USMMB17									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	3	41	41	40	38	37	33	27	24
.04	3	39	39	38	36	33	28	24	20
.08	3	41	41	40	38	35	30	26	22
.15	3	41	41	40	38	36	32	28	23
.30	4	43	45	45	45	43	39	32	26
.60	4	46	49	49	49	48	45	38	32
1.20	4	52	54	54	55	54	50	45	39
2.50	5	57	59	59	60	59	55	50	44
5.00	5	61	63	63	64	63	59	54	49

Size USMMB05									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	4	46	50	50	50	43	40	31	25
.04	3	43	49	49	49	40	38	28	22
.08	4	46	50	50	50	43	40	31	25
.15	5	48	51	51	51	45	43	33	26
.30	6	47	50	49	49	43	42	31	25
.60	6	54	55	55	54	48	45	34	31
1.20	6	58	60	60	60	57	55	44	38
2.50	7	65	68	68	69	66	64	54	47
5.00	8	66	74	70	74	72	68	60	54

Size USMMB19 - USMMB49									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	3	40	40	37	36	33	30	24	21
.04	3	38	38	34	33	29	25	22	18
.08	3	40	40	36	35	32	29	23	20
.15	4	41	41	38	37	34	30	25	20
.30	4	47	45	43	41	38	33	27	22
.60	5	50	47	47	45	42	38	31	27
1.20	5	51	51	50	48	45	40	35	30
2.50	6	56	56	55	53	50	45	38	34
5.00	6	60	60	59	57	54	49	42	38

Inlet Specific Sound Power Level w/o ERC (Lwki)

Size USMA05									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	45	49	50	49	42	41	34	26
.04	1	43	47	47	47	37	36	30	24
.08	1	45	49	50	49	40	39	32	26
.15	1	47	49	50	49	42	41	34	27
.30	2	49	52	52	52	44	43	36	31
.60	3	52	54	54	54	48	47	39	34
1.20	4	57	59	59	59	54	52	44	39
2.50	4	63	65	65	65	60	59	51	46
5.00	5	67	71	71	71	65	63	56	51

Size USMA13 - USMA17									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	39	40	34	31	27	25	21	18
.04	0	37	39	32	29	25	23	19	16
.08	0	39	40	34	31	27	25	21	18
.15	0	41	42	37	33	29	27	23	20
.30	1	43	44	41	36	33	32	28	25
.60	2	44	47	43	39	36	37	33	31
1.20	3	49	52	46	43	40	41	37	35
2.50	4	53	56	50	47	44	45	42	40
5.00	4	57	60	54	51	48	49	46	44

Size USMA07 - USMA11									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	39	40	41	41	39	37	31	27
.04	0	38	38	39	38	36	34	29	24
.08	0	39	40	41	41	39	37	31	27
.15	0	41	41	42	42	41	39	33	29
.30	1	43	44	45	45	43	42	37	32
.60	2	47	48	49	50	49	48	43	38
1.20	3	51	52	53	54	54	53	48	43
2.50	4	56	57	58	58	58	58	54	50
5.00	4	62	61	63	63	63	63	58	53

Size USMA19 - USMA49									
8 BLADES		OCTAVE BAND							
VP/SP	BFI	1	2	3	4	5	6	7	8
.02	2	40	41	34	30	29	26	22	19
.04	0	39	40	33	29	27	24	19	17
.08	0	40	40	34	30	29	26	21	18
.15	1	43	43	36	31	31	29	22	18
.30	1	43	44	39	34	34	32	26	22
.60	2	48	48	42	38	38	36	30	26
1.20	3	53	54	48	43	43	42	36	31
2.50	4	57	59	53	47	48	47	42	37
5.00	4	61	63	57	51	52	51	46	41



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