

AEROVENT

SOUND POWER LEVELS

PLENUM FANS

MODEL CPLF, CPLFN, CPLQ, and CPLQN



Aerovent, A Twin City Fan Company, certifies that the Model CPLFN, CPLF, CPLQN and CPLQ Plenum 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.

Air performance ratings for models CPLFN, CPLF, CPLQN and CPLQ can be found in Catalog 735.



These sound power levels have been determined by laboratory tests in accordance with AMCA Standard 300-96. The sound power levels shown are decibel (dB) levels referred to 10^{-12} watts calculated per AMCA Standard 301. We have listed inlet and outlet values for eight octave bands with frequency ranges 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
	63	125	250	500	1000	2000	4000	8000

Sound power levels (SPL) for the fans can be easily obtained using the Aerovent Selector Program. The SPL can also be obtained using the specific sound power level method described below:

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

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

Calculate inlet sound power levels for:
 Size 365 CPLFN
 CFM 20,910
 SP 3.14" w.g.
 RPM 1000 RPM

1. How to determine L_{wk}

We have published values for L_{wk} at various speeds and operating points on pages 3 through 18 for both the inlet and outlet of the fan.

The operating point is found by using a ratio of design CFM to the wide open volume (WOV) for a given RPM. The WOV can be calculated by multiplying fan RPM by the factors (Rf) shown in the table.

SIZE	Rf FACTOR				SIZE	Rf FACTOR			
	CPLFN	CPLF	CPLQN	CPLQ		CPLFN	CPLF	CPLQN	CPLQ
122	0.973	0.926	0.942	0.920	365	29.87	29.60	29.36	27.93
150	1.407	1.339	1.362	1.330	402	40.05	39.70	39.37	37.45
165	2.004	1.907	1.940	1.894	445	54.12	53.65	53.21	50.61
182	3.790	3.560	3.526	3.419	490	72.26	71.62	71.04	67.57
200	4.988	4.685	4.641	4.500	542	98.06	97.20	96.41	91.70
222	7.044	6.812	6.499	6.390	600	132.67	131.50	130.42	124.06
245	9.167	8.739	8.839	8.534	660	176.58	175.02	173.60	165.12
270	12.19	11.76	11.67	11.29	730	238.94	236.82	234.90	223.43
300	16.77	16.26	16.23	15.72	807	323.40	320.54	317.93	302.42
330	22.32	21.64	21.60	20.92	890	433.00	429.17	425.67	404.90

Thus, WOV for 1000 RPM = $29.87 \times 1000 = 29,870$ CFM.

Therefore, the operating point falls at 70% WOV ($20,910 \div 29,870 \times 100\%$). Referring to the table on page 6 for Size CPLFN 365, the **specific** sound power levels can be read as follows:

L_{wk} inlet =	36	42	35	27	28	22	15	10
L_{wk} outlet =	35	39	36	33	33	28	21	15

2. How to determine M

The value of M can be taken from the table on page 19, or M can be calculated by:

$$M = 10 \log_{10} (\text{CFM}) + 20 \log_{10} \text{TP. For plenum fans, use SP for TP.}$$

Thus, for 20,910 CFM and 3.14" 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} =	36	42	35	27	28	22	15	10
M =	53	53	53	53	53	53	53	53
SPL at inlet =	89	95	88	80	81	75	68	63
L_{wk} =	35	39	36	33	33	28	21	15
M =	53	53	53	53	53	53	53	53
SPL at outlet =	88	92	89	86	86	81	74	68

