# Plenum / Plug Fans



AFPF108

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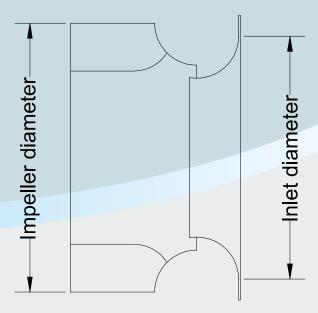
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Performance Curves	Impeller Dia (mm)	Inlet Dia (mm)
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# AIR FLOW AIR SO 9001:2008 Company

## **Company Profile**

**We** "Efforts combined with a sincere selfless commitment and continuous pursuance of excellence Translate into Success;"

At Air Flow, these 4 decades of existence have been an endless process of attaining 'Success' with enhancing capabilities, consolidating commitment and cementing faith in quality and innovation. Right from the inception in 1973, we have been leaders in manufacturing, Exporting and importing Air Terminal Products, Air Distribution Products, Smoke/Fire Damper, Jet Fans Axial Flow Fans, Centrifugal Fans, Flexible Duct Connectors, Jet Nozzles and Louvers through this long duration of time. The way we're empowering our product line and winning laurels from our clients world over by continuously improving upon our existing set on skills, technology, and range, we are poised to set more and more landmarks globally in the future.

Being in the good books of architects, consultants, contractors and builders is one of the key assets we cherish from the core of our heart. Yet again, it's the idea of giving this best and always raising the bar of standards high that propel us towards accomplishing what many think impossible. Fire Rating for Axial Flow Fans & Jet Fans, truly stands the acknowledgment of the most powerful characteristic of the Company as ever.

Air Flow has a team of hard core professionals who believe in 'just make it happen' Our tremendous growth over the year speaks volumes about our professional integrity and never-say—die spirit. Surely, at Air Flow we understand the importance of staying self-motivated and determined to make a difference through what we do'

AFPL:A57: C15 February 2017

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# An ISO 9001:2008 Company

#### Introduction



Air Flow Pvt Ltd certifies that the Plenum / Plug Fans Model AFPF108 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.

#### **Features**

- a) High efficiency
- b) Quality raw materials
- c) Versatile construction
- d) Direct or Belt Driven
- e) Long life finish

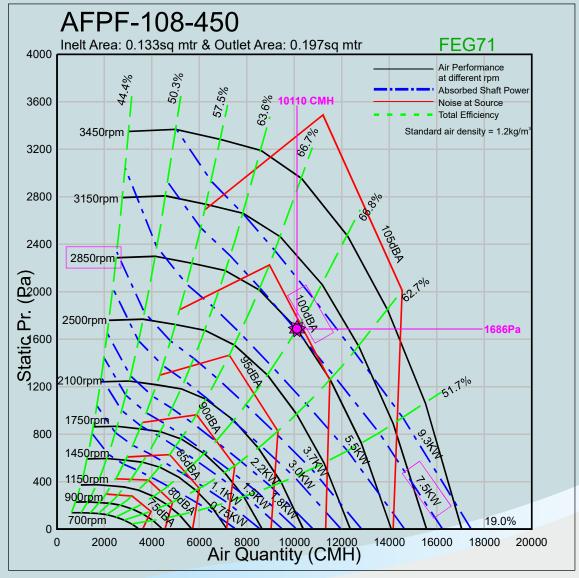
#### **Typical application**

- a) General ventilation
- b) Emergency heat and smoke exhaust stairwell & pressurization
- c) Parking & basement ventilation
- d) Industrial processes Ventilation
- e) Tunnel ventilation
- f) Generator room ventilation
- g) Wide range of volumes.
- h) Minimum operating cost per cubic meter of space.
- I) Minimum space and weight



## **Example Graph**

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Example: AFPF-108-450

Desired point: 10110CMH, 1686 (Pa) Static Pressure

#### **How to determine RPM:**

- 1. Plot your desired point on graph of Fan Model.
- 2. Interpolate RPM scale (Black curve) of desired duty point (2850rpm)
- 3. Interpolate Fan BKW (Blue curve) of desired duty point (7.57KW)
- 4. Interpolate Noise at source in dBA (Red curve) of desired duty point (100dBA)
- 5. Interpolate Total Efficiency (Green curve) of desired duty point (66.8%)



#### **Calculation for Loudness in Fan Sones**

All fan sone values shall be calculated by the following method (based on ANSI S3.4-1980 (R1992) *Procedure for the Computation of Loudness of Noise*).

For each octave band, convert the measured sound power levels from the outlet in decibels (re  $1.0 \times 10-12$  W) to sound pressure level at a distance of 1524 mm (5 ft) from the acoustic center of the fan in a hemispherical free field, using the following formula:

Lp = Lwmo(dB) - 11.5

Find the loudness index for each octave band sound pressure level in Table 4. Add these loudness indices; multiply this sum by 0.3. Add 0.7 times the highest *s* value to this to obtain the total loudness, *S*, in sones.

S = 0.3 (s1 + s2 + s3 + ... + s8) + 0.7 sm

Where:

S = total fan sones

s = octave band loudness index number

sm = highest octave band loudness index number

(Reference AMCA Standard 301)



#### **Fan Laws**

$$\begin{split} & \text{CMH}_2 = \text{CMH}_1 \times \ \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^1 \times \ \left(\frac{D_2}{D_1}\right)^3 \times \left(\frac{d_2}{d_1}\right)^0 \\ & \text{SP}_2 = \text{SP}_1 \times \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^2 \times \left(\frac{D_2}{D_1}\right)^2 \times \left(\frac{d_2}{d_1}\right)^1 \\ & \text{BKW}_2 = \text{BKW}_1 \times \ \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^3 \times \left(\frac{D_2}{D_1}\right)^5 \times \left(\frac{d_2}{d_1}\right)^1 \end{split}$$

**CMH** - Air quantity in Cubic Meter per Hour

SP - Static Pressure in mm WG

**BKW** - Fan Brake Kilowatt

**RPM** - Fan revolution per minute

**D** - Fan diameter

**d** - Density of air Standard air density = 1.2kg/m<sup>3</sup>

At higher than standard elevations and temperatures, air density will be lower than standard.

1 - Initial State2 - Final State

#### To calculate:

Total Pressure = static pressure + velocity Pressure

Velocity Pressure (Pa) =  $\frac{1}{2}$  x d (density of air kg/m3 x (Fan Outlet velocity m/s)2

Fan outlet Velocity  $(m/s) = CMH \div Duct area (sq. mtr) \div 3600$ 

Tip speed (m/s) =  $\pi$  x fan diameter (mtr) x fan rpm  $\div$  60

Total efficiency  $\acute{\eta}$  % =  $\frac{CMS \times Total \ Pressure \ (mm \ WG)}{102 \times BKW}$ 

#### Velocity

Feet/Min. (fpm)	Meter/Sec (mps)	Meters/Min. (mpm)	Meters/Hr. (mph)
1.0	0.00508	0.3048	18.288
60.0	0.3038	18.228	1093.7
80.0	0.4	26.822	1609.4
196.85	1.0	60.0	3600.0
3.2808	0.0167	1.0	60.0
0.05468	0.000267	0.01667	1.0

#### **Volume Flow Rates:**

Volume Flow Nati	<b>cs.</b>	
Cubic Ft./Min (CFM)	Cubic Meter/Sec. (M3/S)	Cubic Meters/Hr. (M3/Hr.)
1.0	0.000472	1.699
0.01667	0.00000787	0.02832
2118.9	1.0	3600.0
35.315	0.01667	60.0
0.58858	0.00028	1.0
2.1189	0.001	3.6

#### MISCELLANEOUS CONVERSION FACTORS

LENGTH		AREA	
1 in	= 2.54 cm	1 in <sup>2</sup>	$= 6.4516 \text{ cm}^2$
1 ft	= .348 m	1 Ft <sup>2</sup>	= .0929 m <sup>2</sup>
1 yd	= .9144 m	$1 \text{ yd}^2$	= .8381 m <sup>2</sup>
1 mi	= 1.6093 km	1 mi <sup>2</sup>	= 2.5899 Km <sup>2</sup>
1 nau. mi	= 1.1516 mi		
POWER			HEAT
1 hp =	.746 KW	1 Btu	= 777.97 Ft-lb
	550 ft-lh/sec	1 hp	= 2545 Btu/hr

1 hp = .746 KW 1 Btu = 777.97 Ft-lb 1 hp = 550 ft-lb/sec 1 hp = 2545 Btu/hr 1 hp = 33000 ft-lb/min 1 hp = 1.014 metric hp 1 hp = 75.00 kg-m/sec 1 hp = .0761 boiler hp 1 hpm = 75.00 kg-m/sec 1 kw = 3414 Btu/hr 1 Ton = 12000 Btu/hr

DENSITY

 $1 \text{ lb/ft}^3 = 16.018 \text{ kg/m}^2$ 

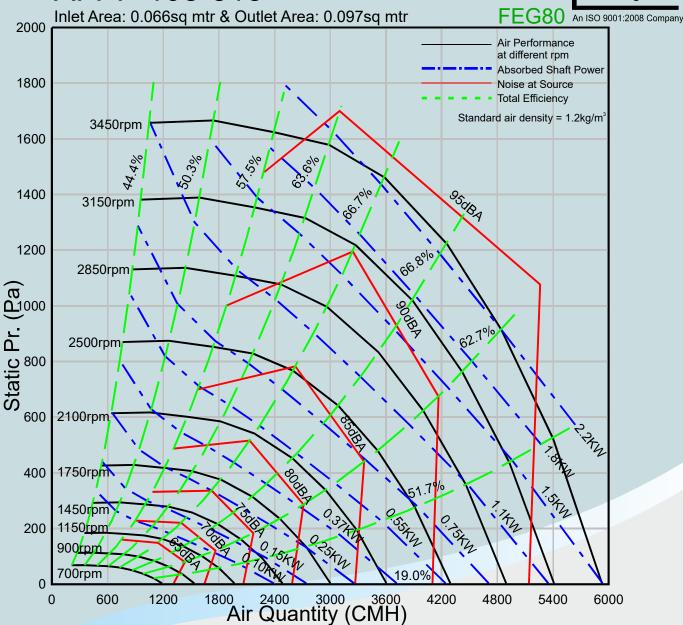
**TIP SPEED** 

1 fpm = .0051 m/s

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#### AFPF-108-315



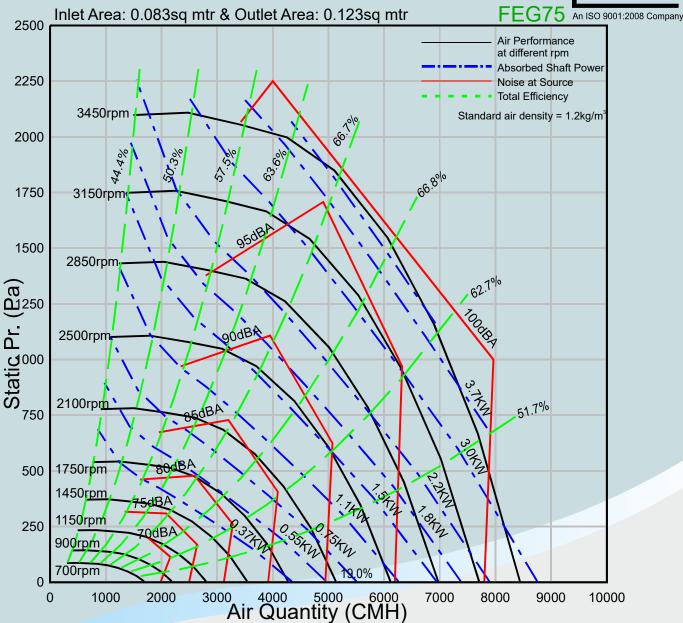
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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
4900	0	2850	0.841	61	63	77	85	86	87	90	87	94	45
4005	623	2850	1.240	59	59	71	78	82	83	85	79	89	31
2962	997	2850	1.275	58	63	72	79	80	83	83	76	88	29
1981	1108	2850	1.070	64	75	82	86	86	86	80	73	91	33

## AFPF-108-355



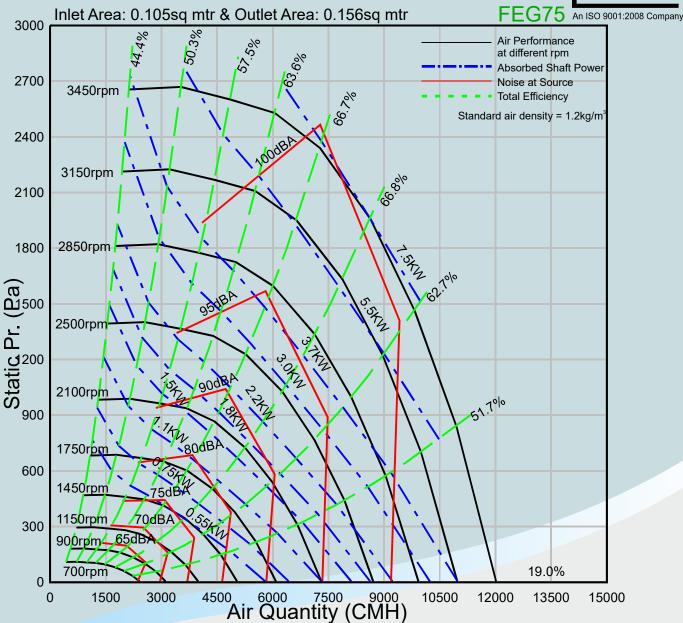
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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
6977	0	2850	1.516	66	67	82	89	90	91	94	91	98	58
5702	789	2850	2.235	63	63	75	82	86	87	89	83	93	40
4218	1262	2850	2.298	62	67	75	83	84	87	87	80	92	36
2820	1402	2850	1.928	68	79	87	90	90	90	84	77	95	42

## AFPF-108-400



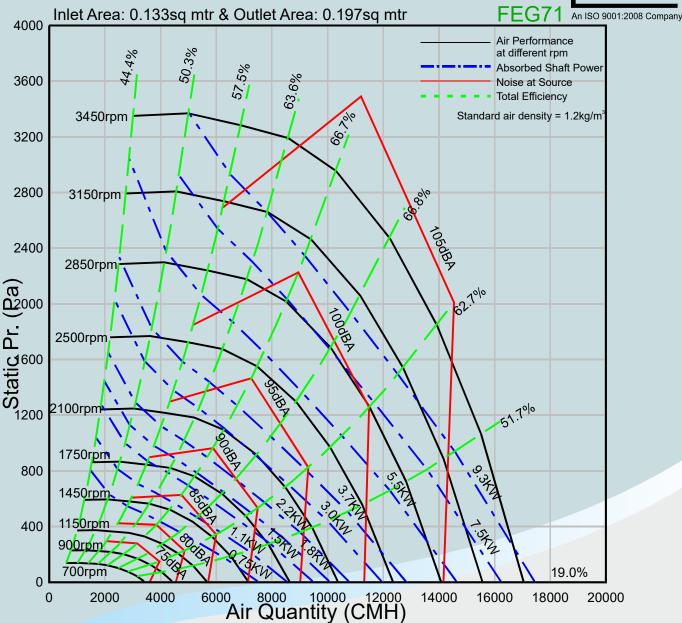
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СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
9934	0	2850	2.731	70	71	86	93	93	94	97	94	101	75
8118	999	2850	4.027	68	68	79	86	90	91	93	87	96	51
6005	1597	2850	4.140	67	72	79	87	88	91	91	84	95	46
4016	1774	2850	3.475	73	83	91	94	93	93	87	80	99	54

#### AFPF-108-450



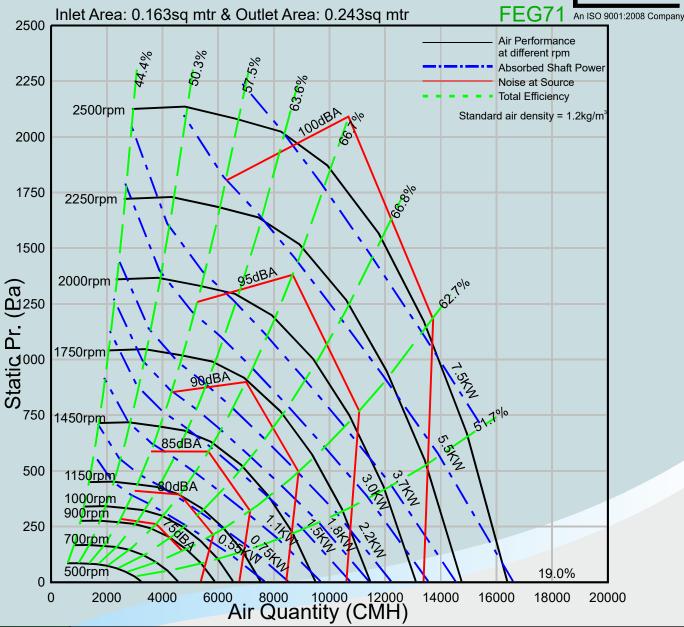
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СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
7167	0	1450	0.644	46	65	74	79	82	86	85	82	90	34
5857	326	1450	0.949	43	58	68	75	78	81	78	72	85	22
4333	522	1450	0.976	47	58	69	73	78	79	75	68	83	20
2897	580	1450	0.819	58	70	75	79	81	76	71	64	84	22

## AFPF-108-500



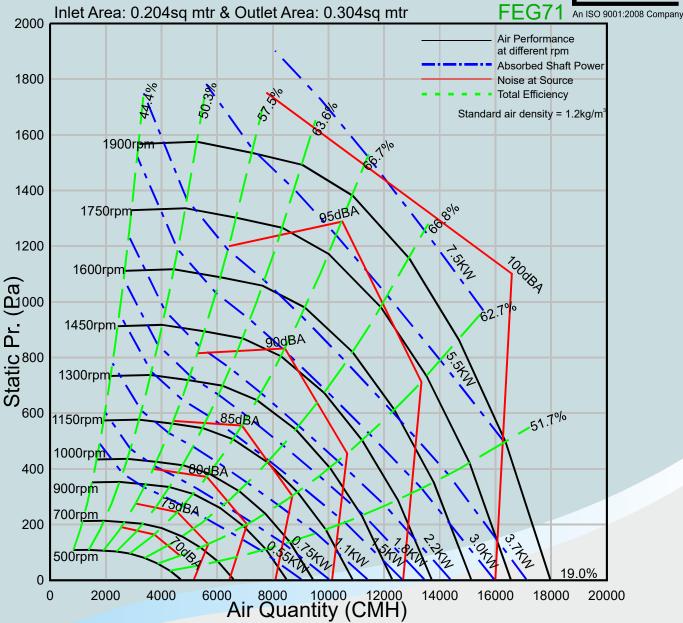
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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
9799	0	1450	1.084	50	68	78	82	85	89	88	85	93	42
8008	402	1450	1.598	47	62	71	78	82	84	81	74	88	26
5924	643	1450	1.644	51	62	72	77	82	83	78	71	86	24
3961	714	1450	1.379	62	74	79	82	84	79	74	67	88	27

#### AFPF-108-560

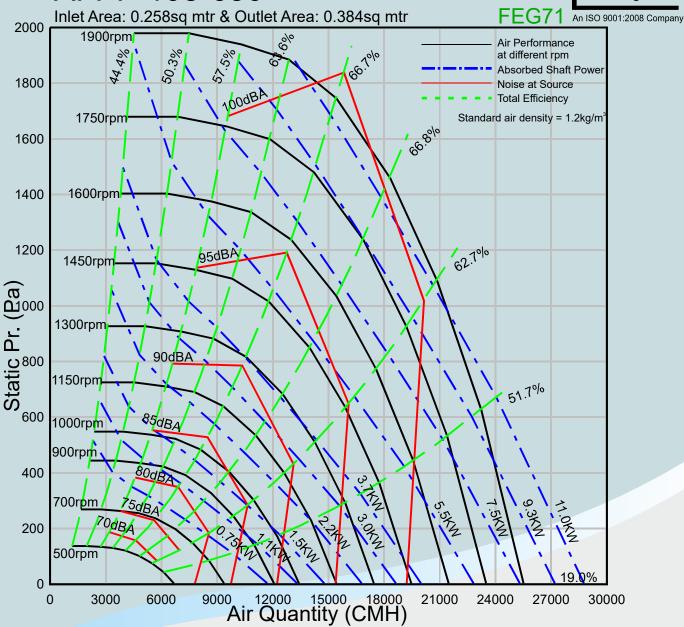


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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
13722	0	1450	1.900	54	73	82	86	89	93	92	89	97	52
11214	503	1450	2.802	51	66	75	82	85	88	84	78	91	33
8296	805	1450	2.881	55	66	76	80	85	86	81	74	90	30
5547	894	1450	2.481	66	78	83	86	87	83	78	71	91	33

## AFPF-108-630



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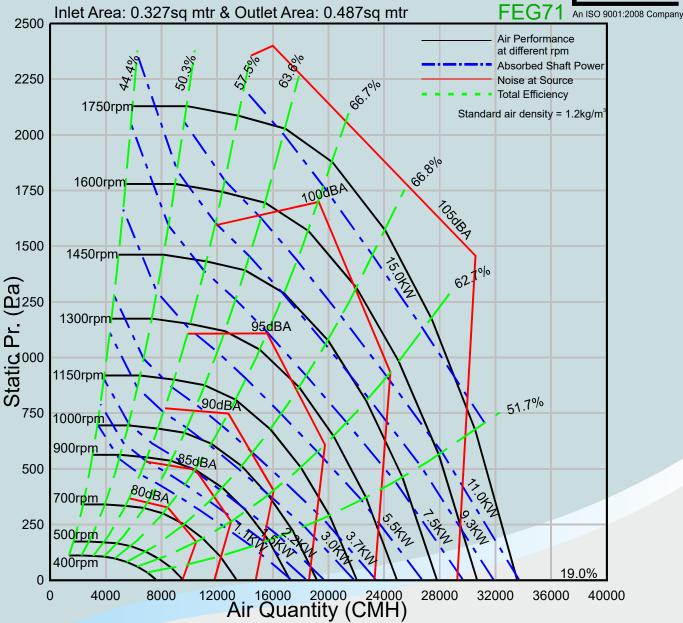
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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW				Loudness						
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
19481	0	1450	3.408	59	77	86	89	92	96	95	92	100	67
15920	635	1450	5.025	55	70	79	86	89	91	88	82	95	41
11777	1016	1450	5.167	59	70	80	84	89	90	84	78	93	37
7875	1129	1450	4.336	71	82	87	90	91	86	81	74	95	41

#### AFPF-108-710



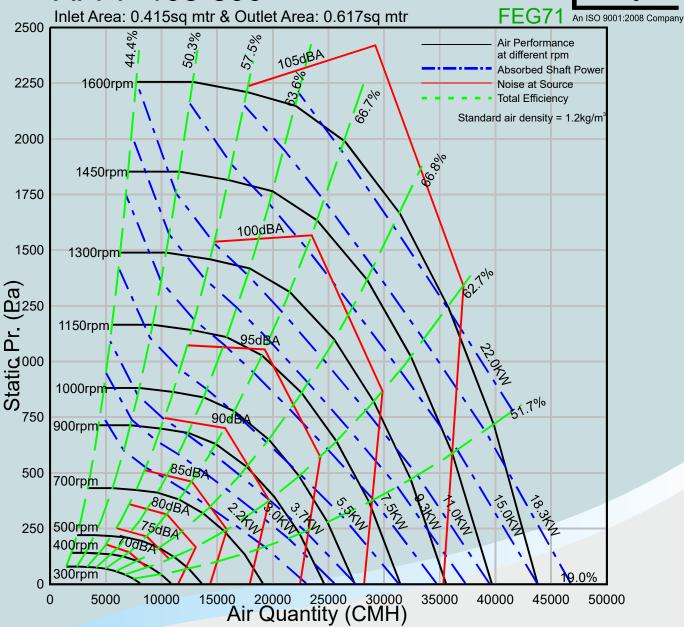
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Performance certified is for installation type A - Free inlet, Free Outlet. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

СМН	St Pr.	RPM	BKW		Sound Power Levels A-weighted (LwoA) - dB								Loudness
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
27810	0	1450	6.186	63	81	89	93	96	100	99	96	104	87
22727	806	1450	9.094	60	74	83	89	92	95	91	85	99	53
16812	1289	1450	9.351	64	74	84	88	92	93	88	81	97	47
11242	1431	1450	7.848	75	86	90	93	95	90	85	78	99	53

#### AFPF-108-800



WORLDWIDE CERTIFIED RATINGS
SOUND AIR PERFORMANCE FEG.

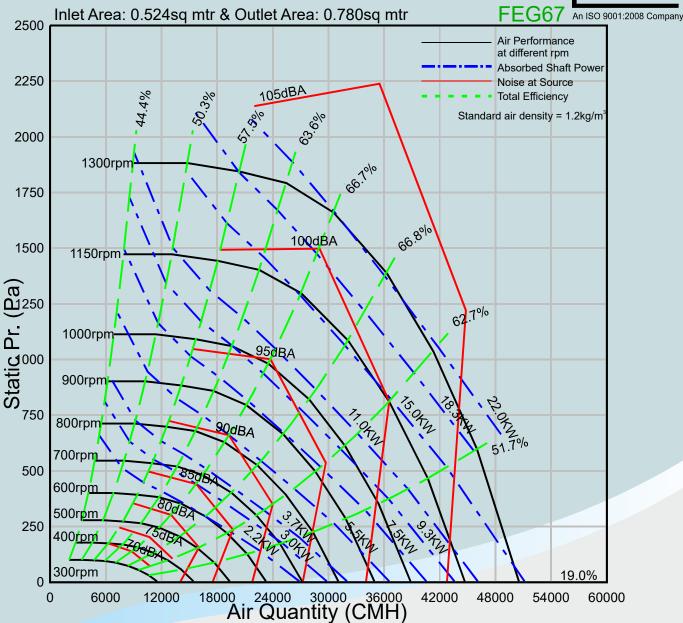
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СМН	St Pr.	RPM	BKW		Sound Power Levels A-weighted (LwoA) - dB								
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
24635	0	900	2.688	60	75	81	86	91	92	91	88	97	53
20132	393	900	3.934	54	68	76	83	87	86	82	76	91	30
14892	629	900	4.045	55	69	75	82	85	83	78	71	89	27
9958	699	900	3.395	67	76	81	86	84	80	75	68	89	29

## AFPF-108-900



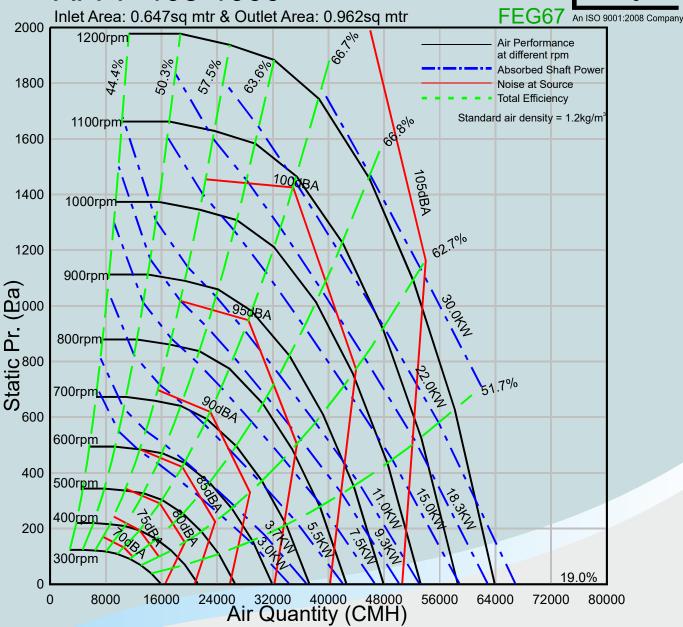
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СМН	St Pr.	RPM	BKW		Sound Power Levels A-weighted (LwoA) - dB								
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
35003	0	900	4.792	64	79	85	90	95	96	95	92	101	68
28606	497	900	7.065	58	72	80	86	90	89	85	79	94	38
21160	795	900	7.264	60	73	79	85	89	87	82	75	92	34
14150	883	900	6.096	71	80	85	89	88	83	78	71	93	36

#### AFPF-108-1000



SOUND PERFORMANCE FEG

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СМН	St Pr.	RPM	BKW		Sound Power Levels A-weighted (LwoA) - dB								
	(Pa)			63	125	250	500	1000	2000	4000	8000	Overall	in Sones
47936	0	900	8.092	68	83	88	93	98	99	98	95	104	85
39175	613	900	11.932	62	76	84	89	94	93	89	83	97	47
28979	981	900	12.268	64	77	83	89	92	90	85	78	96	41
19378	1089	900	10.296	75	84	89	92	91	87	82	75	96	45





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