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Performance Curves

<table>
<thead>
<tr>
<th>Page</th>
<th>Model</th>
<th>Impeller Dia (mm)</th>
<th>Inlet Dia (mm)</th>
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<tbody>
<tr>
<td>Page8</td>
<td>AFPF-108-315</td>
<td>320mm</td>
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<td>AFPF-108-355</td>
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<td>Page18</td>
<td>AFPF-108-1000</td>
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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.”
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

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 × 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:

\[ Lp = Lw_{mo}(dB) - 11.5 \]

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.

\[ S = 0.3 (s_1 + s_2 + s_3 + \ldots + s_8) + 0.7 \text{sm} \]

Where:
- \( S \) = total fan sones
- \( s \) = octave band loudness index number
- \( \text{sm} \) = highest octave band loudness index number

(Reference AMCA Standard 301)
### Fan Laws

\[
\text{CMH}_2 = \text{CMH}_1 \times \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^1 \times \left(\frac{D_2}{D_1}\right)^3 \times \left(\frac{d_2}{d_1}\right)^{0.6}
\]

\[
\text{SP}_2 = \text{SP}_1 \times \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^2 \times \left(\frac{D_2}{D_1}\right)^2 \times \left(\frac{d_2}{d_1}\right)^{1.5}
\]

\[
\text{BKW}_2 = \text{BKW}_1 \times \left(\frac{\text{RPM}_2}{\text{RPM}_1}\right)^{3} \times \left(\frac{D_2}{D_1}\right)^{5} \times \left(\frac{d_2}{d_1}\right)^{0.8}
\]

- **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: 1.2 kg/m³)

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

1 - Initial State
2 - Final State

**To calculate:**

- Total Pressure = static pressure + velocity Pressure
- Velocity Pressure (Pa) = \(\frac{1}{2} \times d \times \text{density of air kg/m}^3 \times \text{(Fan Outlet velocity m/s)}^2\)
- Fan outlet Velocity (m/s) = \(\text{CMH} \div \text{Duct area (sq. mtr)} \div 3600\)
- Tip speed (m/s) = \(\pi \times \text{fan diameter (mtr)} \times \text{fan rpm} \div 60\)

**Total efficiency η % =**

\[
\frac{\text{CMS} \times \text{Total Pressure (mm WG)}}{102 \times \text{BKW}}
\]

### Velocity

<table>
<thead>
<tr>
<th>Feet/Min. (fpm)</th>
<th>Meter/Sec (mps)</th>
<th>Meters/Min. (mpm)</th>
<th>Meters/Hr. (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>0.00508</td>
<td>0.3048</td>
<td>18.288</td>
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<tr>
<td>60.0</td>
<td>0.3038</td>
<td>18.228</td>
<td>1093.7</td>
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<tr>
<td>80.0</td>
<td>0.4</td>
<td>26.822</td>
<td>1609.4</td>
</tr>
<tr>
<td>196.85</td>
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<td>3600.0</td>
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<td>3.2808</td>
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<tr>
<td>0.05468</td>
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<td>0.01667</td>
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### Volume Flow Rates:

<table>
<thead>
<tr>
<th>Cubic Ft./Min (CFM)</th>
<th>Cubic Meter/Sec. (M3/S)</th>
<th>Cubic Meters/Hr. (M3/Hr.)</th>
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<tr>
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<td>2.1189</td>
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### MISCELLANEOUS

#### CONVERSION FACTORS

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<th>LENGTH</th>
<th>AREA</th>
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<tbody>
<tr>
<td>1 in = 2.54 cm</td>
<td>1 in² = 6.4516 cm²</td>
</tr>
<tr>
<td>1 ft = .348 m</td>
<td>1 Ft² = .0929 m²</td>
</tr>
<tr>
<td>1 yd = .9144 m</td>
<td>1 yd² = .8381 m²</td>
</tr>
<tr>
<td>1 mi = 1.6093 km</td>
<td>1 mi² = 2.5899 Km²</td>
</tr>
<tr>
<td>1 nau. mi = 1.1516 mi</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER</th>
<th>HEAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 hp = .746 KW</td>
<td>1 Btu = 777.97 Ft-lb</td>
</tr>
<tr>
<td>1 hp = 550 ft-lb/sec</td>
<td>1 hp = 2545 Btu/hr</td>
</tr>
<tr>
<td>1 hp = 33000 ft-lb/min</td>
<td>1 hp = 1.014 metric hp</td>
</tr>
<tr>
<td>1 hp = 76.04 kg-m/sec</td>
<td>1 hp = .0761 boiler hp</td>
</tr>
<tr>
<td>1 hpm = 75.00 kg-m/sec</td>
<td>1 kw = 3414 Btu/hr</td>
</tr>
<tr>
<td>1 Ton = 12000 Btu/hr</td>
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</table>

<table>
<thead>
<tr>
<th>DENSITY</th>
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<tbody>
<tr>
<td>1 lb/ft³ = 16.018 kg/m³</td>
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</table>

<table>
<thead>
<tr>
<th>TIP SPEED</th>
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</thead>
<tbody>
<tr>
<td>1 fpm = .0051 m/s</td>
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</table>
AFPL:A57: C15 February 2017

AFPF-108-315

Inlet Area: 0.066sq mtr & Outlet Area: 0.097sq mtr

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.

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 LwaO sound power level for Installation Type A: free inlet, free outlet.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
AFPF-108-355
Inlet Area: 0.083sq mtr & Outlet Area: 0.123sq mtr

Air Flow Pvt Ltd certifies that the Plenum / Plug Fans Model AFPF 108 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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

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.
The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for Installation Type A: free inlet, free outlet.

<table>
<thead>
<tr>
<th>CMH</th>
<th>St Pr. (Pa)</th>
<th>RPM</th>
<th>BKW</th>
<th>Sound Power Levels A-weighted (LwoA) - dB</th>
<th>Overall in Sones</th>
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<tbody>
<tr>
<td>7167</td>
<td>0</td>
<td>1450</td>
<td>0.644</td>
<td>63</td>
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<tr>
<td>5857</td>
<td>326</td>
<td>1450</td>
<td>0.949</td>
<td>46</td>
<td>65</td>
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<td>4333</td>
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<td>58</td>
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<td>2897</td>
<td>580</td>
<td>1450</td>
<td>0.819</td>
<td>58</td>
<td>70</td>
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</table>

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.

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.
The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for Installation Type A: free outlet hemispherical sone levels.
AFPF-108-560
Inlet Area: 0.204 sq mtr & Outlet Area: 0.304 sq mtr

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301. Values shown are for outlet LwoA sound power level for Installation Type A: free inlet, free outlet.

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.

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.

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The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
Air Quantity (CMH)

Inlet Area: 0.258sq mtr & Outlet Area: 0.384sq mtr

AFPF-108-630

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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
AFPF-108-900
Inlet Area: 0.524sq mtr & Outlet Area: 0.780sq mtr

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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.
Air Performance at different rpm
Absorbed Shaft Power
Noise at Source
Total Efficiency

Standard air density = 1.2kg/m³

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.

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.

The sound ratings shown are loudness values in fan sones at a distance of 1.5m (5 ft) in a hemispherical free field calculated per AMCA International Standard 301, Values shown are for Installation Type A: free outlet hemispherical sone levels.