

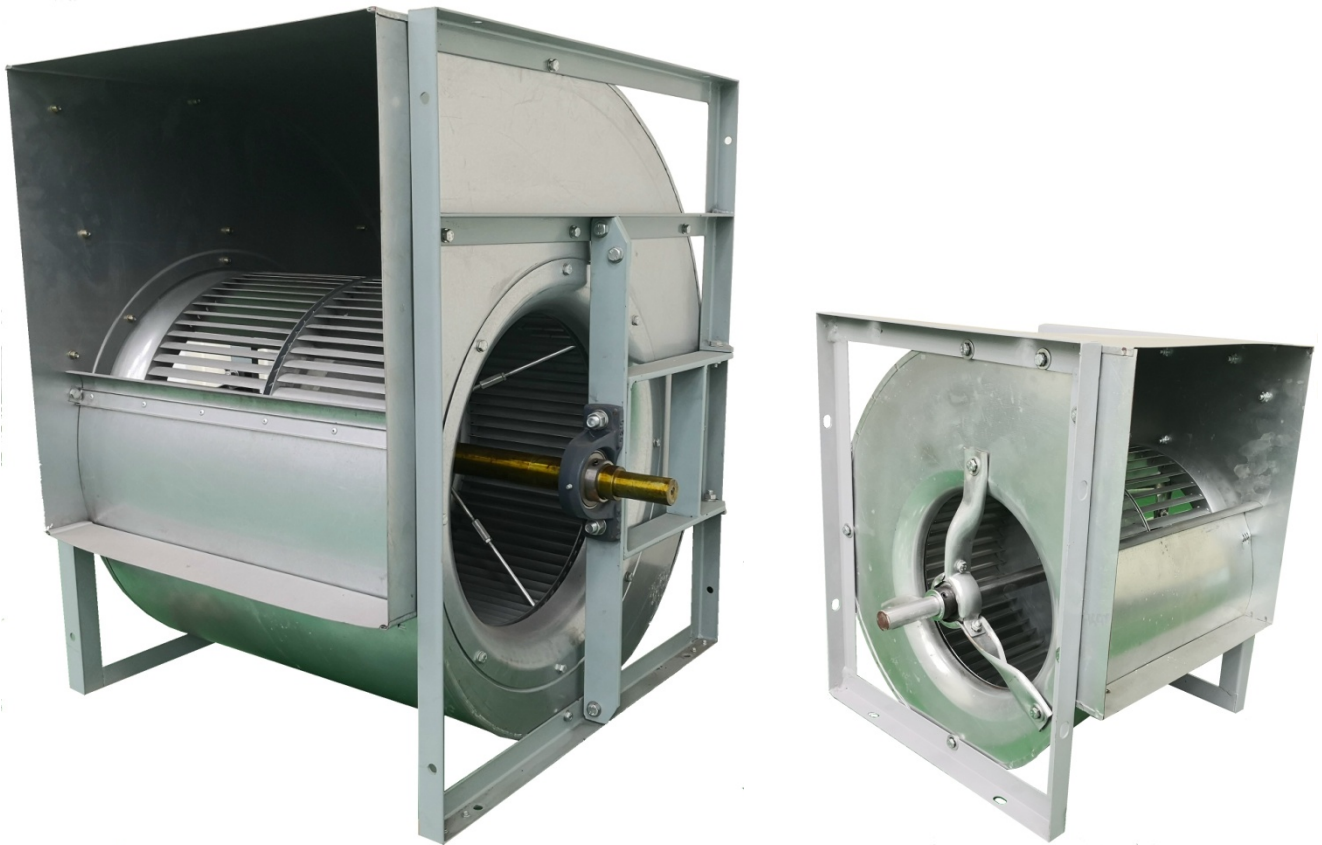


HORUS AIR MOVING 和旭風機

SBA 系列—雙吸前傾式離心風機

Series SBA, Double Inlet Centrifugal Fans, with Forward Wheels

SBA101, June 2020



Horus Air Moving Co. Ltd. certifies that the SBA 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. All the Centrifugal Fans described herein are licensed to bear the AMCA Seal, and their certified ratings are shown on pages 7 through 19.

和旭機械股份有限公司特此證明，此處所示 SBA 系列離心風機獲得了加蓋 AMCA 印章的授權。所示額定值系依據 AMCA 出版物 211 和 AMCA 出版物 311 所進行測試和程序確定並符合 AMCA 認證額定值計劃的要求。這裡描述的所有離心風機都已經取得了 AMCA 印章，它們的認證數據見第 7 到 19 頁。

概述 Outline

本公司之風機採用前傾式離心葉輪，具有通用性強、效率高、噪音低、耗能少等特點。是各類中央空調機組及其它暖氣空調、淨化、通風等最佳選擇。

產品型式 Type of Product

1. 旋向

此風機旋向可分為左旋(LG)和右旋(RD)二種方式，以馬達一端正視，葉輪順時針旋轉的稱為右旋風機、逆時針旋轉的稱為左旋風機。皮帶輪可左右調向，因此不受左右方向的限制。

2. 出風口方向

風機可如下圖所示製成 0° 、 90° 、 180° 、 270° 四種出風方向。

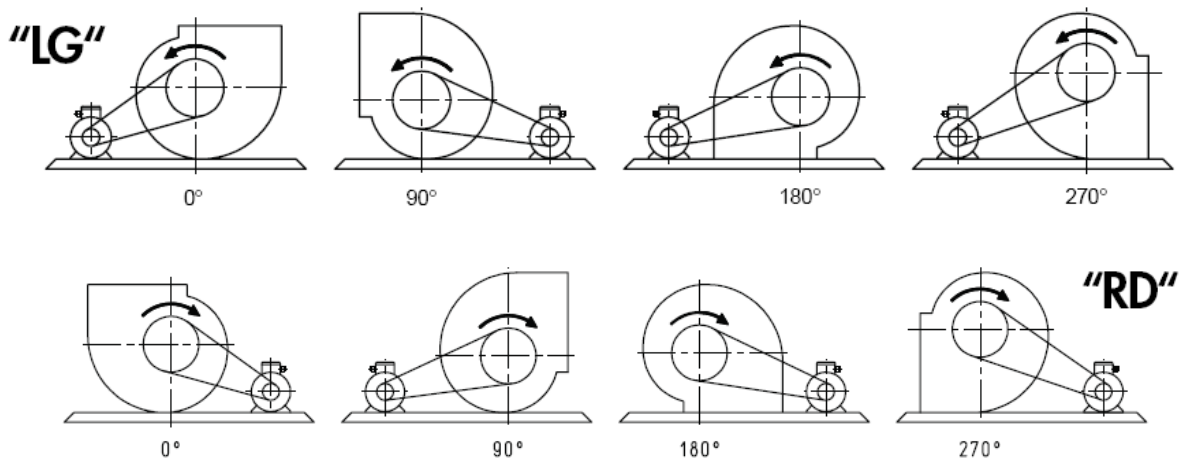
The ventilators are centrifugal fans with forward curved impellers. Some of the features and characteristics of these ventilators are: forward impeller blading, a wide range of applications, high efficiency, low noise, and low power consumption. These ventilators are ideal for use in central air conditioning systems, heating and ventilating air conditioning systems, and in purifiers. They are also suitable for use in a number of other ventilator applications.

1. Direction of Rotation

The ventilators can be applied with two directions of rotation, left hand (LG) and right hand (RD). If the impeller rotates in a counterclockwise direction when viewed from the drive motor side, it is designated as a left hand ventilator. If it rotates clockwise when viewed from the drive pulley can be mounted on either side of the ventilator, so there is no significant limitation on the ventilator directionality.

2. Direction of Air Outlet

The following as shown, the ventilators can be arranged to provide four different air outlet directions, 0, 90, 180, and 270 degrees.



產品結構 Construction of Product

此風機主要由機殼、葉輪、框架、軸承、軸、出風口法蘭（常規配置不帶法蘭）構成。

1. 機殼

機殼基本採用 CNS1244 熱浸鍍鋅鋼板製造，具有符合空氣動力的外形，蝸殼板採用焊接或“匹茲堡溝”咬合的方式與側板連接成一體。其它如不銹鋼材質或鋼板焊接塗裝亦可採用。

2. 葉輪

葉輪採用 CNS1244 熱浸鍍鋅鋼板製造，葉片設計符合空氣動力的特定形狀，使得效率最高、噪音最低。葉片用鉚釘固定在中盤板及端圈上，在最大功率連續運轉時，葉輪具有足夠的剛度。對於 315 以上的大直徑葉輪，用特殊的可調拉杆固定，使其有足夠的剛度並可防止高速運轉下變形。葉輪依據 ISO 1940-1 及 AMCA204 BV-4 的動平衡精度要求，按 G2.5 等級全檢合格。其它如不銹鋼材質亦可採用。

3. 框架

框架由角鋼和扁鋼焊接製成，表面噴漆，以保證框架具有足夠的剛度和強度。

The major components of the ventilators include the scroll, impeller, frame, bearings, shaft, and outlet flange.

1. Scroll

The scroll is made of CNS 1244 galvanized steel normally, and it is designed to provide an aerodynamically efficient flow path. The inlet is formed in one piece. The scroll is connected to the side plate by using welding or a “Pittsburgh lock” type of system. In addition, the stainless or painted steel sheet material is also provided.

2. Impeller

The impeller is made of CNS 1244 galvanized steel, and it is configured to provide a highly efficient and low noise aerodynamic flow path. The blade is fixed to the central disk plate and end plate using formed tabs. The impeller is sufficient to operate continuously at maximum power. The impellers of models 315 and larger use adjustable pull rods to increase the rigidity and to prevent any deformation when operating at high speed levels. The impellers balance quality grades are G2.5 in accordance with ISO1940-1 and AMCA204, BV-4 application category. In addition, the stainless steel material is also available.

3. Frame

The frames use sections of steel to assure sufficient frame rigidity and they are finished with painting.

4. 軸承

風機軸承依照不同的固定方式分為 R-type 與 K-type 兩種。R-type 使用蔽蓋式免潤滑軸承，該軸承在預加潤滑油脂後，無須再添加潤滑油脂； K-type 則是使用優質連座軸承，該軸承預先加潤滑油並有自動對正功能。一般而言，軸承壽命可達 $L_{10} \geq 100,000$ 小時。

5. 軸

風機軸採用 S45C 棒剛粗加工、熱處理及研磨加工製成，嚴格控制軸徑尺寸公差及配合公差，每根軸均經過塗覆防鏽處理。

6. 風機性能曲線

本型錄之性能曲線皆以修正至標準狀態下之空氣密度與轉速。

7. 出風口法蘭（選配）

法蘭採用鍍鋅鋼板製成，法蘭及法蘭與殼體的連接採用鉚釘或自攻螺絲，外觀精美，並具有足夠的剛度與強度。

4. Bearings

There are types of bearing used for fans because of different fix method R-type and K-type. The fan bearings are anti-friction for R-type, only once fill lubrication grease. The self-aligning pillow block ball bearings for K-type which are supplied with lubrication fittings. Bearing service life (L_{10}) are over 100,000 hours ($L_{10} \geq 100000$ hours).

5. Shaft

The shafts are made of C45 carbon steel bars. The shafts are rough machined and then stress relieved before final machining. The shaft diameters are machined to very accurate tolerance levels and they are fully checked to assure precision fits. They are coated after assembly in order to provide corrosion resistance.

6. Fan Performance Curve

The fan performance curves shown are corrected to the standard air and rotation speed condition in the catalog.

7. Outlet Flange (Option)

The outlet flange is made of galvanized steel angle iron bars. The connections of the flange components to each other and to the scroll are made using rivet or self tapping screw. This maintains a good flange appearance while also providing sufficient strength and rigidity.

風機定律 The Fan Laws

1st law :

$$\left[\frac{Q_c}{Q} \right] = \left[\frac{D_c}{D} \right]^3 \left[\frac{N_c}{N} \right] \left[\frac{K_p}{K_{pc}} \right]$$

2nd law :

$$\left[\frac{P_{tc}}{P} \right] = \left[\frac{D_c}{D} \right]^2 \left[\frac{N_c}{N} \right]^2 \left[\frac{K_p}{K_{pc}} \right] \left[\frac{\rho_c}{\rho} \right]$$

3rd law :

$$\left[\frac{P_{vc}}{P} \right] = \left[\frac{D_c}{D} \right]^2 \left[\frac{N_c}{N} \right]^2 \left[\frac{\rho_c}{\rho} \right]$$

4th law :

$$\left[\frac{H_c}{H} \right] = \left[\frac{D_c}{D} \right]^5 \left[\frac{N_c}{N} \right]^3 \left[\frac{K_p}{K_{pc}} \right] \left[\frac{\rho_c}{\rho} \right]$$

5th law :

$$P_{sc} = P_{tc} - P_{vc}$$

Where P_{tc} and P_{vc} are established per the 2nd and 3rd FAN LAW.

6th law :

$$\eta_{sc} = \eta_{tc} \left[\frac{P_{sc}}{P_{tc}} \right]$$

Where P_{sc} is established using the 5th FAN LAW and P_{tc} is established using the 2th FAN LAW. In the above, subscript c denotes the new operating condition, and:

D = Impeller diameter

D_c = Impeller diameter, converted

N = Impeller rotational speed

N_c = Impeller rotational speed, converted

K_p = Compressibility coefficient

K_{pc} = Compressibility coefficient, converted

Q = Volume airflow rate

Q_c = Volume airflow rate, converted

P_t = Pressure, total

P_{tc} = Pressure, total, converted

P_v = Pressure, velocity

P_{vc} = Pressure, velocity, converted

H = Power

H_c = Power, converted

P_s = Pressure, static

P_{sc} = Pressure, static, converted

η_{sc} = Efficiency, static, converted

η_{tc} = Efficiency, total, converted

自由音場 Non-Directional Sound in a Free-Field

聲功率和聲壓之間的最簡單的關係為一個非方向性聲源的自由音場，其關係如下列方程式所示：

The simplest relation between sound power level and sound pressure level is found for a free-field, non-directional sound source, as given by the following equation :

$$L_p = L_{wi} - 20 \log_{10}(r) - k + T$$

L_p = sound pressure level (dB) re $20 \mu\text{Pa}$

L_{wi} = sound power level (dB) re 10^{-12} watts

r = distance from the source in meters or feet

k = 11.0 dB for metric units and 0.5 dB for English units

T = correction factor for atmospheric pressure and temperature (dB) (since most industrial noise problems are concerned with air at or near standard conditions, T is usually negligible and, therefore, equals 0)

Example :

計算在自由音場中 110 dB 的聲功率距離聲源 10 英尺時的聲壓：

Consider a point source having a L_{wi} of 110 dB for a free-field . The sound pressure level at a distance of 10 feet from the source would be calculated as follows (since the source is found for a free-field, the equation for hemispherical radiation from a point source is used) :

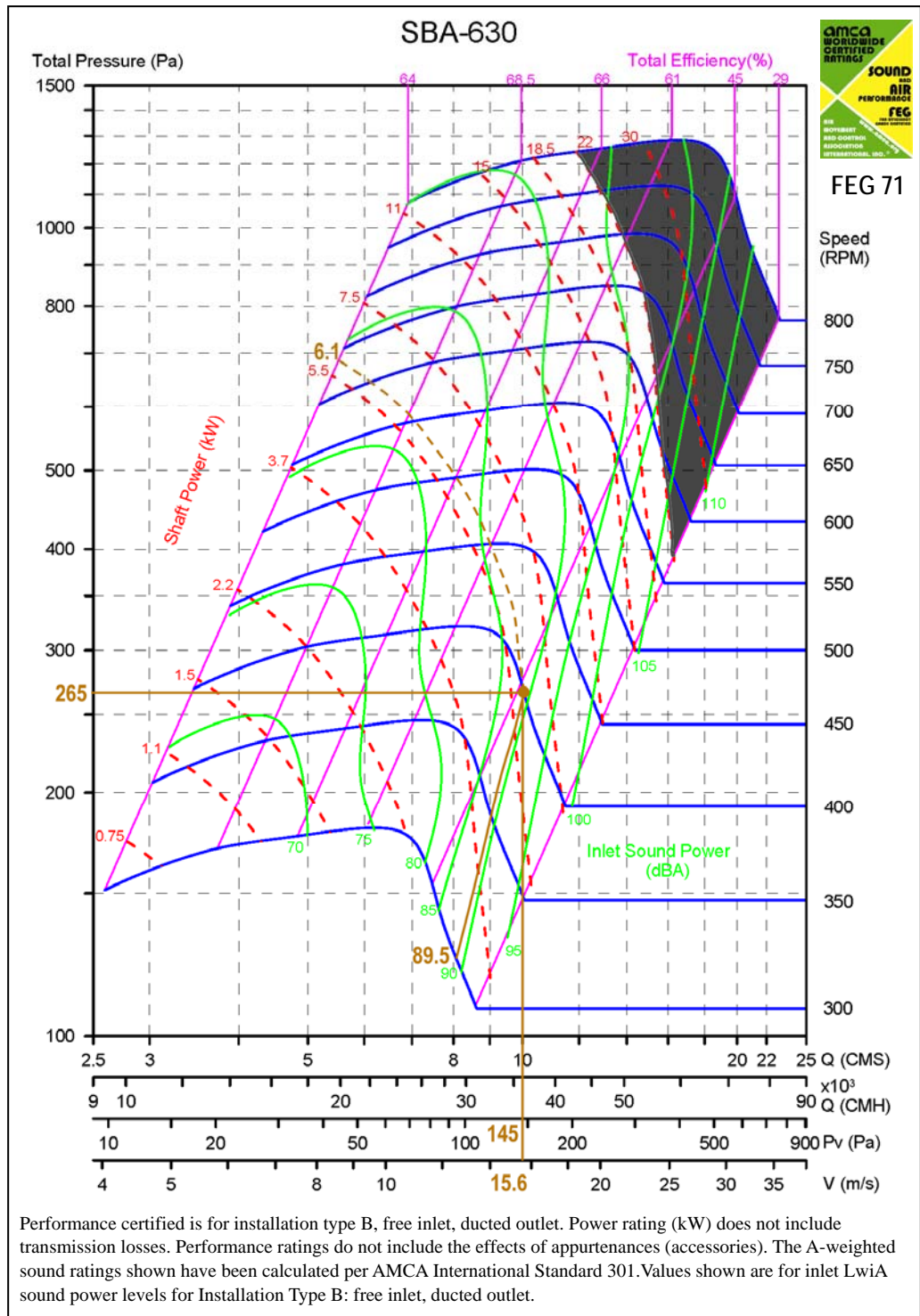
$$L_p = L_{wi} - 20 \log_{10}(r) - k$$

therefore :

$$L_p = 110 \text{ dB} - 20 \log_{10}(10) - 0.5 = 89.5 \text{ dB}$$

範例 Example Of Curve Reading

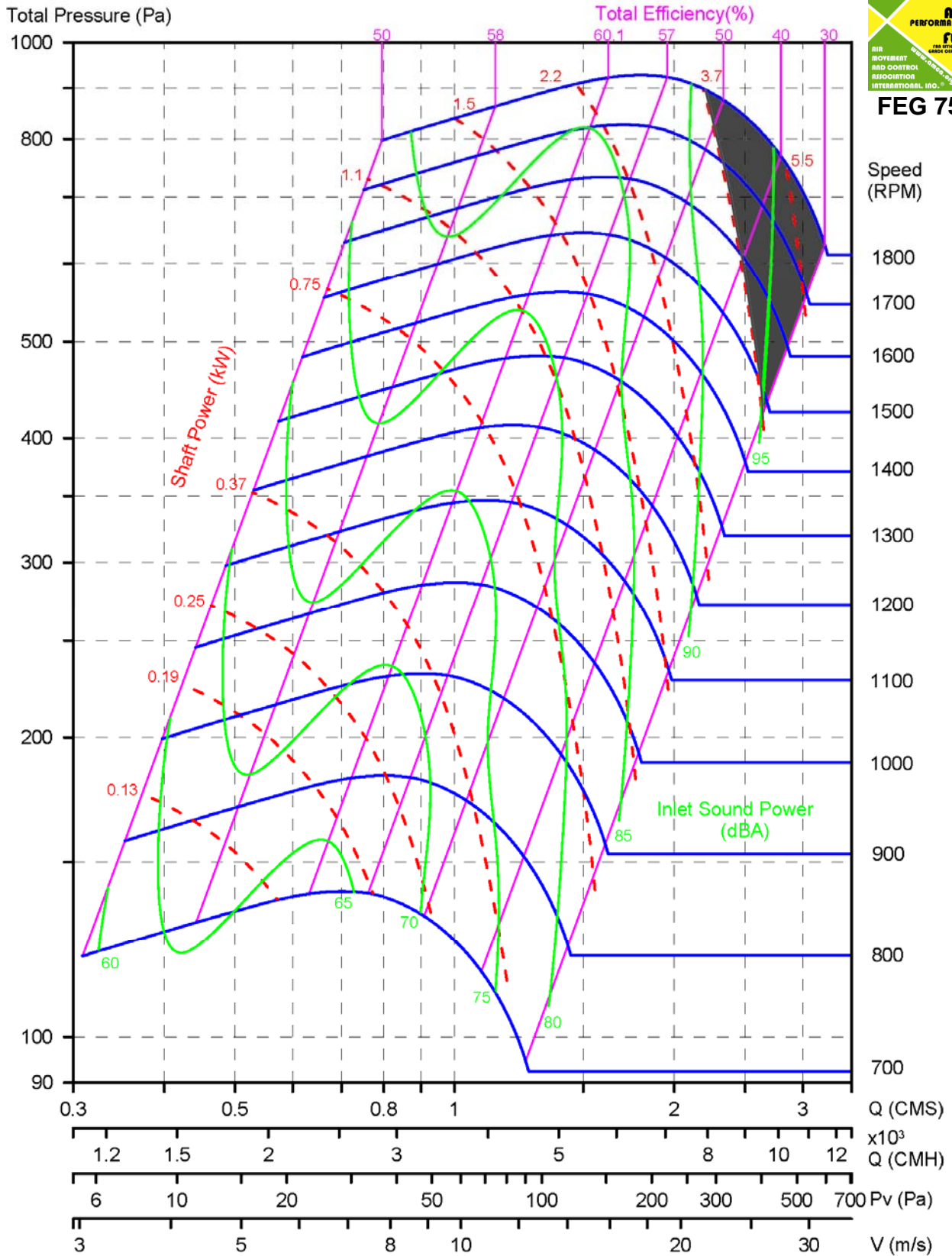
風量
 Air Volume $Q=36000\text{m}^3/\text{h}$
 風速
 Outlet Velocity $V=15.6\text{m/s}$
 全壓
 Total Pressure $P_t=265\text{ Pa}$
 動壓
 Velocity Pressure $P_v=145\text{ Pa}$
 靜壓
 Static Pressure $P_s = P_t - P_v$
 $=120\text{ Pa}$
 轉速
 Fan Speed $N=400\text{ rpm}$
 軸功率
 Shaft Power $W=6.1\text{ kW}$
 聲功率
 Sound Power $L_{wi}A=89.5\text{dB(A)}$
 總效率
 Total Efficiency $\eta=44.5\%$



SBA-250



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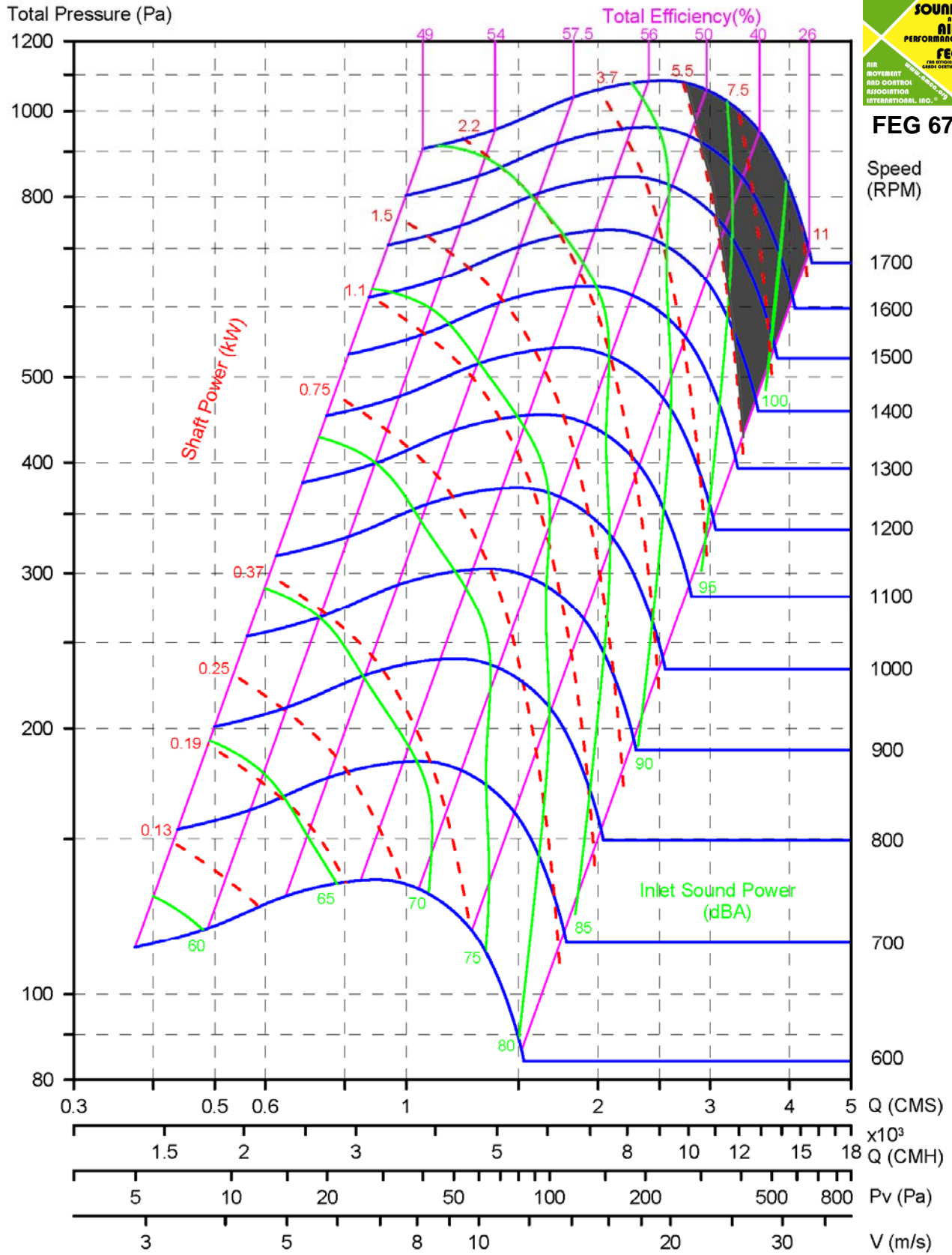


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lw1A sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-280



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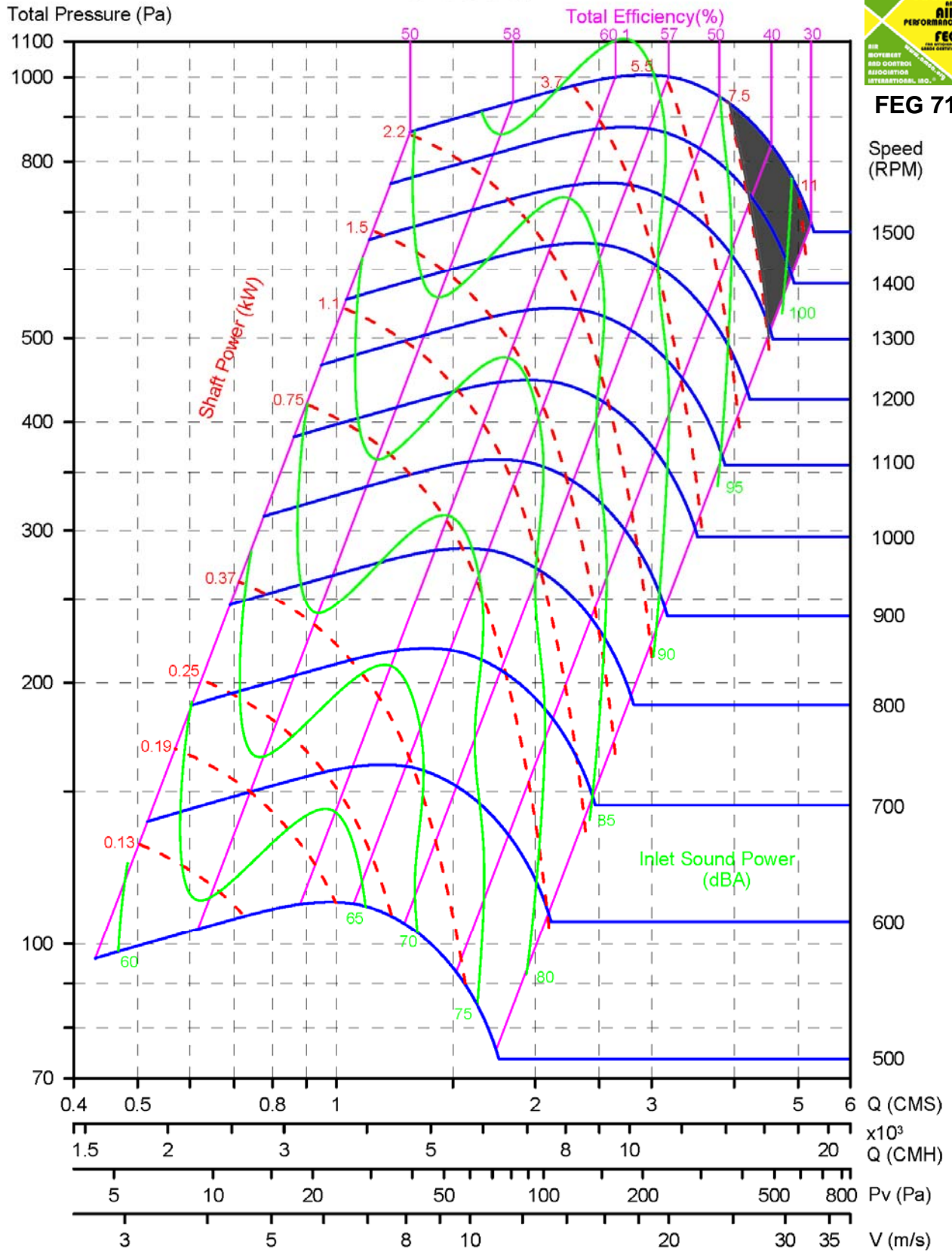


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lw_{iA} sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-315



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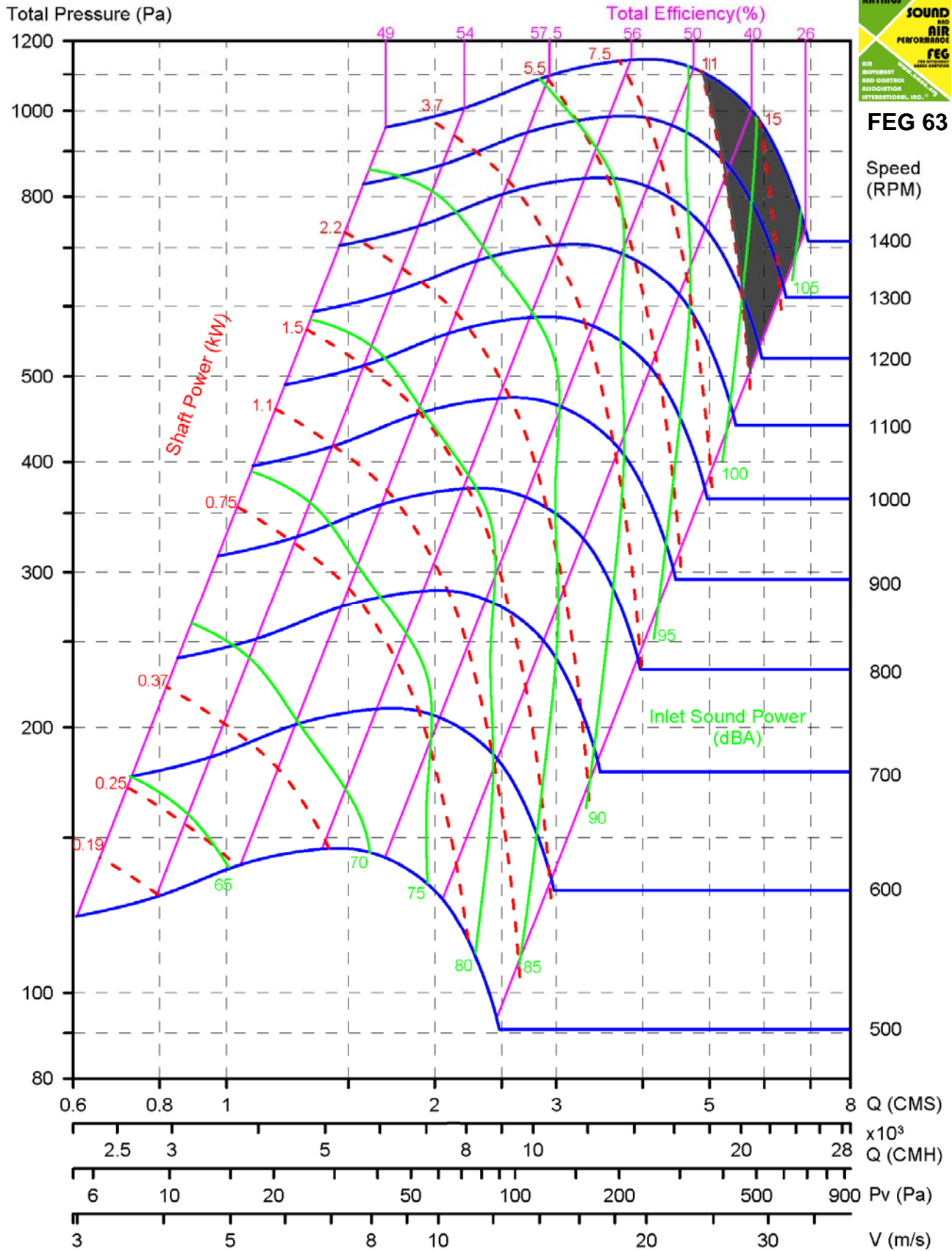


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SBA-355



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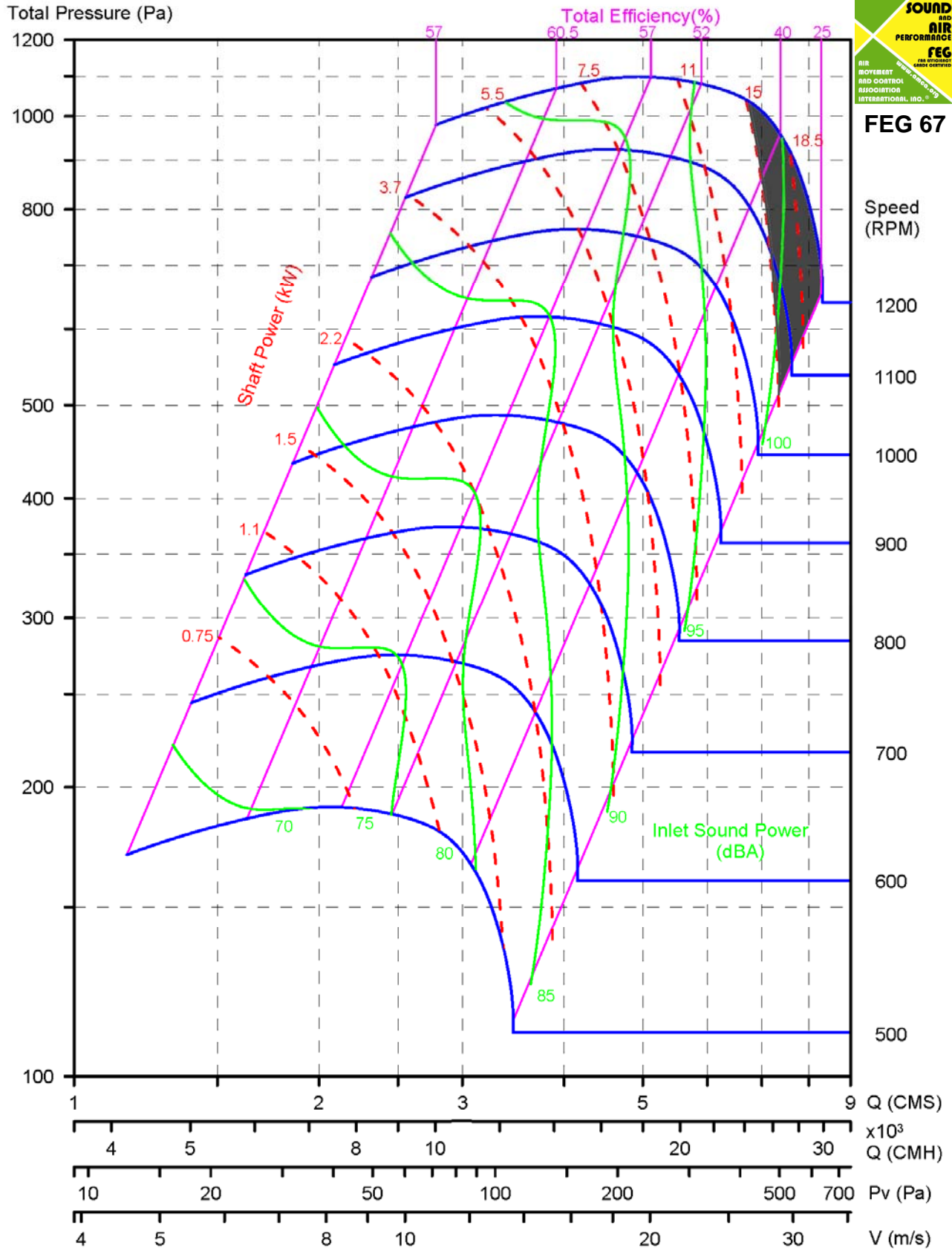


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lw_{iA} sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-400



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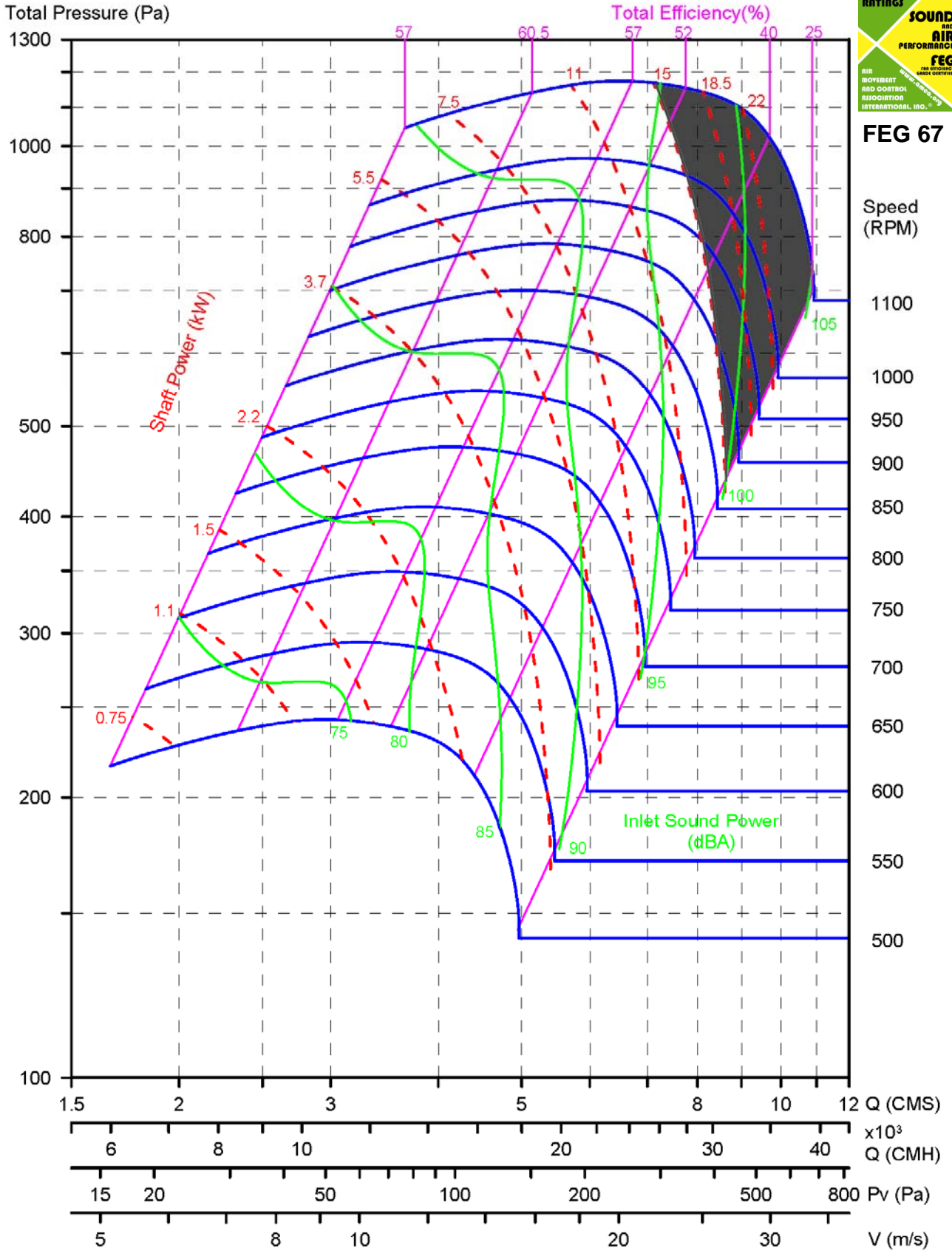


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SBA-450



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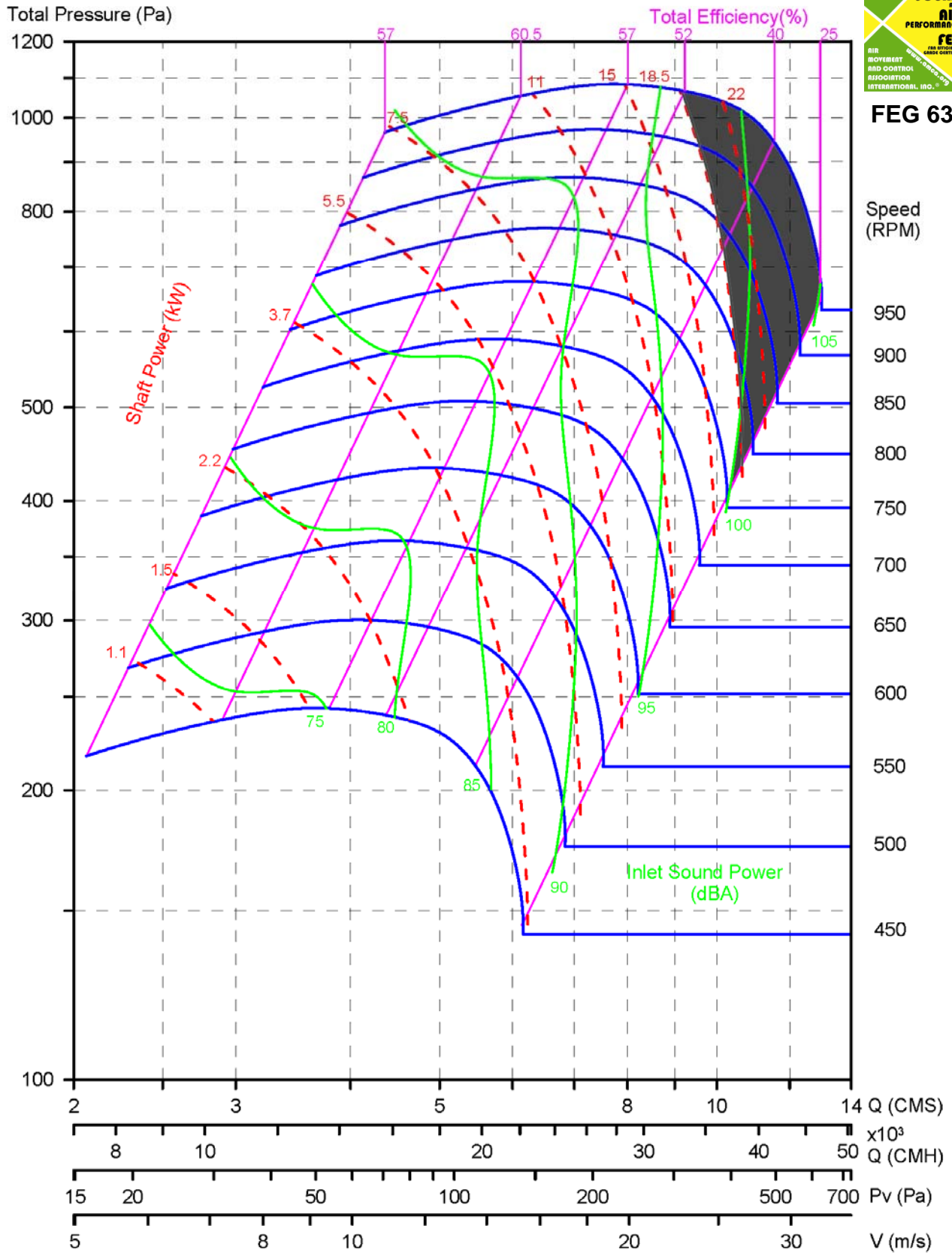


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet L_wiA sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-500



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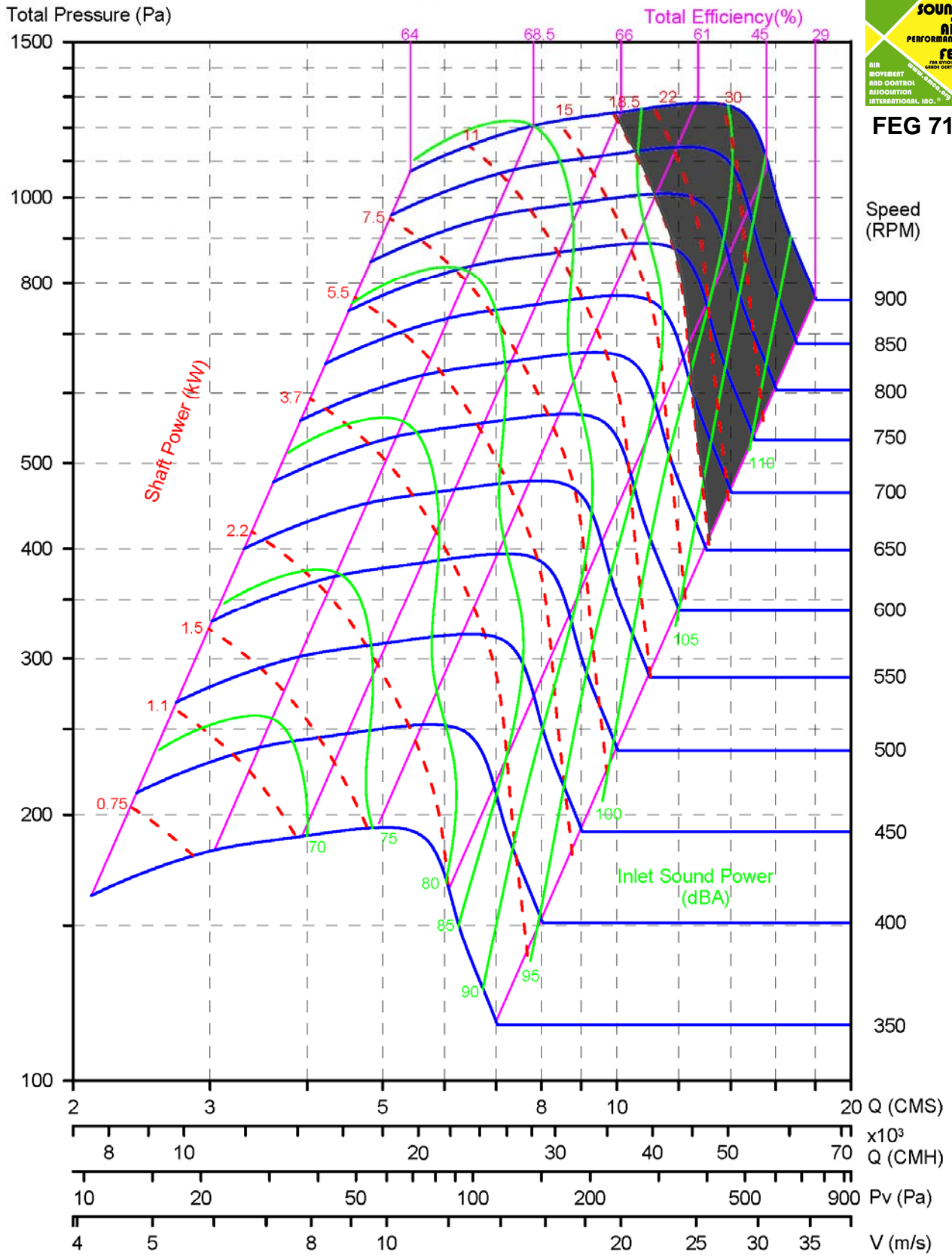


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet L_wiA sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-560



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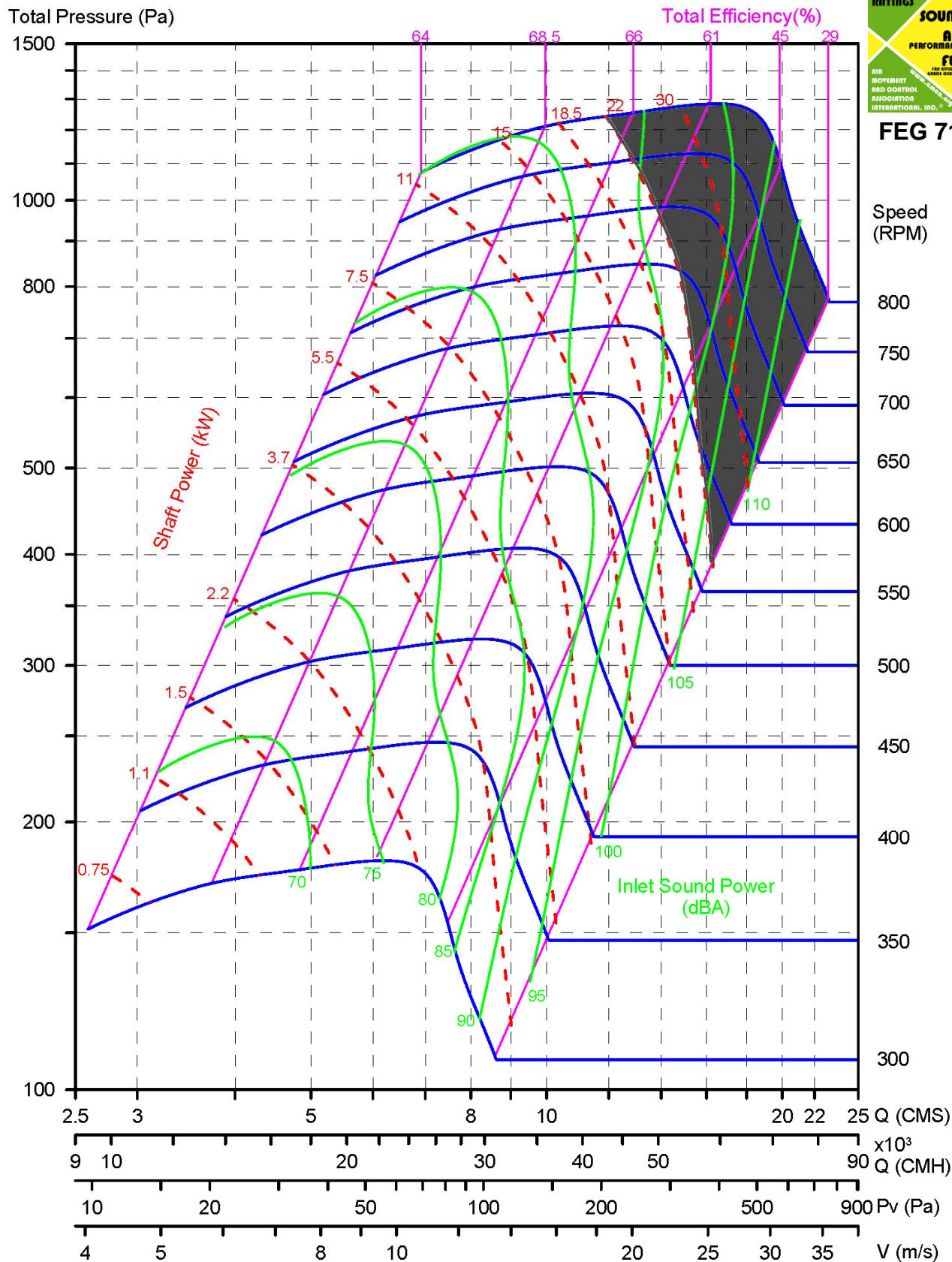


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SBA-630



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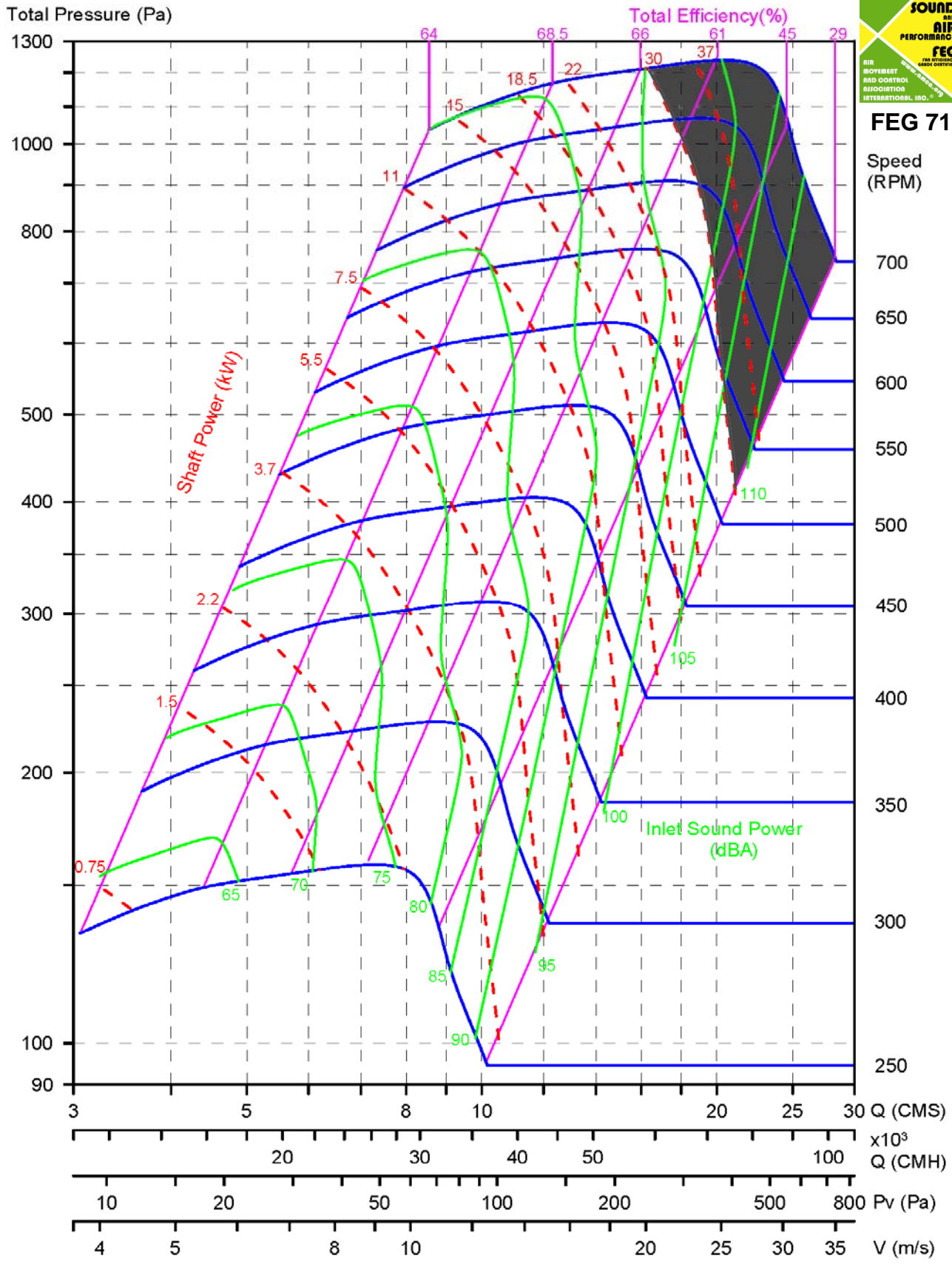
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SBA-710



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Speed (RPM)

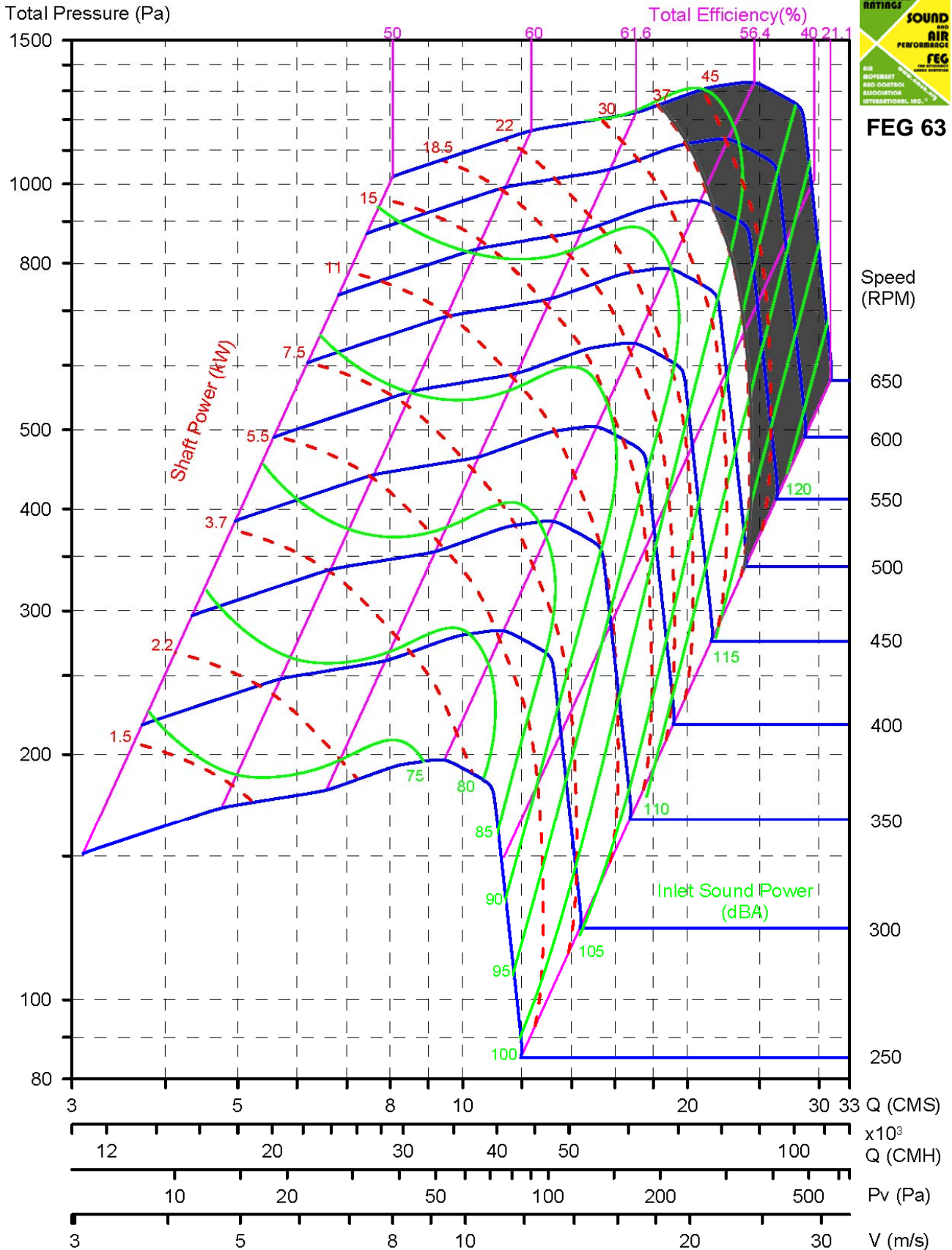


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SBA-800



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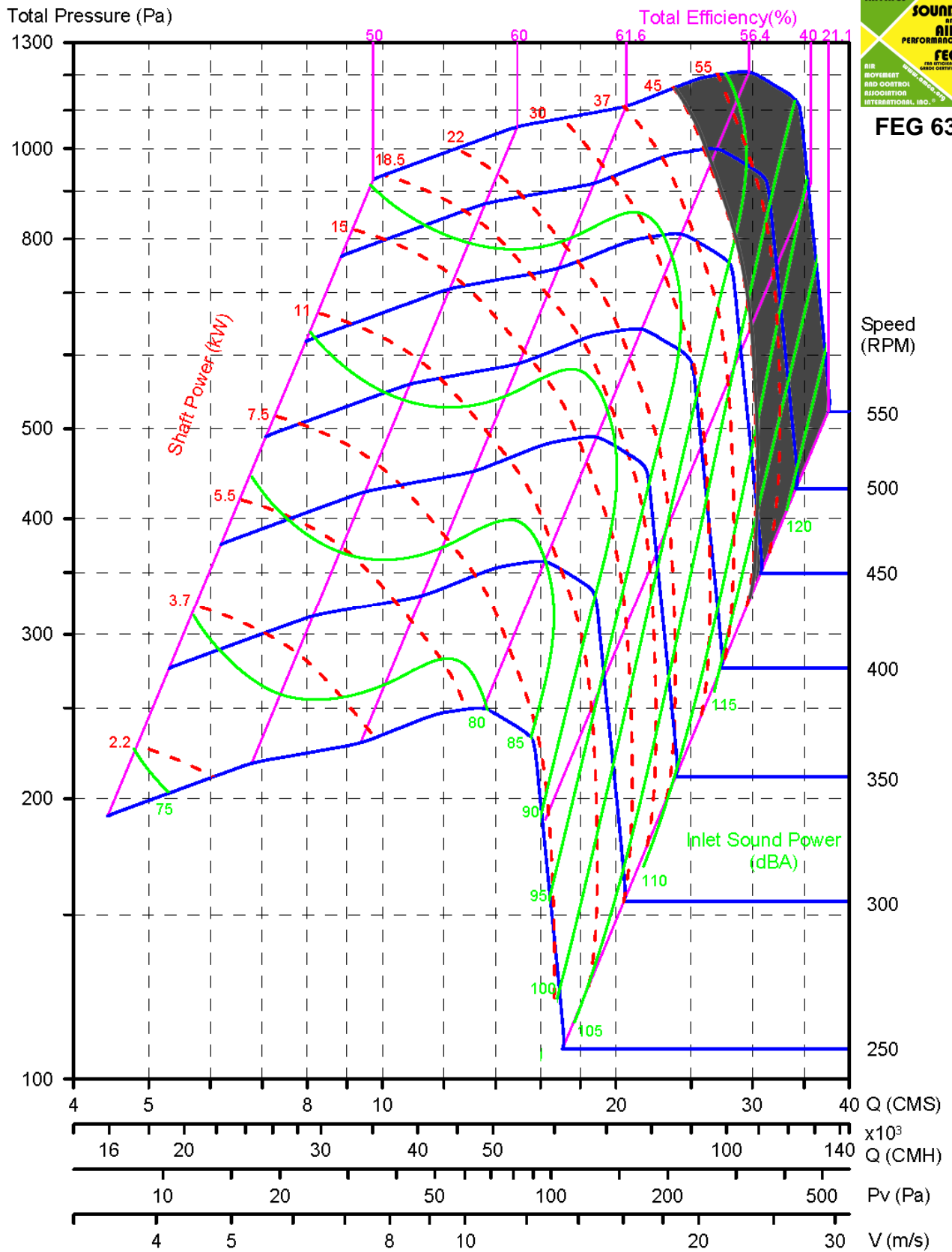


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lw_{iA} sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-900



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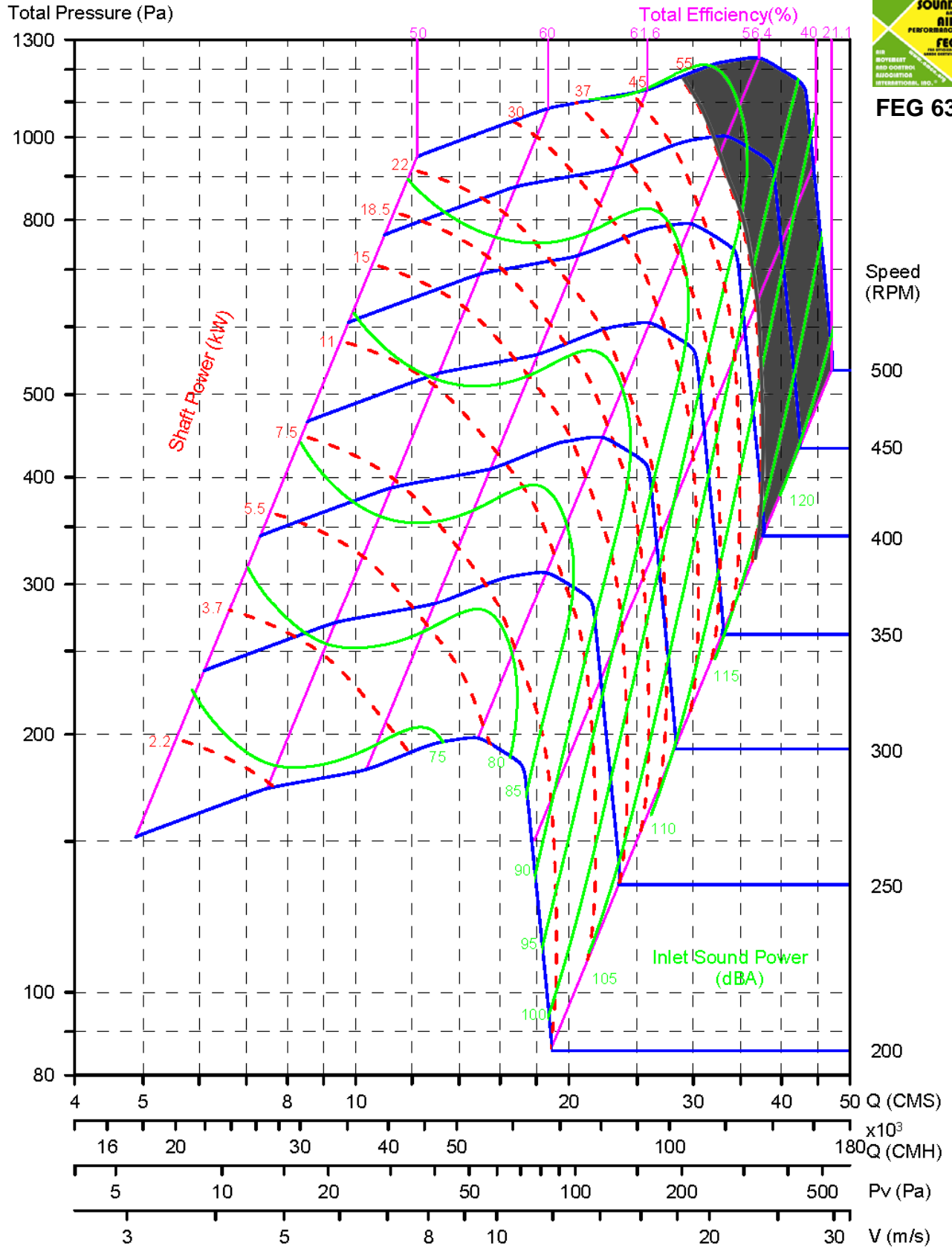


Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lw_{iA} sound power levels for Installation Type B: free inlet, ducted outlet.

SBA-1000

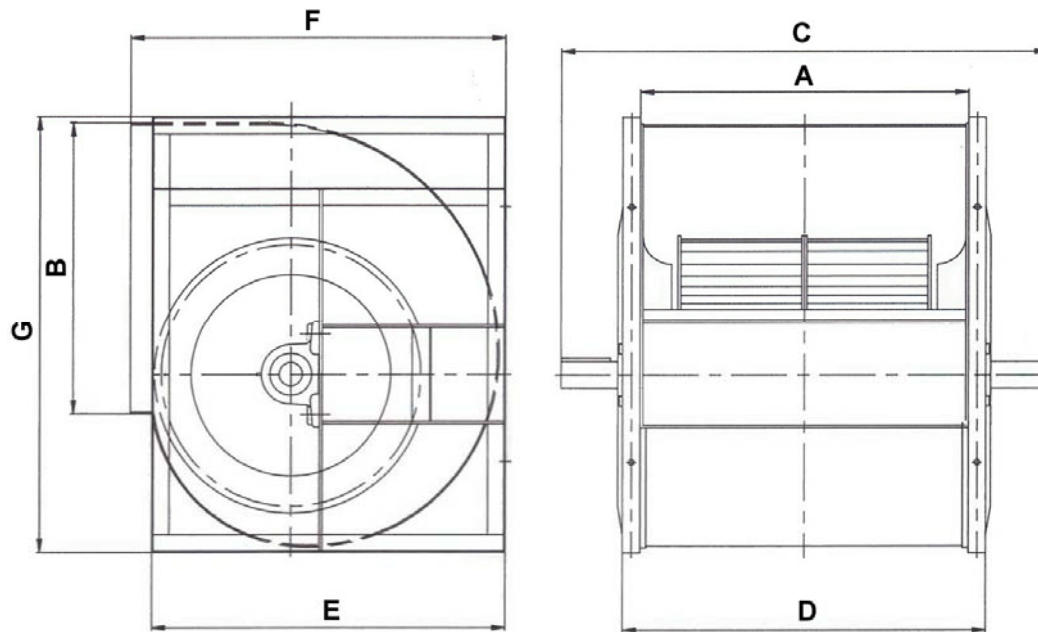


FEG 63



Performance certified is for installation type B, free inlet, ducted outlet. Power rating (kW) does not include transmission losses. 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 inlet Lw_{iA} sound power levels for Installation Type B: free inlet, ducted outlet.

SBA 系列之外型尺寸 Overall Dimension -SBA Series



Model	A	B	C	D	E	F	G
250	323	323	515	387	395	427	476
280	362	362	580	426	437	472	531
315	405	405	625	469	488	523	596
355	454	454	685	535	544	579	665
400	506	506	730	590	610	645	743
450	569	569	815	652	686	721	837
500	638	638	885	720	754	807	926
560	713	713	1000	818	855	908	1050
630	800	800	1155	903	948	1015	1177
710	898	898	1290	1001	1066	1145	1331
800	1005	1005	1450	1110	1176	1254	1471
900	1130	1130	1570	1234	1337	1420	1668
1000	1267	1267	1700	1370	1471	1564	1830

Note : The data such as performance, dimension and etc. in this catalogue is subject to change without notice. Please contact with the manufacture for further information.