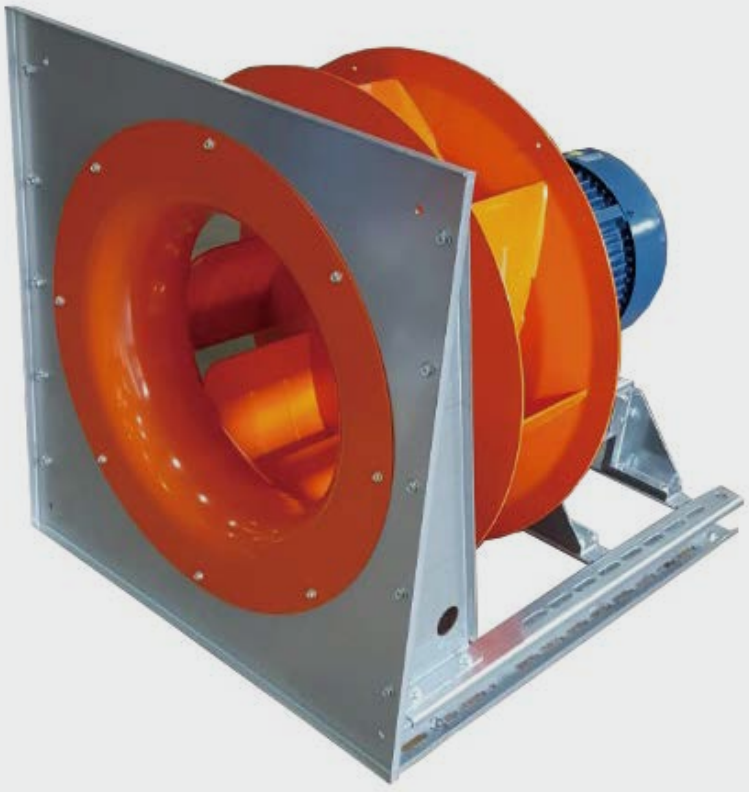
SAMHWA
Air Conditioning Engineering

13

High-performance Centrifugal Fan



Think More

In-depth understanding, experience in customer and environment are the keys to research and development.

Think Better

We create better value enabling various life patterns with innovative and advanced solution.

Think Different

Paradigm shift and idea challenge are the keys to future vision.

Table of Contents

SAMHWA ACE

SAMHWA ACE has the highest level of air conditioning technology in Korea with the continuous efforts and enthusiastic R&D activities in the last 30 years.
In addition, we are doing our best from product development to follow-up management to satisfy all customer's needs based on our business philosophy that the customer satisfaction is the top priority.
We promise to do our best in order to give you the best impression and quality with technology, products and service according to the philosophy of customer satisfaction.

Company profile

Company	SAMHWA ACE Co.,Ltd.
CEO	HAK-KUN KIM
Established	1 Nov, 1984
Head office	53, Banpo-daero 22-gil, Seocho-gu, Seoul, Republic of Korea
	Tel. +82-2-523-2242 / Fax. +82-2-3472-9846
Capital	USD 940,000
Turn over	USD 78,700,000
Business field	Design, manufacture, sales, and construction of AHU, Precision A/C unit, Clean room & Environment test equipment

Major projects

- AHU
- Constant Temp.& Humidity system
- Clean room system
- Hospital operating room
- GHP & EHP

History of company

2017 Obtained AHRI Certification

2016 Obtained NET Certification

2015 Awarded for USD10 million Export by Trade & Industry Ministry

2014 Awarded for USD10 million Export by Trade & Industry Ministry
Appointed as "Hidden Star 500 selection" by KB Kookmin Bank

2013 Established branch in Egypt

2012 Established branch company in China –
Zhangjiagang SAMHWA ACE Co., Ltd.
Established branch company in Vietnam - KIM'S TECH CO.,LTD.

2011 Best Service Quality Certificate from MKE
(Ministry of Knowledge Economy)
Technical cooperation with SCHMID(Switzerland) on Biomass boiler

2009 Registered as new and renewable energy expert company
Obtained K-Mark

2008 Certified as high efficiency energy equipment for fan
Certified as excellent quality product by Public Procurement Service

2007 Ansung factory construction completed

2006 Appointed as excellent service quality company by Industry and Resources Ministry

2005 Completed construction of Head office in Seoul

2004 Acquired ISO 14001 certification
Awarded by Small & Medium Biz Administration and by Industry and Resources Minister

2003 Citation from Small & Medium Biz promotion Corp.
Registered as high efficiency energy handling company

2002 Appointed as GD Excellent Goods Design-Air Handling Unit System

2001 Awarded by Science and Technology Minister

2000 Appointed as venture company
Appointed as excellent technology competitiveness company by Ministry of SMEs and Startups

1997 Appointed as promising advanced technology company by Ministry of SMEs and Startups
Acquired ISO 9001 certification

1994 Established the research and development center certified by Korea Industrial Technology Association

1993 Built the factory in Namdong Industry complex in Incheon

1989 SAMHWA ACE incorporated

1984 SAMHWA Engineering established

What is AMCA?

Air Movement and Control Association (AMCA) International Inc is a nonprofit organization of manufacturers of fans, louvers, dampers, air curtains, airflow-measurement devices, ducts, acoustic attenuators, and other air-system components and dedicated to the certification of performance ratings on them. AMCA was founded in 1917 and headquartered in North America, with operations in Asia, Europe, the Middle East, and Latin America with more than 380 member companies in 37 countries.
With internationally recognized prestige in fan and HVAC industry, AMCA standard is adopted as ASHRAE and ANSI standard as well as ISO and KS(Korean Industrial Standards).

AMCA assures that a product line has been tested and rated in conformance with AMCA's test standard and rating requirements. Manufacturers submit their catalogs and published ratings to get the approval that those match with AMCA's test results. AMCA seals prove that a product line has been tested and its cataloged ratings have been submitted to and approved by AMCA. This would give buyers, users and related people in the industry of air movement and control equipment assurance that published ratings are reliable and accurate.

AMCA SEAL(Sound & Air Performance)

(SAMHWA ACE as shown on License Agreement) certifies that the (SZP-Series) shown herein is (or 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 311and comply with the requirements of the AMCA Certified Ratings Program.

High Efficiency Energy Equipment

To promote technology development and distribution of high-efficiency product, the Korean government certifies products satisfying energy efficiency requirements.

고효율기자재

Fan performance test facilities

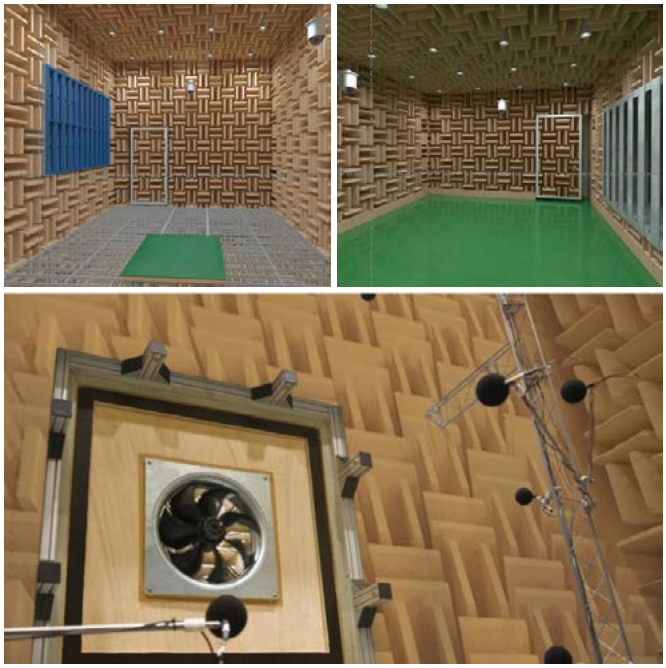
We have our own fan performance testing equipment designed and verified by AMCA 210-07 and ISO 3745. We are doing various research and development for fan performance development and verification.

Fan Test Nozzle Chamber

Specification

Static Pressure	3,000 Pa
Air Volume	Max. 99,600 m3/h
Standard	AMCA 210-07 ISO 5801
	Figure 15 Inlet Chamber Setup-Multiple Nozzles in Chamber

Full / Semi Anechoic Chamber



Specification

Static Pressure	3,000 Pa
Air Volume	Max. 99,600 m3/h
Standard	AMCA 210-07 ISO 5801
Frequency accuracy	Class 1 measurements According to ISO 3745
Standard	ISO 3745 ISO 13347-1 and -3

- Sound source noise level and distribution(SPL)
- Sound source radiation directivity
- Product performance and acoustic characteristics test
- Sound source sound power level(PWL)
- Sound source formation structural analysis
- R&D regarding sound

Fan characteristic

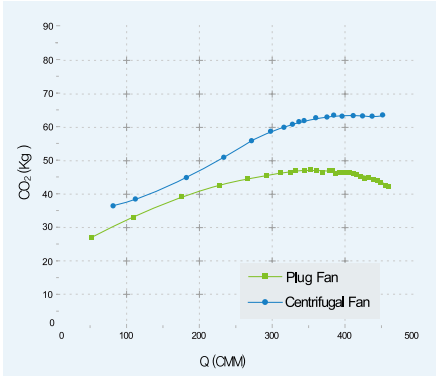
Over 40~50% of energy consumption in a an office building is consumed by air conditioning, and fans take up 30% of the whole equipment energy.

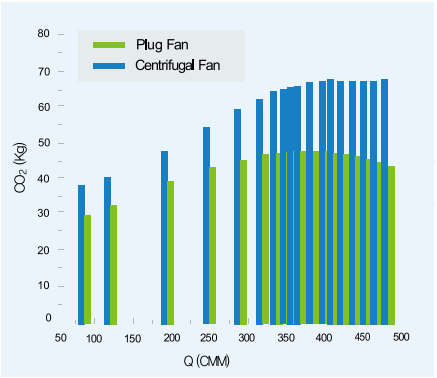
Fans for air handling unit take up about 20% of the energy consumption of the whole building. This is one of the important factors to be considered for CO_2 emissions reduction.

Energy saving	Easy maintenance	Less space	Better efficiency of machines inside	Less noise & vibration
10~30%	**50%**	**10~30%**	**10%**	**15%**
• Less power thanks to increased fan efficiency	• No replacing of bearing, belt and grease • Less labor cost	• Fan & motor integrated type, smaller AHU size	• Better coil and filter efficiency	• Silencer installed inside AHU (AMCA standard 203-05,310-05) • No need of vibration isolation spring as fan & motor integrated type

Driving type	Direct entry type
Impeller blade	• Backward Curved • Cold rolled steel plate • Powder coating • Assembly by welding • Balance Grade: G 2.5 (AMCA-203-05, ISO 1940)

CO_2 emissions reduction effect





$$151.5\ (kWh) \times \frac{424\ (gCO_2)}{1(kWh)} = 64.2\ (kgCO_2)$$

$$106.5\ (kWh) \times \frac{424\ (gCO_2)}{1(kWh)} = 45.2\ (kgCO_2)$$

[Required power calculation and comparison]

CO2 emissions(gCO_2) = Power consumption (kWh) x Emission factor (gCO_2/kWh)
** Emission factor: electricity 1kWh = 424 gCO_2

6935Kg Year Reduction

1 Day • 1 Year

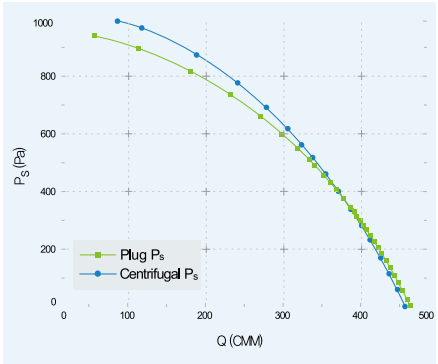
64.2 > 45.2 $kgCO_2$ reduction

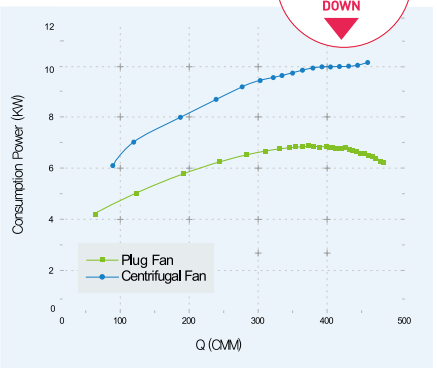
23433 > 16498 $kgCO_2$ reduction

About 2500 Pine trees are required.

Saving of power consumption 30% DOWN

Energy Saving FAN





Backward plug fan

SZP Series

SAMHWA ACE's fan is designed with optimized structure with galvanized steel, and it don't need the separate housing, so AHU can be compact with high efficiency.
It has an Inlet Ring with flow measuring device for optimum flow. The impeller balanced with the hub has been verified to have a vibration strength of less than 2.8 mm/s according to ISO 14694. In addition, the fan is fixed by profile and frame welding, so vibration-proof equipment can be installed.

1. Flexible configuration for the environment

- Has a wide range of products with various types of fans
- Energy saving and compact design with Multi plug fan

2. Perfect prevention of condensation and heat loss

- Applied patented frame with double casing filled with internal insulation

3. Provide total solution customized for site requirement

- Has a lineup of various waste heat energy recovery systems

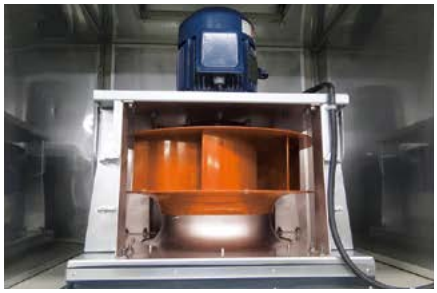
4. Perfect quality control and quick after-sales service

- Built self-production system for main parts of air handling unit

Plug fan

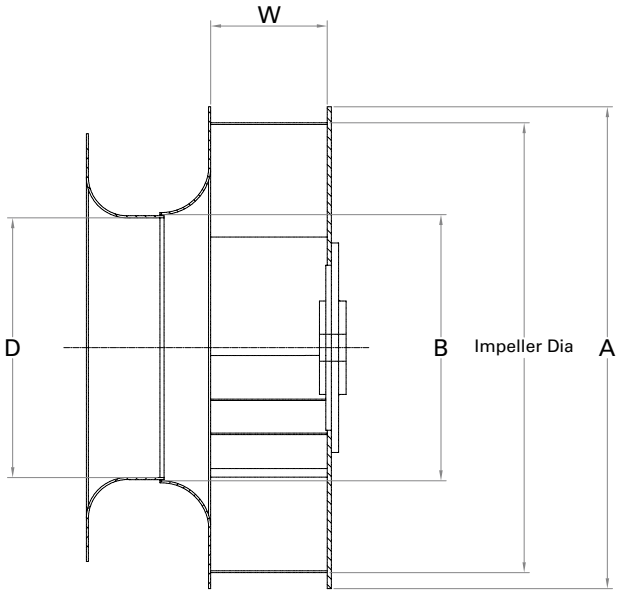
Multi-Plug fan

VR/HR



Dimensions

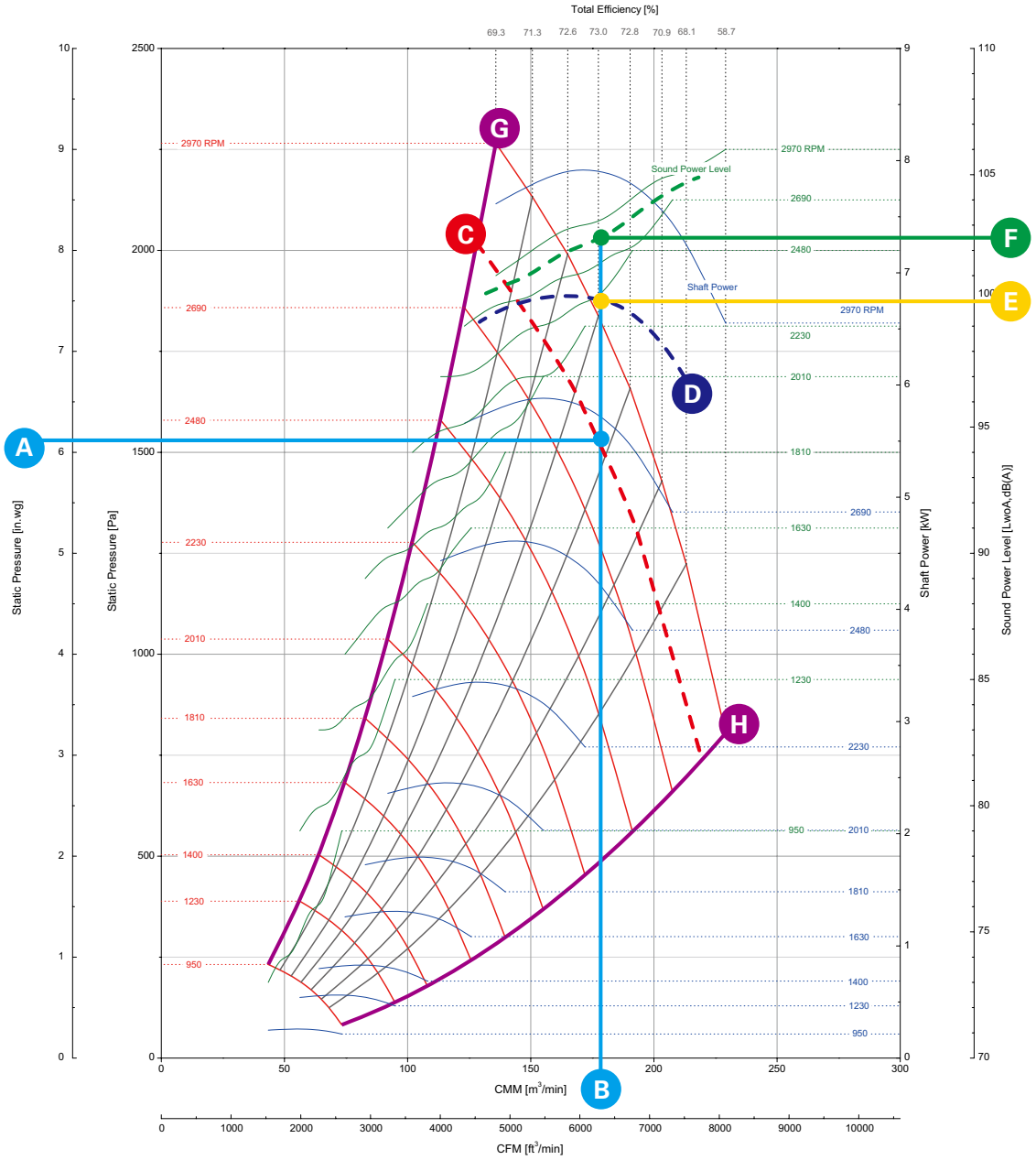
Standard outside view



A: Diameter at Blade Tip
B: Diameter at Blade Heel
W: Blade Width at Discharge
D: Minimum Dameter at Inlet Cone

Rated Output (Kw)	Impeller Dia	A	B	W	D
	mm	mm	mm	mm	mm
SZP-450S	458	515	278	144	285
SZP-500S	515	579	312	160	320
SZP-560S	572	644	347	180	355
SZP-630S	641	721	389	199	397
SZP-710S	721	811	437	221	447

Fan Selection

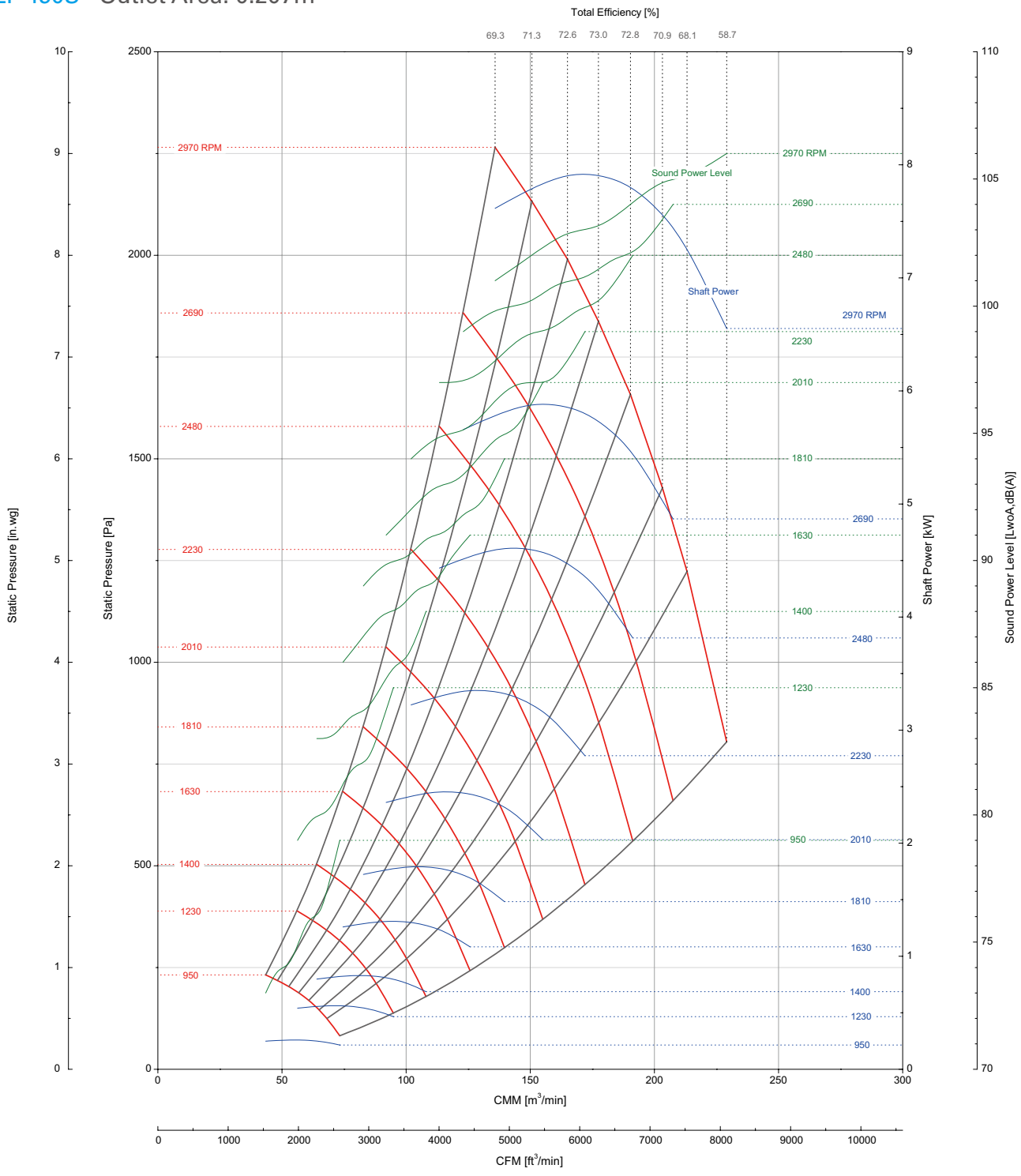


How to select the Fan

1. Mark the horizontal line(A) corresponding to the static pressure of the Fan to be selected.
2. Mark the vertical line(B) corresponding to the air volume of the Fan to be selected.
3. Calculate the expected number of revolutions and the expected air volume pressure curve(C) at the intersection of the selected static pressure(A) and the air volume(B).
4. Predict the expected power curve(D) based on the expected number of revolutions in the air volume pressure curve(C).
5. Mark the horizontal line(E) at the intersection where the selected air volume vertical line(B) and the expected power curve(D) meet as the power line coordinate.
6. Mark the horizontal line(F) at the intersection where the selected air volume vertical line(B) and the expected number of revolutions meet as the noise coordinate.
7. It is effective to change the model and type of fan when it goes out the recommended line for using(G, H).

Fan Data

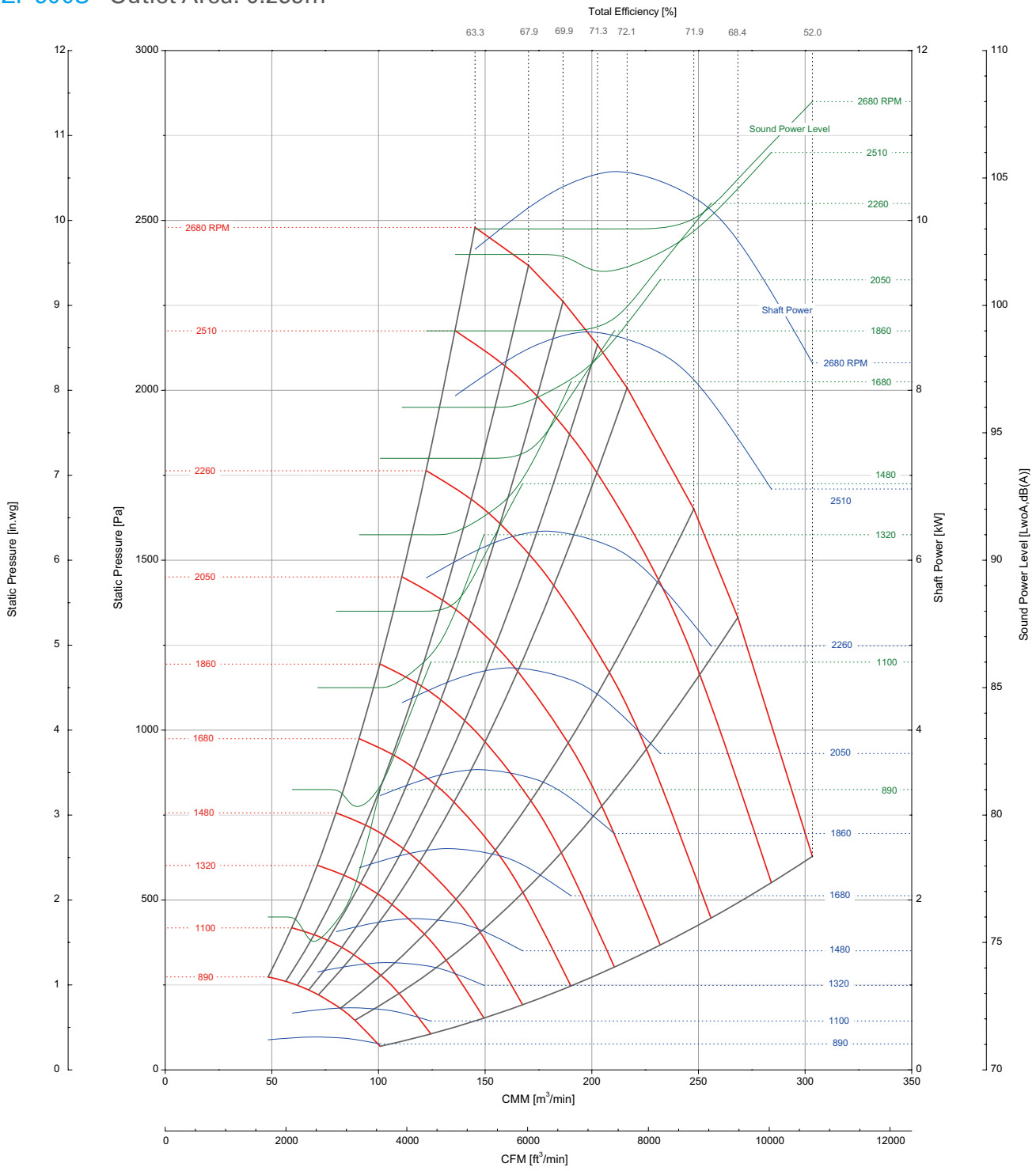
SZP-450S Outlet Area: 0.207m^2



- The A-Weighted sound rating shown have been calculated per AMCA Standard 301
- Value shown are for outlet LwoA sound power levels 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), Power rating kW does not include transmission losses.

Fan Data

SZP-500S Outlet Area: 0.259m^2



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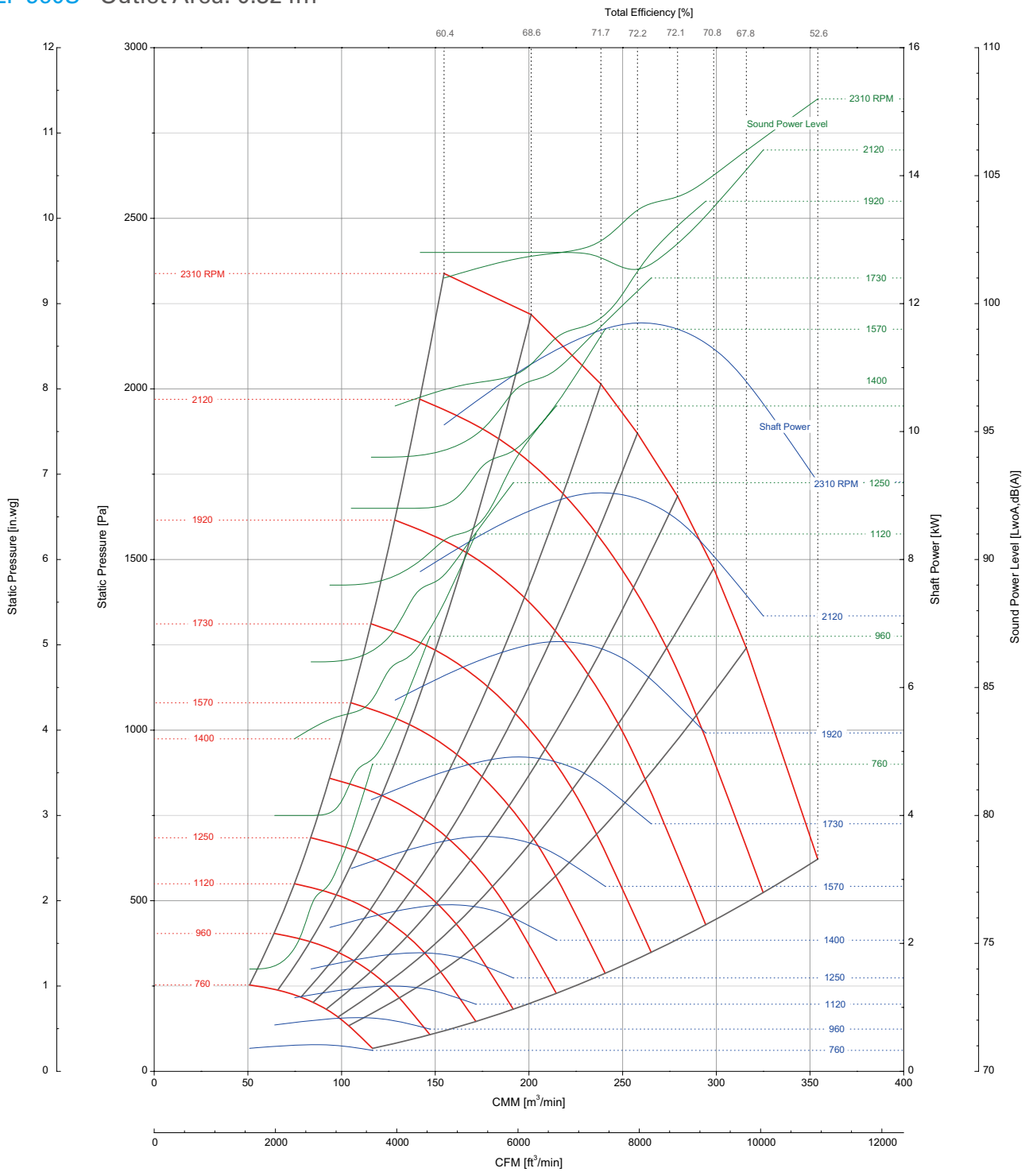
Fan Data

SZP-560S Outlet Area: 0.324m^2



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- Performance certified is for installation type A - free inlet, free outlet.
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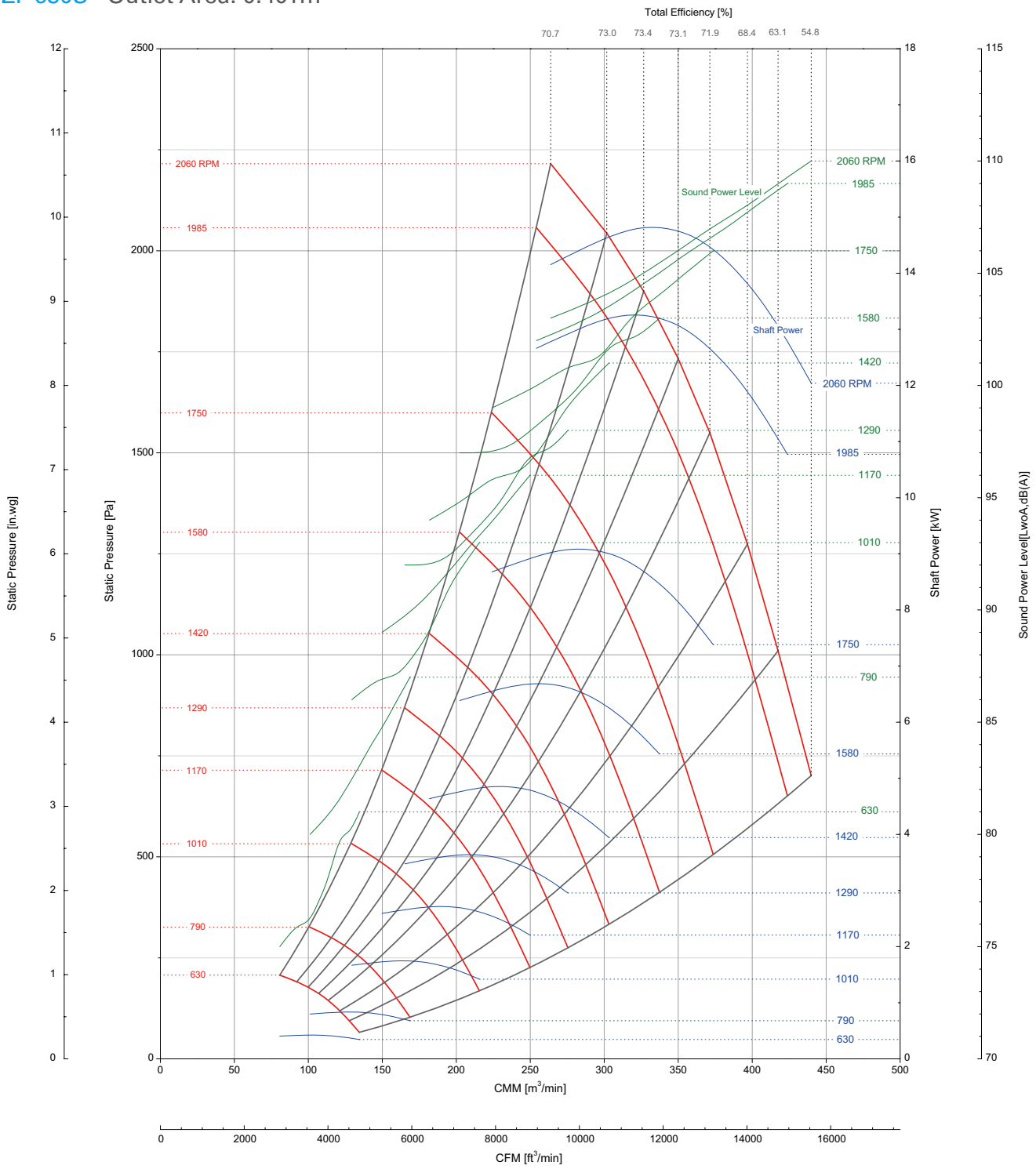
Fan Data

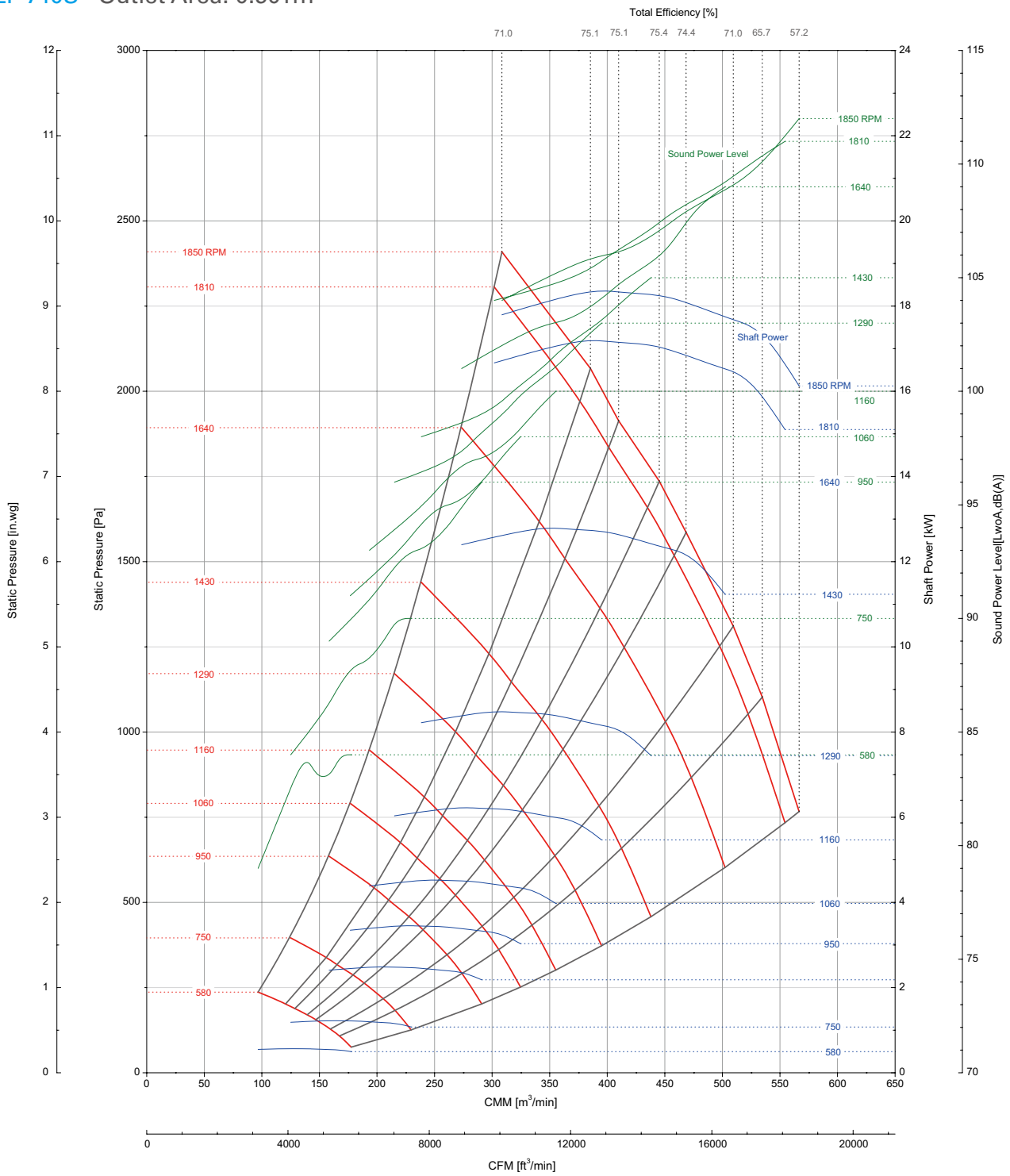
SZP-630S Outlet Area: 0.401m^2



- The A-Weighted sound rating shown have been calculated per AMCA Standard 301
- Value shown are for outlet LwoA sound power levels 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), Power rating kW does not include transmission losses.

Fan Data

SZP-710S Outlet Area: 0.501m^2



- The A-Weighted sound rating shown have been calculated per AMCA Standard 301
- Value shown are for outlet LwoA sound power levels 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), Power rating kW does not include transmission losses.

Network

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ANSEONG	492-20, Baudeogi-ro, Anseong-si, Gyeonggi-do, Korea Tel. +82-70-4329-4506 Fax. +82-31-676-3401	ASAN	4-101, 77-6, Myeongam-gil 2beon-gil, Tangjeong-myeon, Asan-si, Chungcheongnam-do, Korea Tel. +82-41-543-6596 Fax. +82-41-543-9596
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