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## LKQS/LKDS系列离心式空调风机技术手册 The LKQS/LKDS Series Centrifugal Fan



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Qualification Certificate

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Honesty is the foundation of LION KING. We consistently pursue good faith as our principle. We advocate our managers and employees operating honestly, and we advocate to develop with society, customers and partners in harmony to make our company to exist more than one hundred years.

Innovation is the source of vitality of LION KING. We advocate innovation, and actively create good atmosphere for innovation, such as respecting talents, respecting knowledge, respecting hardworking, respecting creation. And in practice, we continue to promote innovation of our system, mechanism, technologies and products.

Mutual benefits are the way to lead us to a great future. With honest attitude, pragmatic work style and innovative thinking, we'll try our best to achieve multi-win situation for our company, employees, customers, partners and the society, which will help us for a long-time sustainable development.

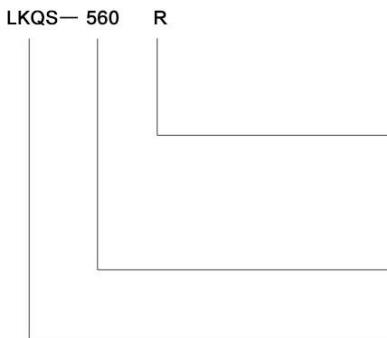
## Contents 目录



## 概述

LKQS 系列后向单进风离心风机采用国际同类产品先进技术自行开发,通过了AMCA 国际认证并取得 AMCA 印章。该样本列出的 15 种 规 格 风 机 , 流 量 范 围 从  $700\text{m}^3/\text{h}$ - $120000\text{m}^3/\text{h}$ , 全 压 从  $200\text{Pa}$ - $3000\text{Pa}$ , 产 品 具 有 效 率 高 、 噪 声 低 、 耗 能 少 、 通 用 性 强 、 安 全 性 好 等 特 点 。 广 泛 应 用 与 各 类 中 央 空 调 机 组 及 其 他 暖 通 空 气 、 净 化 、 通 风 等 空 气 系 统 。

## 命名方式



## 产品型式

### 1. 旋向

LKQS 系列 风 机 可 分 为 左 旋 (LG) 和 右 旋 (RD) 两 种 旋 向 方 式 , 从 风 机 皮 带 轮 一 端 正 视 , 叶 轮 顺 时 针 旋 转 的 称 为 右 旋 风 机 , 逆 时 针 旋 转 的 称 为 左 旋 风 机 。

## Summary

The LKQS Series of centrifugal fans with backward blade were developed with advanced technologies. They are licensed to bear the AMCA Seal for air performance, sound, and FEG. The LKQS Series includes 15 models as described in this catalogue. The volume flow of the LKQS Series ranges from  $1,000 \text{ m}^3/\text{h}$  to  $120,000 \text{ m}^3/\text{h}$ , the total pressure ranges from  $200\text{Pa}$  to  $3,000\text{Pa}$ . Some of the features and characteristics of these fans are: forward Wheel blades, a wide range of applications, high efficiency, low noise, and low power consumption. These fans are ideal for use in central air-conditioning systems, in purifiers. They are also suitable for use in a variety of other ventilation.

## Nomenclature

### 结构型式 Construction type

- R型(基本型) Type R (Basic Model)
- E型(加强型) Type E (Heavy Duty Model)
- C型(悬臂型) Type C (Hanging Model)

### 叶轮名义直径 (mm) Nominal diameter of Wheel (mm)

### 后向单进风离心风机系列代号 Series fan of single inlet with backward blades

## Product Features

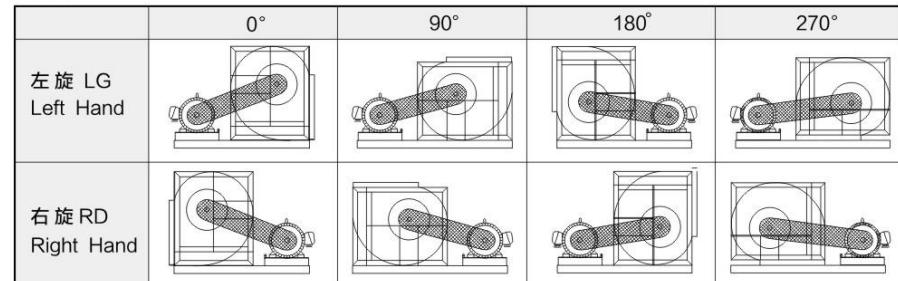
### 1. Rotation

LKQS series fans have two direction of rotations, left-hand rotation (LG) and right-hand rotation (RD); Viewing from drive side, if the Wheel rotates clockwise, it is left hand (LG) rotation. If the Wheel rotates counter clockwise, it is right-hand (RD).

## 2. 出风口方向

LKQS 系列出风口可按图 1 所示制成  $0^\circ$  、  $90^\circ$  、  $180^\circ$  、  $270^\circ$  四 种 出 风 方 向 。

图 1(Fig 1)



## 3. 结构形式

LKQS 系列 风 机 可 按 图 2 所 示 制 成 R 型 、 E 型 、 C 型 。

## 3. Type of Construction

As shown in Fig 2, LKQS series fans can be divided into category R, E, C.

图 2(Fig 2)

风机类型 Fan Type	机号 Fan Size	风机示意图 Fan Diagram	轴承实物图 Bearing Type
R型 TYPE R	280-710		
E型 TYPE E	280-1000		
C型 TYPE C	280-1400		



## 产品结构

LKQS 系列风机主要由机壳、叶轮、框架、轴承及轴构成。  
出口法兰(为可选件)。

### 1. 机壳

机壳采用热镀锌钢板制造，侧板具有符合空气动力的外形，进风口整体拉伸成型，蜗板采用点焊或“Pittsburg seam locking”的连接方式与侧板连成一体。

### 2. 叶轮

后向叶轮采用优质冷轧钢板制成，按三元流理论设计的机翼型叶片焊接在高精度激光切割机床加工的中盘和端圈上，整体喷塑。所有叶轮进行静平衡和动平衡测试，内控精度达到 G2.5 级 (ANSI/AMCA 204-05)。

### 3. 框架

R 型风机框架采用热镀锌钢板剪切、折弯制成，TOX 连接保证了所需的尺寸精度和应有的刚度；E 型、C 型风机框架由角钢和扁钢冷弯焊接制成表面喷塑处理，以保证足够的刚度和强度。

### 4. 轴承

LKQS 系列风机均采用优质滚珠轴承，并根据噪声最低来选择，该轴承设有加润滑油的孔，已预先加润滑油并自动对中；R 型风机的轴承安装在轴承支架上，并设有防振垫圈；E 型、C 型风机则采用带座向心球轴承；轴承寿命为  $L_{10} \geq 100000$  小时。

### 5. 轴

风机轴采用 40Cr 低合金钢，经车、调质热处理、磨削制成，强度高，挠度小，严格控制轴径尺寸公差及形位公差，每根轴均经过涂覆防锈处理。轴尺寸设计应满足第一临界转速至少为风机最大运行转速的 1.4 倍。

### 6. 出风口法兰

进风口法兰采用优质冷轧板制成，整体喷塑。出风口法兰采用热镀锌钢板制成，出风口法兰与蜗壳的连接采用 TOX 免焊工艺，外观精美，并具有足够的刚度与强度。

## Construction of Product

LKQS series fans are mainly constructed of housing, Wheel, frame, bearing and shaft. Outlet flange (is optional).

### 1. Housing

The housing is made of hot galvanized steel sheet. The side plates include inlets cones that are designed with the best aerodynamics for inlet condition. The scroll is fixed to the side plates by spot welding or "Pittsburg seam locking."

### 2. Wheel

Backwards curved airfoil Wheel is constructed of high-grade cold-roll steel sheets, according to the three-dimensional flow theory, the Wheel is fixed on the center plate and on the end ring with welding by high precision laser cutting machine, the unity of the Wheel is spraying by plastic. All Wheels are balanced to ANSI/AMCA Standard 204-05 . Yilida's internal standard is G2.5 or higher for wheel balancing.

### 3. Frame

The frames for type R construction are made of galvanized steel angle iron bars. The cutting and bending of the frame parts, as well as the TOX connections, are formed with the use of toolings to ensure the high accuracy and the rigidity of the frames; The frames for E and C constructions are welded by angle steel and flat steel with polyester coating in order to ensure sufficient rigidity and strength.

### 4. Bearings

Ball bearings are used in all of the SYQS Series fans. These are high-quality bearings and selected to minimize the fan noise levels. The bearings are pre-lubricated, sealed, and self-centering. For type R constructions, the bearings are supplied with lubrication fittings. For type E and C constructions, the bearings are supplied with radial bearing. Yilida bearing service life ( $L_{10}$ ) are over 100,000 hours ( $L_{10} \geq 100000$  hours).

### 5. Shaft

The shafts are made of 40 Cr carbon steel bars. The shafts are rough machined and then stress relieved with heat treatment before final machining. The shaft diameters are machined to very accurate tolerance levels, and they are fully checked to ensure precision fit. Each shaft is made turned, ground and polished. They are coated after assembly to provide corrosion resistance. Shaft size should be designed to meet the first critical speed of at least fan maximum running speed 1.4 times.

### 6. Outlet Flange

The inlet flange is made of high-grade cold-rolling sheet with polyester coating. The outlet flange is made of galvanized steel. The connections of the flange components to the scroll are made using a TOX non-welding process. This maintains a good flange appearance while also providing sufficient strength and rigidity.

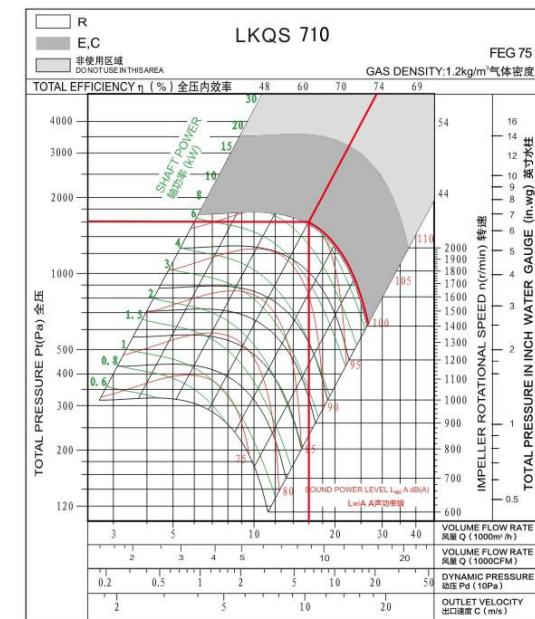
## 风机性能

### 1、风机选型示意图例

型号 Type	LKQS710K
风量 Volume	$q_v = 16000 \text{ m}^3/\text{h}$
全压 Total Pressure	$P_{tf} = 1600 \text{ Pa}$
动压 Dynamic Pressure	$P_{df} = 64 \text{ Pa}$
出口速度 Outlet Velocity	$C = 10.35 \text{ m/s}$
风机转速 Fan Speed	$n = 1430 \text{ r/min}$
轴功率 Shaft Power	$P_{sh} = 9.5 \text{ kW}$
A声功率级 A Sound Power Level	$L_{wA} = 94 \text{ dB(A)}$
全压效率 Total Efficiency	$\eta_{tf} = 74 \%$

## Performance Chart

### 1. Fan Performance Curve





## 2、电机的选配

性能曲线图上的功率  $P_{sh}$  是指风机的轴功率。

配套电机的功率： $P_{sh,p} = P_{sh} \times K \div \eta_{me}$

风机传动效率的取值方法可参照表 1，  
电机容量安全系数的取值方法可参照表 2。

表 1 (Table 1)

风机传动方式	Drive Type	$\eta_{me}$
电机直联传动	Motor Direct Drive	1
联轴器直联传动	Coupling Direct Drive	0.98
三角皮带传动	V-Belt Drive	0.95

## 安装与维护

### A ) 皮带传动安装

- 拆除风机轴端的保护并检查有无缺口和毛刺；
- 检查风机和电机轴之间的平行度；
- 中心距控制在  $0.7(d_1+d_2) < a < 2(d_1+d_2)$ ，前向风机皮带速度应控制在  $10\sim15m/s$ ；后向风机皮带速度应控制在  $25\sim35m/s$ ；
- 将皮带轮套在轴上滑进去，不要敲击，以免损伤轴承；
- 用一根直尺把风机和电机上的带轮对齐并紧固；
- 把皮带套进皮带轮，不要撬、挤压，以免损伤皮带；
- 调整张进度直至皮带看起来松紧适度，风机运行几分钟后，再调整皮带至合适的张紧度；
- 关掉风机，移动电机座以调整张紧度，当风机工作时，皮带紧的一边是两个皮带轮连成的一条直线，松的一边有轻微弧形。

### 2. Motor Selection

The power ( $P_{sh}$ ) on the performance chart refers to the shaft power of the fan.

The rated power of the drive motor equals the total required shaft input multiplied by the safety factor :  $P_{sh,p} = P_{sh} \times K \div \eta_{me}$ . The value of mechanical drive efficiency can be obtained from Table 1.

The required safety factors is provided in Table 2.

表 2 (Table 2)

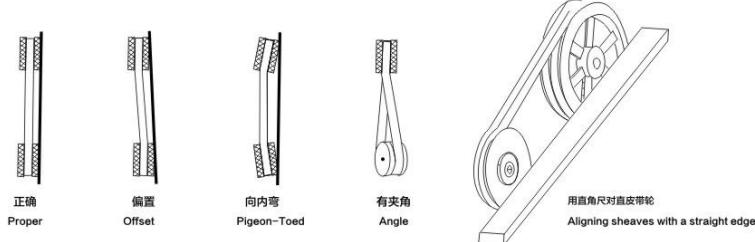
电机功率	Power of electric motor (kW)	K值 Value k
$\leq 0.75kW$	1.3	
$\leq 2.2kW$	1.2	
$\leq 7.5kW$	1.15	
$\geq 11kW$	1.1	

## Installation and Maintenance

### A) V-belt Drive Installation

- Remove the protective coating from the ends of the fan shaft and ensure that the shaft ends are free of nick and burrs.
- Check fan and motor shafts for alignment.
- The center distance must be controlled as  $0.7(d_1+d_2) < a < 2(d_1+d_2)$ , The belt speed of forward curve fan should be more than  $10m/s$ , but less than  $15m/s$ , ( $10 < v < 15m/s$ ). The belt speed of backward curve fan should be more  $25m/s$ , but less than  $35m/s$ .
- Slide sheaves on to the shafts. Do not hammer the sheaves on to the shafts with force as this may result in bearing damage.
- Align fan and motor sheaves with a straight-edge, and tighten the sheaves.
- Place belts over the sheaves with care. Do not bend or squeeze the belts or it might get damaged.
- Adjust the belt tension until the belts appear snug. Run the unit for a few minutes and allow the belts to set properly.
- Switch off the fan, adjust the belt tension by moving the motor base. When in operation, the tight side of the belts should be in a straight line from sheave to sheave and there should be a slight bow on the slack side.

图 3 (Fig3)



### B ) 皮带松紧度

合适的皮带松紧度对使用寿命来说很重要，太紧会给皮带和轴承带来额外的负载，降低它们的使用寿命，太松会出现皮带打滑现象而产生热能并降低使用寿命。

皮带松紧度量具可用来判断皮带是否松紧合适。量具本身带有一个尺表，根据皮带轮中心距和皮带横截面确定皮带张紧力的大小，如图 4 和表 3。

如没有皮带张紧度量具，应调节皮带松紧至风机启动时皮带不发生尖叫声为止，如发生短促的叫声是允许的。

拉紧皮带后、开动风机之前，重新检查皮带轮的对齐情况，如有必要则重新调整对齐。新皮带在开始使用时可能有点拉伸，则应在运行几天后重新检查皮带张紧度。

### B) Belt Tension

A proper level of belt tension is required in order to obtain a satisfactory belt life. If the belt tension level is too high, excessive loads will be imposed on the belts and the bearing, and this will reduce the lives of both of these components. If the belt tension level is too low, the belt will slip. Belt slippage generates a large amount of heat, and this heat will drastically reduce the life of a belt.

Belt-tensioning gauges can be used to determine whether the belts are tensioned properly. A chart is normally supplied with the gauge which indicates the ranges of forces required to deflect the belts by a given amount to obtain the proper belt tension level. The required forces are based upon the center distance of the sheaves and the belt cross-section. The belts are properly tensioned when the forces required to deflect the belt are within the specified range, see Fig 4 and Table 3. If a belt-tensioning gauge is not available, then the belt should be tightened just enough so that the belt does not squeal when the ventilator is started. A very short period of noise during the starting of a ventilator is allowable, but a squeal lasting several seconds or longer is not acceptable. After tensioning and before starting the fan, check to make sure that the sheaves are properly aligned.

Realign the sheaves if necessary. Note that new belts may stretch a little during initial use, so the belt tension level should be checked after a few days of operation.

图 4 (Fig4)

与中心距有关的皮带张紧度指示  
Belt tension indicator applied to mid centre distance.

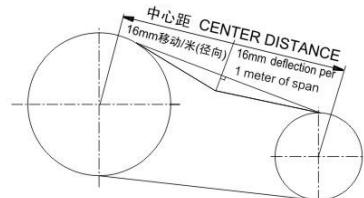


表 3 (Table3)

Belt Section	使皮带向下移动16mm径向距离1米所需的力量		
	张紧力 (小皮带轮直径) Small Pulley/Diameter (mm)	牛顿 Newtonian (N)	千克力 Kilogram force (kgf)
SPZ	56-95	13-20	1.3-2.0
	100-140	20-25	2.0-2.5
SPA	80-132	25-35	2.5-3.6
	140-200	35-45	3.6-4.6
SPB	112-224	45-65	4.6-6.6
	236-315	65-85	6.6-8.7
SPC	224-335	85-115	8.7-11.7
	375-560	115-150	11.7-15.3
A	80-140	10-15	1.1-1.5
B	125-200	20-30	2.0-3.1



### C ) 轴承润滑

风机使用带座轴承，可通过加油嘴注入润滑油。润滑油有效期取决于油脂类型、轴承的转速和工作温度。判断是否加油的最佳办法是当加新油时观察清除下来的旧油脂，可延长换油脂的间隔，如果清除下来的油脂比新的黑得多表明油脂已氧化，应缩短换油脂的间隔。

### 说明

- 1). 订货时须注明风机型号、转速、风量、风压、出风口方向和旋转方向。若需配套皮带、皮带轮、电机、安装底座等配件及其特殊要求可在订货时提出。
- 2). 在安装前应对风机各部件进行检查，对叶轮、主轴和轴承等主要机件应重点细致检查，如有损伤应修复后再安装使用。
- 3). 检查机壳及其它壳体内部，不应有掉入、遗留的工具和杂物。
- 4). 风机正式运转前，需检查电机的转向是否符合风机转向的要求。
- 5). 风管与出风口之间应采用软连接，接头不得拉紧。
- 6). 风机安装后用手或杠杆拨动叶轮，检查是否过紧或碰撞现象，确认无这些现象时方向可进行试转。
- 7). 风机配用电机功率是指在特定工况下，风机内功率加上机械损失与电机容量安全系数而言，并非出风口全敞开时所需的功率。为防止电机超功率运行而烧毁，严禁风机出风口或进风口不接管路或未加外界任何阻力进行空运转。
- 8). 风机在无较大腐蚀性气体、不含酸（碱）性和尘粒物质<150mg/m³ 的气体、-20°C < 温度 < 85°C 的气体环境下使用，风机在运输装卸过程中应小心轻放，防止碰撞挤压。

### C) Bearing Lubrication

The allowable period of time between lubrication of these bearings depends upon the operating speeds and temperatures of the bearing as well as on the type of lubrication. It is recommended to inspect the condition of the grease that is discharged from the bearings when new grease is added. If the discharged grease looks similar to the new grease, then a longer period of time between lubrications is possible. If the discharged grease is much darker than the new grease, this indicates that the grease is being oxidized and more frequent lubrications of the bearings are required.

### Instructions

- 1) When placing the order, it is necessary to state the type of fan, speed, air volume, air pressure, discharge direction, rotation direction, type of electric motor and its specifications.
- 2) Prior to installation, the fan should be carefully inspected. Special care should be taken in checking the shaft, Wheel and bearings. If there is an indication of any damage, the damaged parts should be repaired or repaired before the fan is installed or commissioned.
- 3) The inside of the scroll and casing need to be checked to make sure that there are no foreign objects inside the housing, such as tools or loose parts.
- 4) The rotational directions of the motor and Wheel should be checked to ensure that they are in compliance with the specification and purchase orders.
- 5) A flexible connector should be used between the fan outlet flange and its mating ductwork. The flex connector should not be over-stretched.
- 6) Following the installation, the Wheel should be turned by hand or with the use of a wrench to make sure that it turns freely without colliding with other parts of the fan. Once all this is done, the fan can be commissioned normally.
- 7) The rated motor power as calculated herein might not be sufficient to drive the fan with an unrestricted discharge flow. Operating the fan with an unrestricted discharge outlet will result in flow rate that exceeds the specified fan capabilities. Such operation will quickly burn the motor and damage the fan. Great care must be taken in operating the fan to make sure that the maximum rated flows, as provided on the performance charts in this catalog, are not exceeded.
- 8) The fan is limited for use in areas where air substances are non-corrosive, non-toxic and non-erosive and where dust particles are less than 150mg/m³ with a temperature between -20°C and 85°C. Special care should be taken during transportation, load and unload.

### 技术参数

### Technical Data

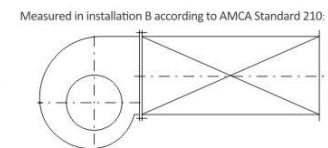
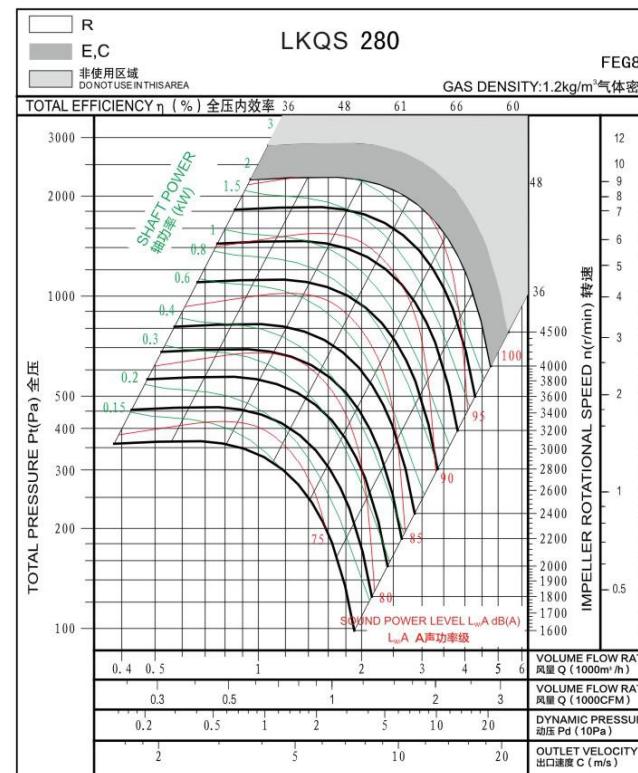
Wheel diameter	叶轮直径	$D = 280 \text{ mm}$	Fan weight	风机质量	$m = 17 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.04 \text{ kg m}^2$	Speed limit	极限转速	$n_{\max} = 4500 \text{ r/min}$

### 性能曲线

### Performance Curve

经认证的性能是B类安装：自由入口，管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声学性能额定值已按AMCA International标准301计算。所示值为安装类型B：自由入口，管道出口的声功率级 (入口 $L_{WA}$ )。

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  $L_{WA}$  sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

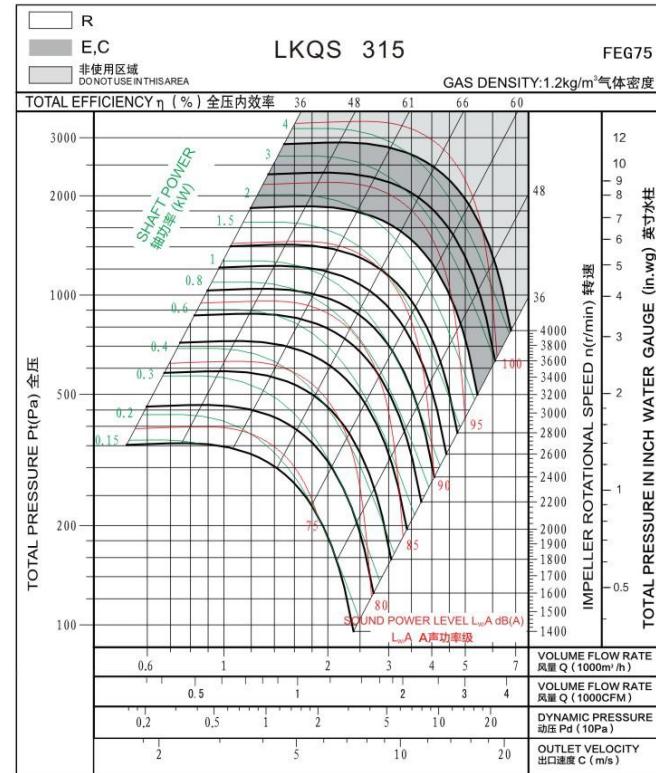
Wheel diameter	叶轮直径	$D = 315 \text{ mm}$	Fan weight	风机质量	$m = 27 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.06 \text{ kg m}^2$	Speed limit	极限转速	$n_{\text{max}} = 4000 \text{ r/min}$

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口 $L_{w,A}$ )。

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  $L_{w,A}$  sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

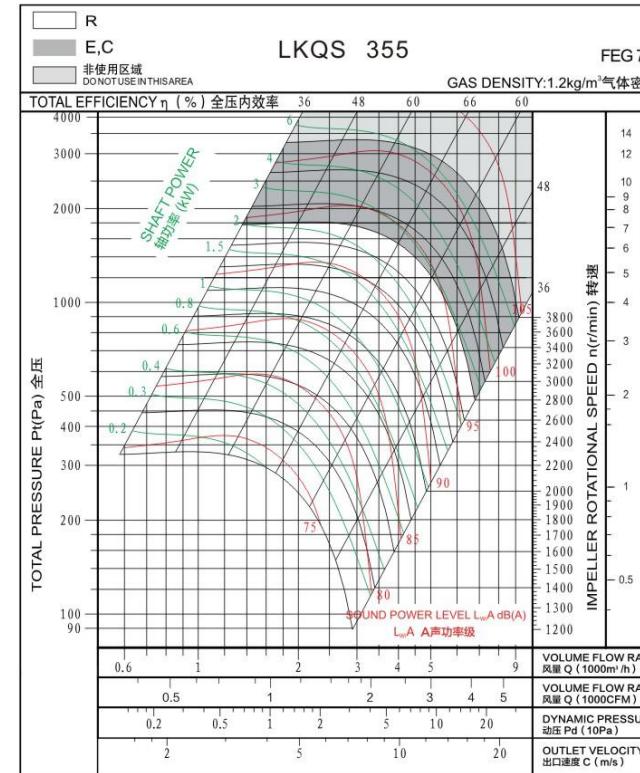
Wheel diameter	叶轮直径	$D = 355 \text{ mm}$	Fan weight	风机质量	$m = 39 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.112 \text{ kg m}^2$	Speed limit	极限转速	$n_{\text{max}} = 3800 \text{ r/min}$

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口 $L_{w,A}$ )。

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  $L_{w,A}$  sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

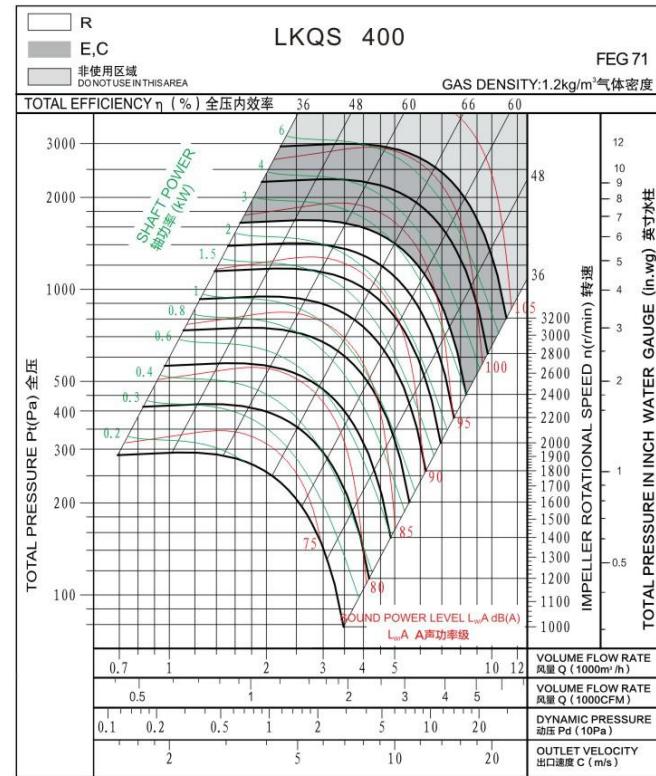
Wheel diameter	叶轮直径	$D = 400 \text{ mm}$	Fan weight	风机质量	$m = 44 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.185 \text{ kg m}^2$	Speed limit	极限转速	$n_{\max} = 3200 \text{ r/min}$

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口 $L_{WA}$ )。

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  $L_{WA}$  sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

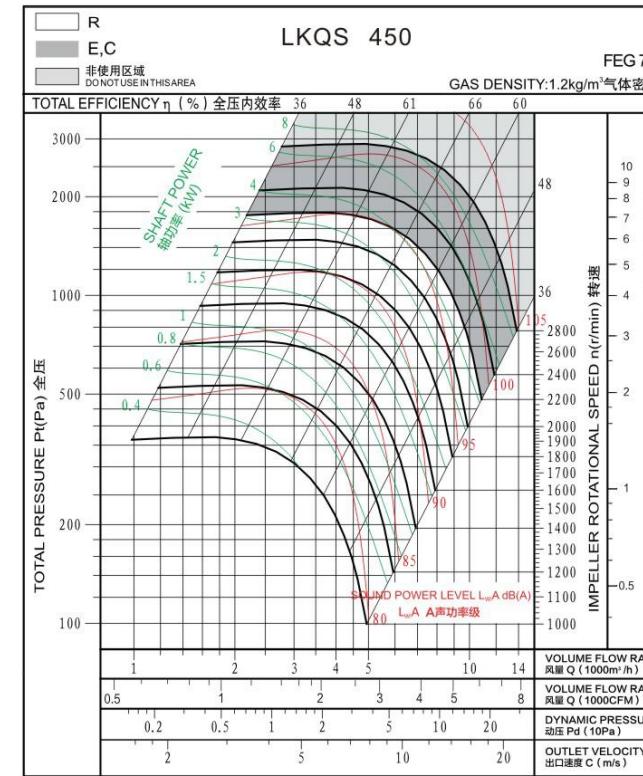
Wheel diameter	叶轮直径	$D = 450 \text{ mm}$	Fan weight	风机质量	$m = 55 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.29 \text{ kg m}^2$	Speed limit	极限转速	$n_{\max} = 2800 \text{ r/min}$

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口 $L_{WA}$ )。

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  $L_{WA}$  sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

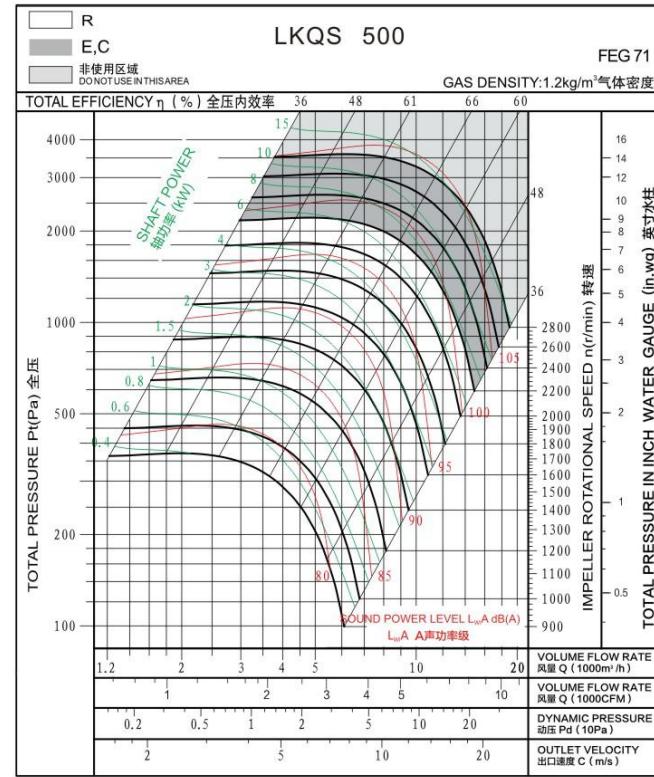
Wheel diameter 叶轮直径	D = 500 mm	Fan weight 风机质量	m = 70 kg
Moment of inertia 转动惯量	J = 0.49 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2800 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级 (入口L<sub>w,A</sub>)。

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<sub>w,A</sub> sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

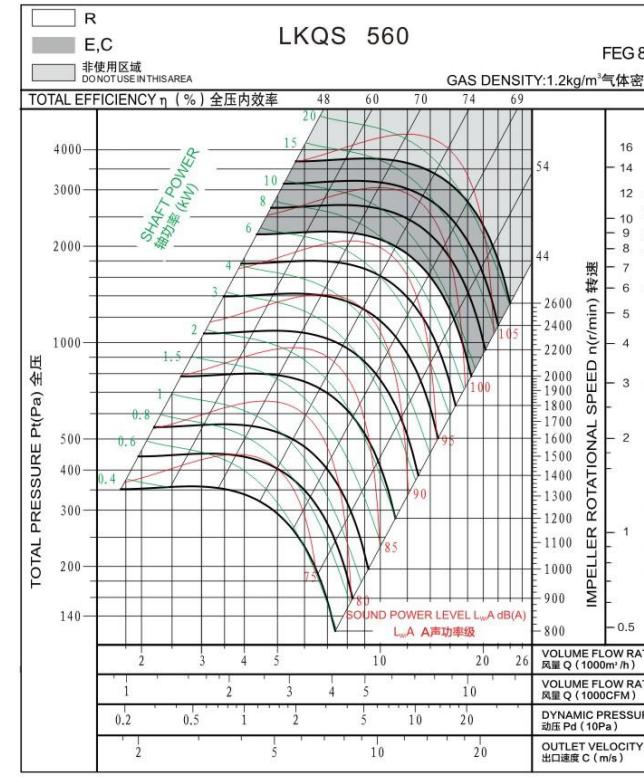
Wheel diameter 叶轮直径	D = 560 mm	Fan weight 风机质量	m = 110 kg
Moment of inertia 转动惯量	J = 0.78 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2600 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级 (入口L<sub>w,A</sub>)。

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<sub>w,A</sub> sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

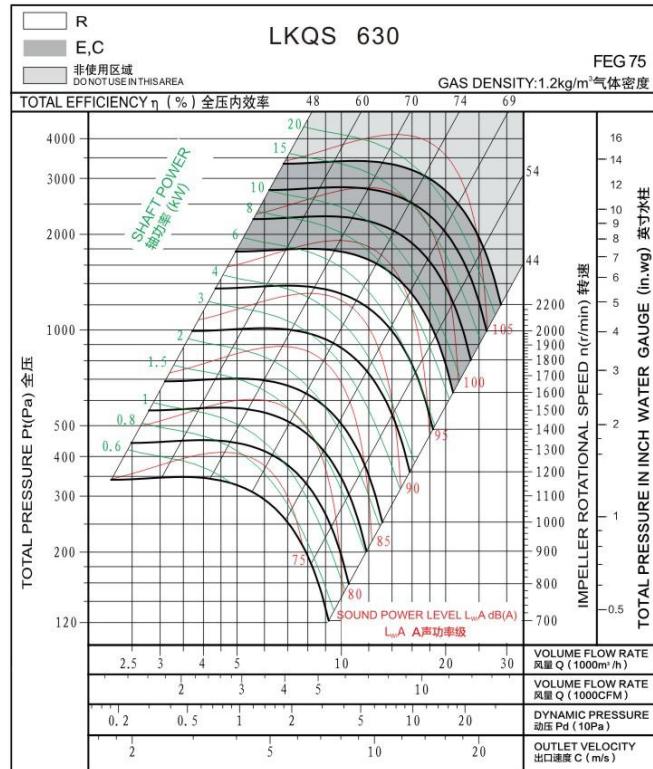
Wheel diameter 叶轮直径	D = 630 mm	Fan weight 风机质量	m = 125 kg
Moment of inertia 转动惯量	J = 1.28 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2200 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

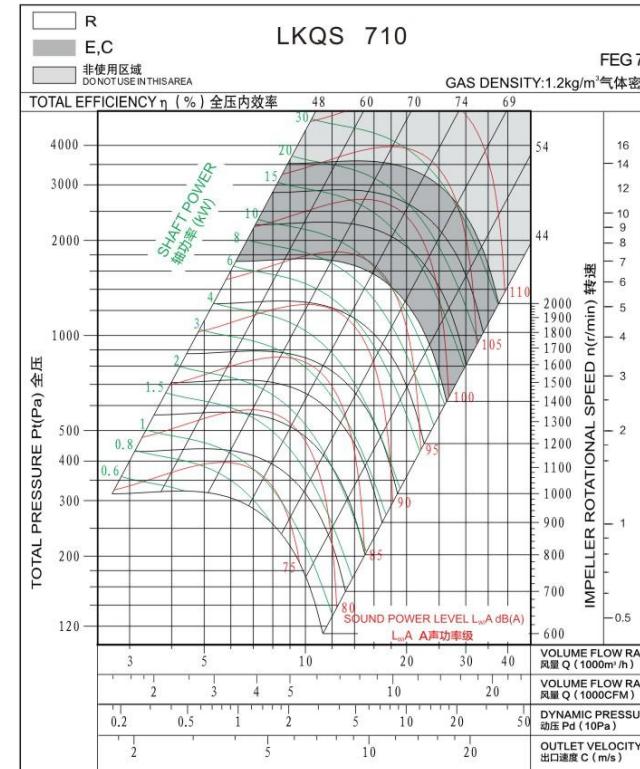
Wheel diameter 叶轮直径	D = 710 mm	Fan weight 风机质量	m = 215 kg
Moment of inertia 转动惯量	J = 2.61 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2000 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

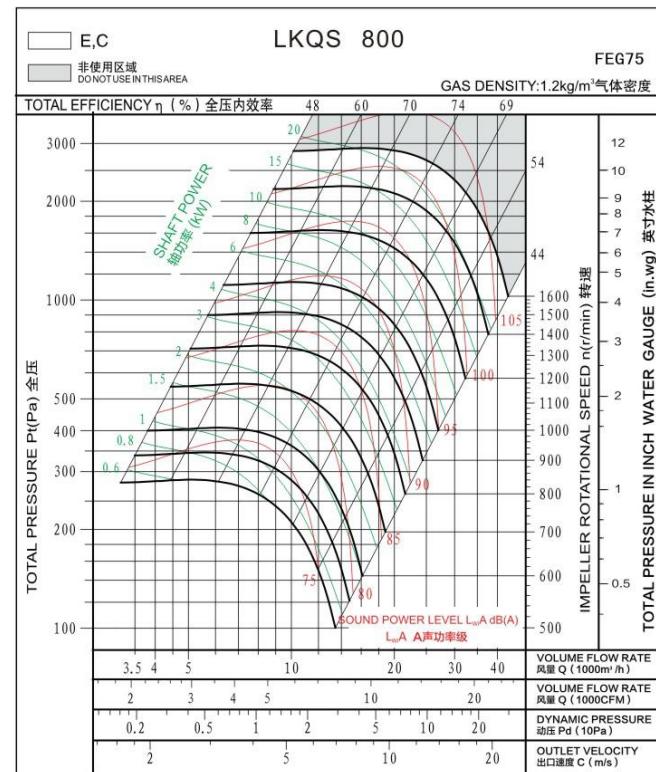
Wheel diameter 叶轮直径	D = 800 mm	Fan weight 风机质量	m = 245 kg
Moment of inertia 转动惯量	J = 5.09kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1400 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

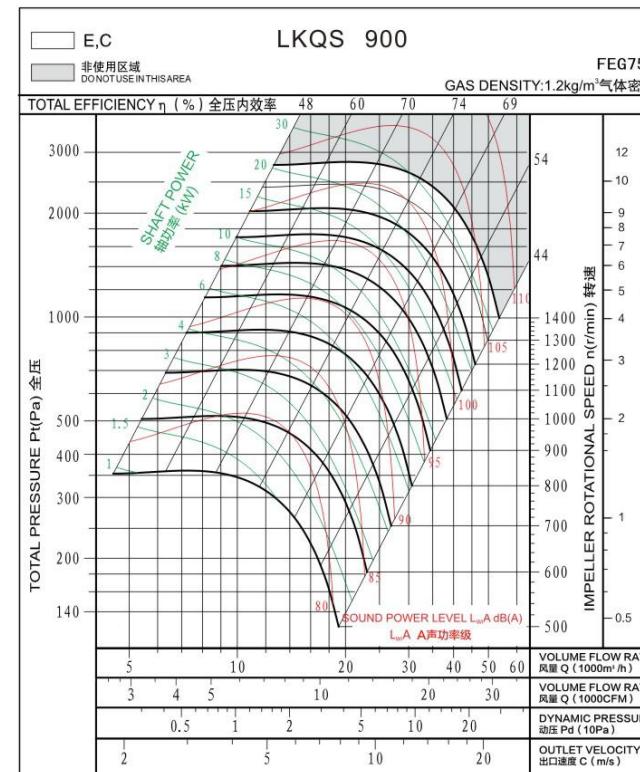
Wheel diameter 叶轮直径	D = 900 mm	Fan weight 风机质量	m = 350 kg
Moment of inertia 转动惯量	J = 7.59kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1400 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

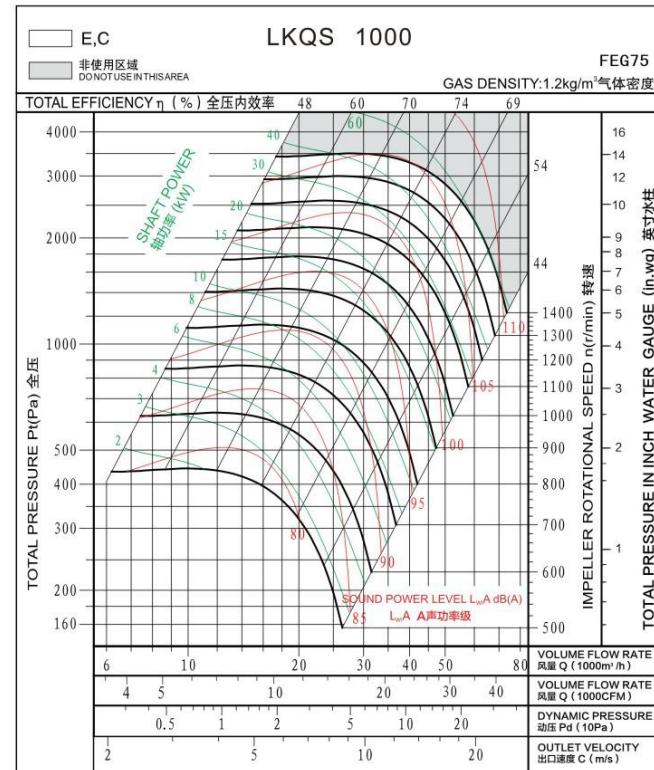
Wheel diameter 叶轮直径	D = 1000 mm	Fan weight 风机质量	m = 435 kg
Moment of inertia 转动惯量	J = 13.64 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1400 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级 (入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

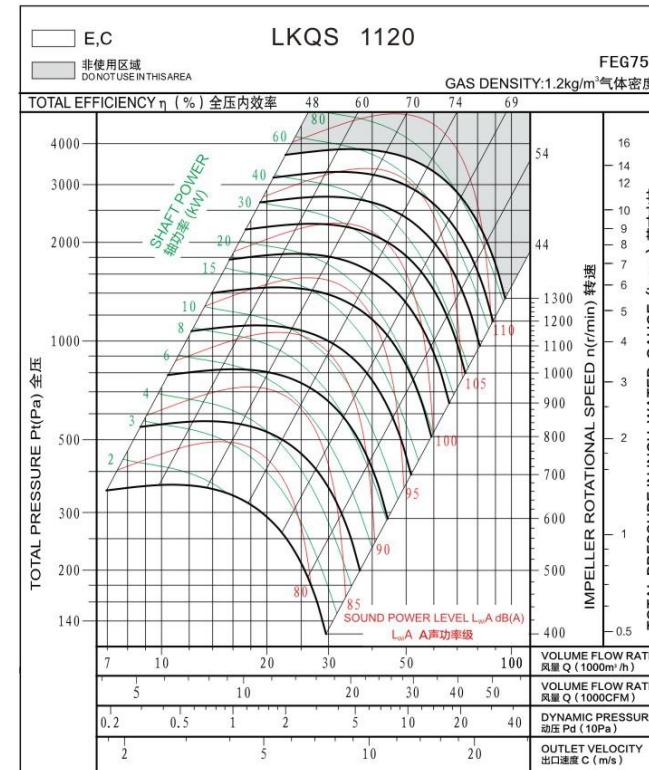
Wheel diameter 叶轮直径	D = 1120 mm	Fan weight 风机质量	m = 600 kg
Moment of inertia 转动惯量	J = 23.93kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1300 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级 (入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.





## 技术参数

## Technical Data

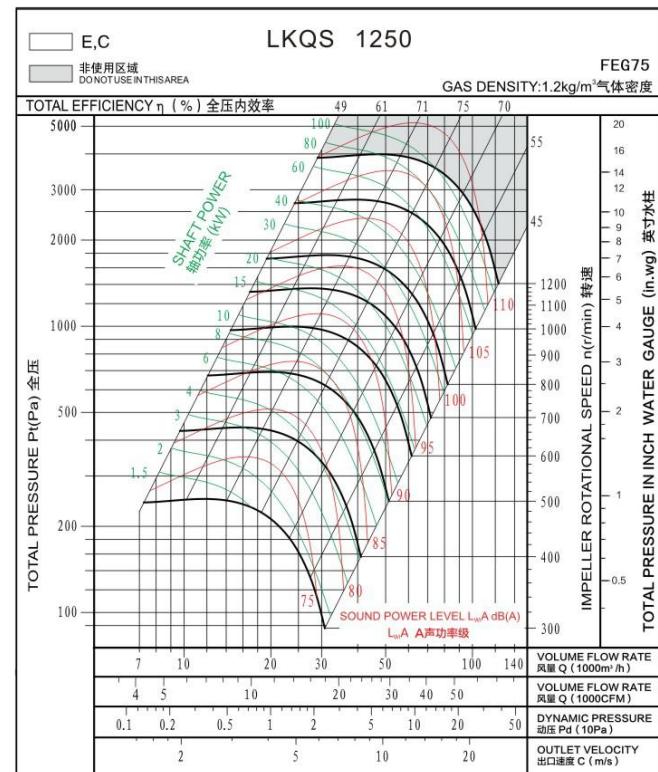
Wheel diameter 叶轮直径	D = 1250 mm	Fan weight 风机质量	m = 790 kg
Moment of inertia 转动惯量	J = 41.7 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1200 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

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<sub>WA</sub> sound power levels for installation type B: free inlet, ducted outlet.



## 技术参数

## Technical Data

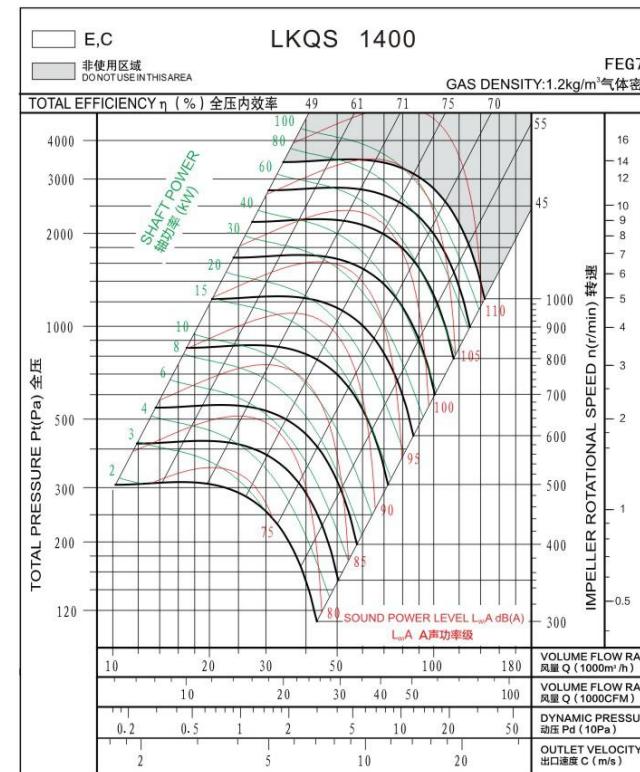
Wheel diameter 叶轮直径	D = 1400 mm	Fan weight 风机质量	m = 1080 kg
Moment of inertia 转动惯量	J = 77.4 kg m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> =1000 r/min

## 性能曲线

## Performance Curve

经认证的性能是B类安装:自由入口,管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B:自由入口,管道出口的声功率级(入口L<sub>WA</sub>)。

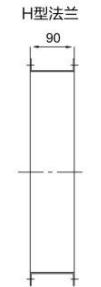
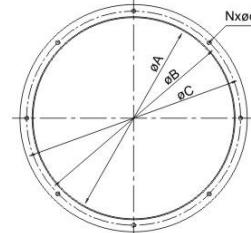
Performance certified is for installation type B: free inlet, ducted outlet. Power rating (kW) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.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





### 进口法兰

### Imported Flange



单位: mm

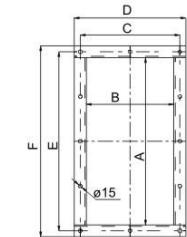
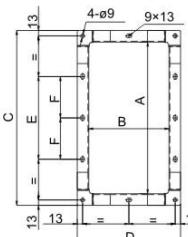
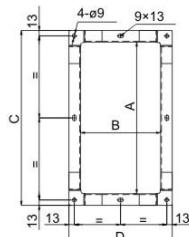
Dim	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400
A	292	322	362	404	448	510	570	635	722	808	896	996	1130	1264	1404
B	325	344	386	432	485	544	605	670	750	844	945	1044	1180	1310	1450
C	355	383	423	466	515	570	635	700	778	875	980	1080	1226	1360	1500
N-d	6x7	6x7	8x9	8x9	8x9	8x11	8x11	10x13	10x13	12x13	12x13	12x13	12x15	16x17	16x17

注: H型法兰、L型法兰可由客户选配,默认为L型法兰。

Note: Customers can choose H-type flange or L-type flange. The default is the L-type flange.

### 进口法兰

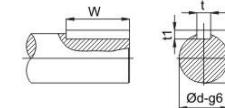
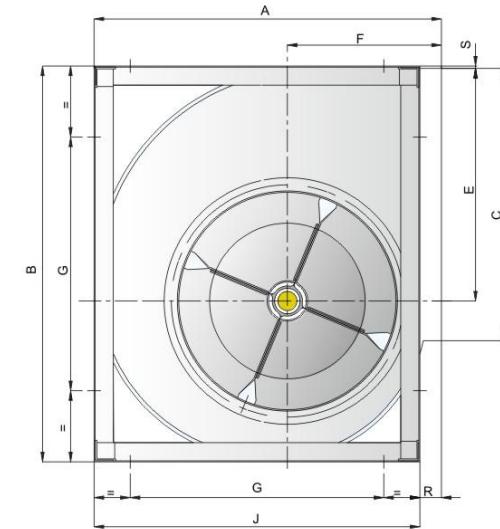
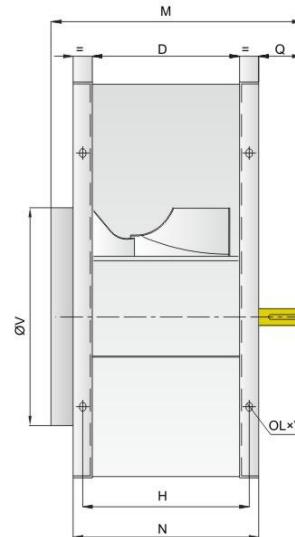
### Imported Flange



单位: mm

Model	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400
Dim	A	361	404	453	507	569	638	715	801	898	1007	1130	1267	1250	1400
B	197	223	237	257	308	344	383	432	478	533	595	663	1426	1588	1776
C	417	460	509	563	625	684	771	857	954	1063	1186	1323	777	850	952
D	253	279	294	330	364	400	439	488	534	589	651	719	825	900	1002
E	\	\	\	200	200	250	250	300	400	500	600	700	1478	1638	1826
F	\	\	\	\	\	\	\	200	250	300	350	1526	1688	1876	

### LKQS-R

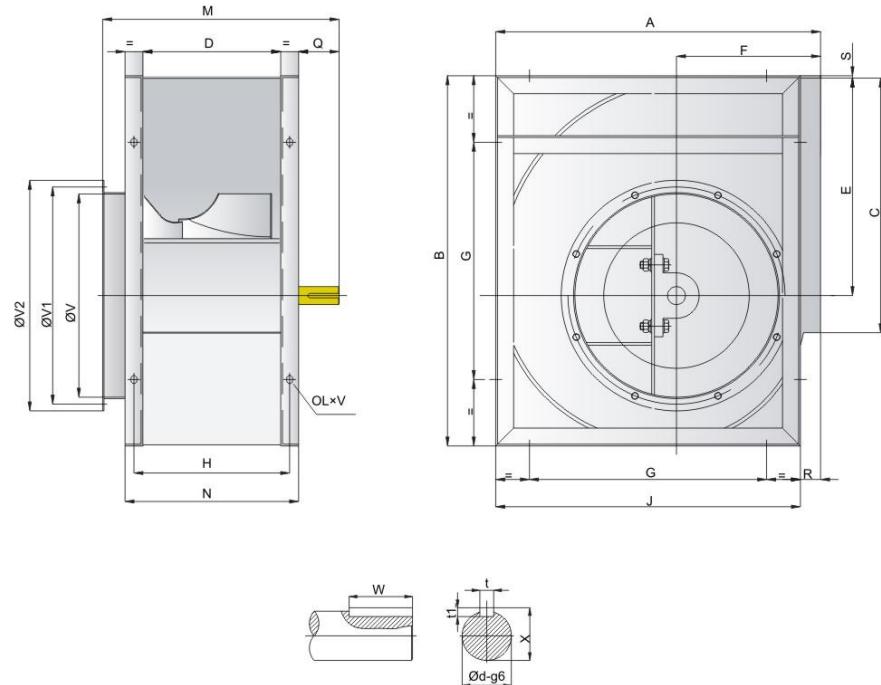


单位: mm

Model	A	B	C	D	E	F	G	H	J	K	M	N	Q	R	S	V	t	t1	W	X	Ød	LxV	
Dim	280	466	518	361	197	302	215	280	227	432	30	360	257	73	34	5	292	8	7	50	28	25	13x18
B	315	518	578	404	223	340	236	280	253	480	30	395	283	83	38	3	322	8	7	60	28	25	13x18
C	355	578	655	453	247	383	261	355	287	548	40	425	327	78	30	6	362	8	7	60	33	30	13x18
D	400	651	736	507	274	431.5	290	355	314	613	40	452	354	78	38	4.5	404	8	7	60	33	30	13x18
E	450	726	827	569	308	486	322	530	348	681	40	500	388	92	45	5	448	10	8	70	38	35	13x18
F	500	800	918	638	344	538	352	530	394	750	40	535	424	92	50	5	510	10	8	70	38	35	13x18
G	560	893	1030	715	383	602	390	530	433	845	50	600	483	87	48	8	570	12	8	70	43	40	13x18
H	630	999	1157	801	432	678.5	434	530	482	946	50	650	532	87	53	7	635	14	9	70	48.5	45	13x18
I	710	1121	1303	898	478	765	485	630	528	1058	50	725	578	115	63	7	722	14	9	90	48.5	50	17x22

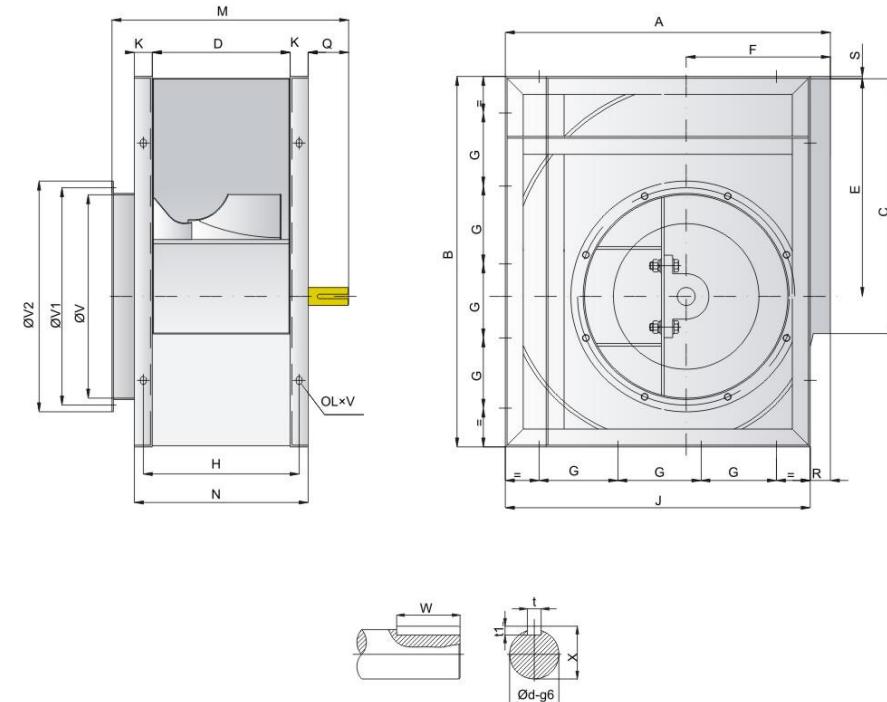


LKQS-E



Model Dim	A	B	C	D	E	F	G	H	J	K	M	N	Q	R	S	V	V1	V2	t	t1	W	X	Φd	LxV
280	466	518	361	197	302	215	280	227	432	30	405	257	86	34	5	292	325	355	8	7	60	33	30	13x18
315	518	578	404	223	340	236	280	253	480	30	440	283	96	38	3	322	344	383	8	7	70	33	30	13x18
355	578	655	453	247	383	261	355	287	548	40	470	327	91	30	6	362	386	423	10	8	70	38	35	13x18
400	651	736	507	274	431.5	290	355	314	613	40	497	354	91	38	4.5	404	432	466	10	8	70	38	35	13x18
450	726	827	569	308	486	322	530	348	681	40	556	388	116	45	5	448	465	515	12	8	90	43	40	13x18
500	800	918	638	344	538	352	530	394	750	40	592	424	116	50	5	510	544	570	12	8	90	43	40	13x18
560	893	1030	715	383	602	390	530	433	845	50	640	483	115	48	8	570	605	635	14	9	90	53.5	50	13x18
630	999	1157	801	432	678.5	434	530	482	946	50	690	532	115	53	7	635	670	700	14	9	90	53.5	50	13x18
710	1121	1303	898	478	765	485	630	528	1058	50	746	578	126	63	7	722	750	778	18	11	90	64	60	17x22
800	1250	1468	1107	533	862	535	710	583	1181	50	801	633	126	69	7	808	844	875	18	11	90	64	60	17x22
900	1408	1648	1130	595	971	604	800	655	1319	60	880	715	135	89	7	896	945	980	18	11	100	69	65	17x22
1000	1541	1810	1267	663	1066	657	900	713	1462	60	950	783	135	79	9	996	1044	1080	18	11	100	69	65	17x22

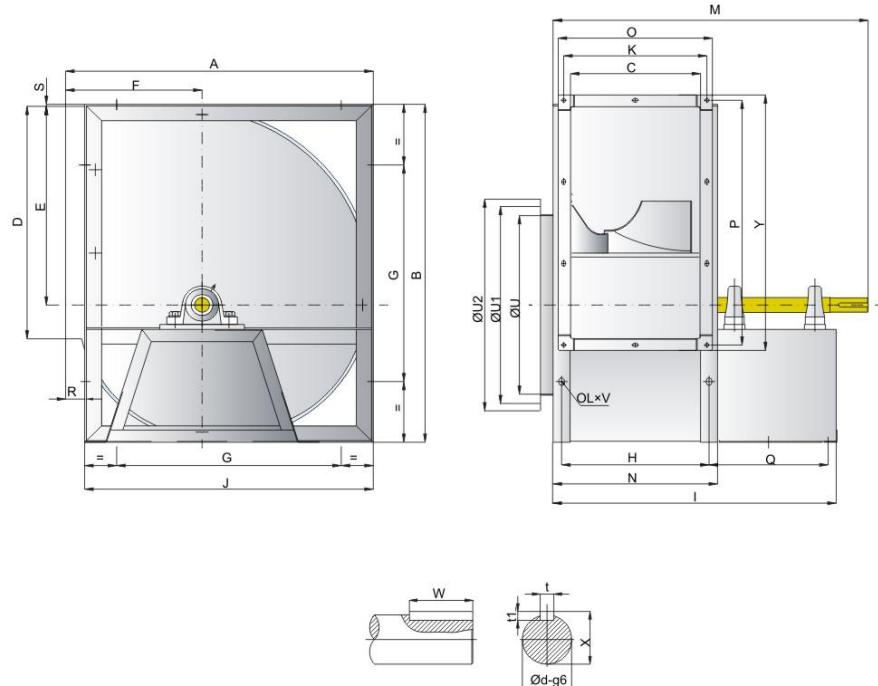
LKQS-E



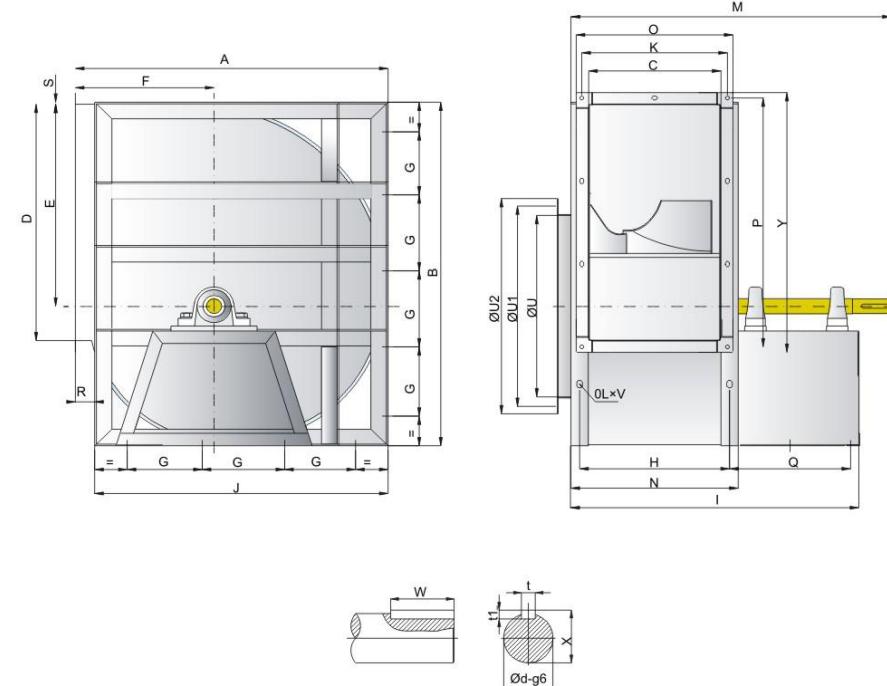
Model Dim	A	B	C	D	E	F	G	H	J	K	M	N	Q	R	S	V	V1	V2	t	t1	W	X	Φd	LxV
1120	1748	2033	1421	722	1192	758	400	782	1630	60	1135	842	247	188	11	1130	1181	1266	18	11	140	69	65	17x22
1250	1950	2270	1588	800	1333	840	450	880	1825	75	1218	950	235	125	12	1265	1361	1361	20	12	140	74.5	70	17x22
1400	2160	2535	1744	900	1492	920	500	980	2050	75	1337	1050	255	110	10	1402	1450	1500	22	14	140	85	80	17x22



LKQS-C



LKQS-C



单位: mm

	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Q	R	S	t	t1	U	U1	U2	W	X	Y	Φd	LxV
280	466	518	197	361	302	215	280	227	530	432	213	590	257	239	391	274	34	5	8	7	292	325	355	40	28	417	25	13x18
315	518	578	223	403	340	236	280	255	556	480	233	612	283	259	434	274	38	3	8	7	322	344	383	40	28	460	25	13x18
355	578	655	247	453	383	281	355	287	627	548	260	697	327	286	483	300	30	6	8	7	362	386	423	50	33	509	30	13x18
400	651	736	274	507	432	290	355	314	654	613	290	724	354	316	537	300	38	4.5	8	7	404	432	466	50	33	563	30	13x18
450	726	827	308	566	486	322	530	348	728	681	318	816	388	344	599	340	45	5	10	8	448	485	515	70	38	625	35	13x18
500	800	918	344	638	538	352	530	384	764	750	350	850	424	376	668	340	50	5	10	8	510	544	570	70	38	699	35	13x18
560	893	1030	383	715	603	390	530	433	855	845	366	945	483	414	745	378	48	8	12	8	570	605	635	90	43	771	40	13x18
630	999	1157	432	801	679	434	530	482	904	946	434	994	532	460	831	378	53	7	12	8	635	670	700	90	43	857	40	13x18
710	1121	1303	478	899	765	485	630	528	1005	1058	483	1115	578	512	928	436	63	7	14	9	722	750	778	90	48.5	954	45	17x22
800	1250	1468	533	1107	862	535	710	583	1060	1181	541	1170	633	567	1039	440	69	7	14	9	808	844	875	90	48.5	1063	45	17x22
900	1408	1648	595	1130	971	604	800	655	1191	1319	602	1313	715	613	1160	510	89	7	16	10	896	945	980	100	58.5	1186	45	17x22
1000	1541	1810	663	1267	1066	657	900	713	1259	1462	668	1381	783	694	1297	510	79	9	16	10	996	1044	1080	100	58.5	1323	45	17x22

单位: mm

	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Q	R	S	t	t1	U	U1	U2	W	X	Y	Φd	LxV
1120	1748	2033	722	1421	1192	758	400	782	1397	1630	777	1583	842	825	1478	572	118	11	18	11	1130	1180	1266	120	69	1526	65	17x22
1250	1950	2270	800	1588	1333	840	450	880	1565	1825	850	1740	950	900	1638	600	125	12	20	12	1265	1310	1361	140	74.5	1688	70	17x22
1400	2160	2535	900	1744	1492	920	500	980	1760	2050	952	1910	1050	1002	1826	695	110	10	22	14	1402	1450	1500	140	85	1876	80	17x22











## LKDS 系列离心式空调风机

样本此处所示LKDS系列离心风机获得了加盖AMCA印章的授权。所示额定值系根据AMCA出版物21)和AMCA出版物311所进行测试和程序确定，并符合AMCA认证额定值计划的要求。

Zhejiang LION KING Ventilator CO., LTD.. certifies that the LKDS 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 21 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.



## Centrifugal Ventilators

## 概述

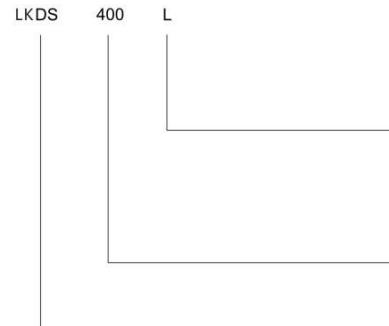
## Summary

LKDS系列前向多翼单进风离心风机采用国际同类产品先进技术自行开发，通过了AMCA国际认证并取得AMCA印章。该样本中列出的12种规格风机，流量范围从700 m<sup>3</sup>/h-50000m<sup>3</sup>/h, 全压从200Pa-1500Pa, 产品具有效率高、噪声低、耗能少、通用性强、安全性好等特点。广泛应用于各类中央空调机组及其暖通空调、净化、通风等空调系统。

The LKDS Series of centrifugal air conditioning fans was developed with advanced technologies. They are licensed to bear the AMCA Seal for air performance, sound, and FEG. The LKDS Series includes 12 models as described in this catalogue. The volume flow of the SYDS Series ranges from 700 m<sup>3</sup>/h to 50,000 m<sup>3</sup>/h, the total pressure ranges from 200Pa to 1,500Pa. Some of the features and characteristics of these fans are: forward blades, a wide range of applications, high efficiency, low noise, and low power consumption. These fans are ideal for use in central air-conditioning systems, in purifiers. They are also suitable for use in a variety of other ventilation applications.

## 命名方式

## Nomenclature



结构型式 Construction type

R型(基本型) Type R (Basic Model)

E型(加强型) Type E (Heavy Duty Model)

C型(悬臂型) Type C (Hanging Model)

叶轮名义直径 (mm)

Nominal diameter of Wheel (mm)

前向多翼离心风机系列代号

Fan series with multi-vane forward curved blades

## 产品型式

## Product Features

### 1. 旋向

LKDS 系列风机可分为左旋( LG ) 和右旋( RD )两种旋转方式，从风机皮带轮一端正视，叶轮顺时针旋转的称为右旋风机，逆时针旋转的称为左旋风机。

### 1. Rotation

LKDS series fans have two direction of rotations, left-hand rotation (LG) and right-hand rotation (RD); Viewing from drive side, if the Wheel rotates clockwise, it is left hand (LG) rotation. If the Wheel rotates counter clockwise, it is right-hand (RD).



## 2. 出风口方向

LKDS 系列出风口可按图 1 所示制成  $0^\circ$ 、 $90^\circ$ 、 $180^\circ$ 、 $270^\circ$  四种出风方向。

图1 (Fig 1)

	$0^\circ$	$90^\circ$	$180^\circ$	$270^\circ$
左 旋 LG Left Hand				
右 旋 RD Right Hand				

## 2. Discharge Direction

As shown in Fig1, LKDS Series fans can be constructed in four discharge directions:  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ , and  $270^\circ$ .

## 3. 结构形式

LKDS 系列风机可按图 2 所示制成 R 型、E 型、C 型。

图2 (Fig 2)

风机类型 Fan Type	机号 Fan Size	风机示意图 Fan Diagram	轴承实物图 Bearing Type
R 型 TYPE R	280-710		
E 型 TYPE E	280-1000		
C 型 TYPE C	280-1000		

## 3. Type of Construction

As shown in Fig 2, LKDS series fans can be divided into category R, E, C.

## 产品结构

LKDS 系列风机主要由机壳、叶轮、框架、轴承及轴构成。出口法兰(为可选件)。

### 1. 机壳

机壳采用热镀锌钢板制造，侧板具有符合空气动力的外形，进风口整体拉伸成型，蜗板采用点焊或“Pittsburg seam locking”的连接方式与侧板连成一体。

### 2. 叶轮

前向多翼叶轮采用优质热镀锌钢板制成，叶片设计成符合空气动力学的特定形状，使得效率最高，噪声最低。叶片用铆爪固定在中盘及端圈上，在最大功率连续运转时，叶轮将具备足够的刚度。所有叶轮进行静平衡和动平衡测试，内控精度达到 G2.5 级 (ANSI/AMCA 204-05)。

### 3. 框架

R 型风机框架采用热镀锌钢板剪切、折弯制成，TOX 连接保证了所需的尺寸精度和应有的刚度；E 型、C 型风机框架由角钢和扁钢冷弯焊接成表面喷塑处理，以保证足够的刚度和强度。

### 4. 轴承

LKDS 系列风机均采用优质滚珠轴承，并根据噪声最低来选择，该轴承设有加润滑油的孔，已预先加润滑油并自动对中；R 型风机的轴承安装在轴承支架上，并设有防振垫圈；E 型、C 型风机则采用带座向心球轴承；轴承寿命为  $L10 \geq 100000$  小时。

### 5. 轴

风机轴采用 40Cr 低合金钢，经车、调质热处理、磨削制成，强度高，挠度小，严格控制轴径尺寸公差及形位公差，每根轴均经过涂覆防锈处理。轴尺寸设计应满足第一临界转速至少为风机最大运行转速的 1.4 倍。

### 6. 出风口法兰

进风口法兰采用优质冷轧板制成，整体喷塑。出风口法兰采用热镀锌钢板制成，出风口法兰与蜗壳的连接采用 TOX 免焊工艺，外观精美，并具有足够的刚度与强度。

## Construction of Product

LKDS series fans are mainly constructed of housing, Wheel, frame, bearing and shaft. Outlet flange (is optional).

### 1. Housing

The housing is made of hot galvanized steel sheet. The side plates include inlet cones that are designed with the best aerodynamics for inlet condition. The scroll is fixed to the side plates by spot welding or "Pittsburg seam locking".

### 2. Wheel

Forward curved Wheel is constructed of high-grade hot galvanized steel sheet with the advanced aerodynamics profile to achieve the highest efficiency and the lowest noise level. The Wheel is fixed on the center plate and on the end ring with riveting grip pins. The Wheel is constructed with maximum strength that endures the continuous operation with maximum power. All Wheels are balanced to ANSI/AMCA Standard 204-05 . Yilida's internal standard is G2.5 or higher for wheel balancing.

### 3. Frame

The frames for type R construction are made of galvanized steel angle iron bars. The cutting and bending of the frame parts, as well as the TOX connections, are formed with the use of toolings to ensure the high accuracy and the rigidity of the frames; The frames for E and C constructions are welded by angle steel and flat steel, and finished with polyester coating in order to ensure sufficient rigidity and strength.

### 4. Bearings

Ball bearings are used in all of the LKDS Series fans. These are high-quality bearings and selected to minimize the fan noise levels. The bearings are pre-lubricated, sealed, and self-centering. For type R constructions, the bearings are supplied with lubrication fittings. For type E and C constructions, the bearings are supplied with radial bearing. All Yilida bearing service life ( $L10$ ) are over 100,000 hours ( $L10 \geq 100000$  hours).

### 5. Shaft

The shafts are made of 40 Cr carbon steel bars. The shafts are rough machined and then stress relieved with heat treatment before final machining. The shaft diameters are machined to very accurate tolerance levels and they are fully checked to ensure precision fit. Each shaft is made turned, ground and polished. They are coated after assembly to provide corrosion resistance. Shaft size should be designed to meet the first critical speed of at least fan maximum running speed 1.4 times.

### 6. Outlet Flange

The inlet flange is made of high-grade cold-rolling sheet with polyester coating. The outlet flange is made of galvanized steel. The connections of the flange components to the scroll are made using a TOX non-welding process. This maintains a good flange appearance while also providing sufficient strength and rigidity.



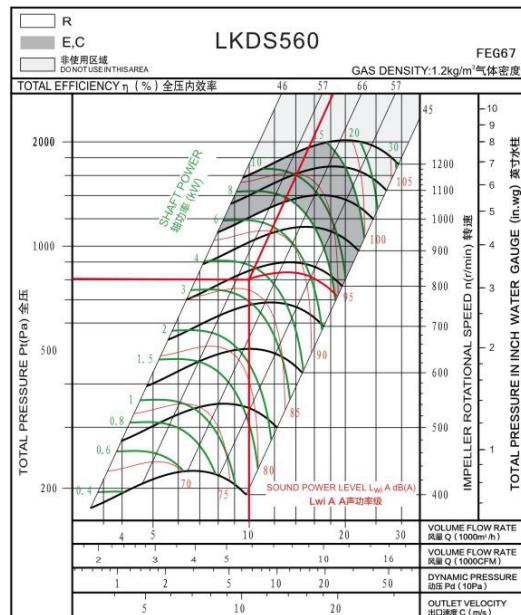
## 风机性能

### 1、风机选型示意图例

型号 Type	LKDS560R
风量 Volume	$q_v = 10000 \text{m}^3/\text{h}$
全压 Total Pressure	$P_{tf} = 800 \text{Pa}$
动压 Dynamic Pressure	$P_{df} = 67 \text{Pa}$
出口速度 Outlet Velocity	$C = 10.56 \text{m/s}$
风机转速 Fan Speed	$n = 768 \text{r/min}$
轴功率 Shaft Power	$P_{sh} = 3.43 \text{kW}$
A声功率级 A Sound Power Level	$L_{w,A} = 87 \text{dB(A)}$
全压效率 Total Efficiency	$\eta_{tf} = 64.8\%$

## Performance Chart

### 1. Fan Performance Curve



## 2、电机的选配

性能曲线图上的功率  $P_{sh}$  是指风机的轴功率。

配套电机的功率:  $P_{sh,p} = P_{sh} \times K \div \eta_{me}$

风机传动效率的取值方法可参照表 1,

电机容量安全系数的取值方法可参照表 2。

## 2. Motor Selection

The power ( $P_{sh}$ ) on the performance chart refers to the shaft power of the fan.

The rated power of the drive motor equals the total required shaft input multiplied by the safety factor :  $P_{sh,p} = P_{sh} \times K \div \eta_{me}$ . The value of mechanical drive efficiency can be obtained from Table 1. The required safety factors is provided in Table 2.

表1 (Table 1)

风机传动方式 Drive Type	$\eta_{me}$
电机直联传动 Motor Direct Drive	1
联轴器直联传动 Coupling Direct Drive	0.98
三角皮带传动 V-Belt Drive	0.95

表2 (Table 2)

电机功率 Power of electric motor (kW)	K值 Value k
≤ 0.75kW	1.3
≤ 2.2kW	1.2
≤ 7.5kW	1.15
≥ 11kW	1.1

## 安装与维护

## Installation and Maintenance

### A ) 皮带传动安装

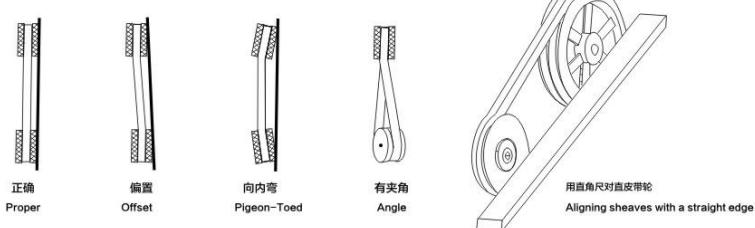
- 拆除风机轴端的保护并检查有无缺口和毛刺;
- 检查风机和电机轴之间的平行度;
- 中心距控制在  $0.7(d_1+d_2) < a < 2(d_1+d_2)$ , 前向风机皮带速度应控制在  $10 \sim 15 \text{m/s}$ ; 后向风机皮带速度应控制在  $25 \sim 35 \text{m/s}$ ;
- 将皮带轮套在轴上滑进去, 不要敲击, 以免损伤轴承;
- 用一根直尺把风机和电机上的带轮对齐并紧固;
- 把皮带套进皮带轮, 不要撬、挤压, 以免损伤皮带;
- 调整张进度直至皮带看起来松紧适度, 风机运行几分钟后, 再调整皮带至合适的张紧度;
- 关掉风机, 移动电机座以调整张紧度, 当风机工作时, 皮带紧的一边是两个皮带轮连成的一条直线, 松的一边有轻微弧形。

### A) V-belt Drive Installation

- Remove the protective coating from the ends of the fan shaft and ensure that the shaft ends are free of nick and burrs.
- Check fan and motor shafts for alignment.
- The center distance must be controlled as  $0.7(d_1+d_2) < a < 2(d_1+d_2)$ , The belt speed of forward curve fan should be more than  $10 \text{m/s}$ , but less than  $15 \text{m/s}$ , ( $10 < v < 15 \text{m/s}$ ). The belt speed of backward curve fan should be more  $25 \text{m/s}$ , but less than  $35 \text{m/s}$  ( $25 < v < 35 \text{m/s}$ ).
- Slide sheaves on to the shafts, Do not hammer the sheaves on to the shafts with force as this may result in bearing damage.
- Align fan and motor sheaves with a straight-edge, and tighten the sheaves.
- Place belts over the sheaves with care. Do not bend or squeeze the belts or it might get damaged.
- Adjust the belt tension until the belts appear snug. Run the unit for a few minutes and allow the belts to set properly.
- Switch off the fan, adjust the belt tension by moving the motor base. When in operation, the tight side of the belts should be in a straight line from sheave to sheave and there should be a slight bow on the slack side.



图3 (Fig3)



## B ) 皮带松紧度

合适的皮带松紧度对使用寿命来说很重要，太紧会带给皮带和轴承带来额外的负载，降低它们的使用寿命，太松会出现皮带打滑现象而产生热能并降低使用寿命。

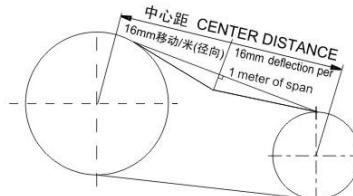
皮带松紧度量具可用来判断皮带是否松紧合适。量具本身带有一个尺表，根据皮带轮中心距和皮带横截面确定皮带张紧力的大小，如图4和表3。

如没有皮带张紧度量具，应调节皮带松紧至风机启动时皮带不发生尖叫声为止，如发生短促的叫声是允许的。

拉紧皮带后、开动风机之前，重新检查皮带轮的对齐情况，如有必要则重新调整对齐。新皮带在开始使用时可能有点拉伸，则应在运行几天后重新检查皮带张紧度。

表4 (Fig4)

与中心距有关的皮带张紧度指示  
Belt tension indicator applied to mid centre distance.



## B) Belt Tension

A proper level of belt tension is required in order to obtain a satisfactory belt life. If the belt tension level is too high, excessive loads will be imposed on the belts and the bearing, and this will reduce the lives of both of these components. If the belt tension level is too low, the belt will slip. Belt slippage generates a large amount of heat, and this heat will drastically reduce the life of a belt.

Belt-tensioning gauges can be used to determine whether the belts are tensioned properly. A chart is normally supplied with the gauge which indicates the ranges of forces required to deflect the belts by a given amount to obtain the proper belt tension level. The required forces are based upon the center distance of the sheaves and the belt cross-section. The belts are properly tensioned when the forces required to deflect the belt are within the specified range, see Fig 4 and Table 3.

If a belt-tensioning gauge is not available, then the belt should be tightened just enough so that the belt does not squeal when the ventilator is started. A very short period of noise during the starting of a ventilator is allowable, but a squeal lasting several seconds or longer is not acceptable. After tensioning the belts and before starting the fan, check to make sure that the sheaves are properly aligned. Realign the sheaves if necessary. Note that new belts may stretch a little during initial use, so the belt tension level should be checked after a few days of operation.

表3 (Table3)

皮带截面 Belt Section	使皮带向下移动16mm径向距离1米所需的力量 Force required to deflect belt 16mm per metre of span		
	张紧力 (小皮带轮直径) Small Pulley/Diameter (mm)	牛顿 Newtonian (N)	千克力 Kilogram force (kgf)
SPZ	56-95	13-20	1.3-2.0
	100-140	20-25	2.0-2.5
SPA	80-132	25-35	2.5-3.6
	140-200	35-45	3.6-4.6
SPB	112-224	45-65	4.6-6.6
	236-315	65-85	6.6-8.7
SPC	224 -335	85-115	8.7-11.7
	375-560	115-150	11.7-15.3
A	80-140	10-15	1.1-1.5
B	125-200	20-30	2.0-3.1

## C ) 轴承润滑

风机使用带座轴承，可通过加油嘴注入润滑油。润滑油有效期取决于油脂类型、轴承的转速和工作温度。判断是否加油的最好办法是当加新油时观察清除下来的旧油脂，可延长换油脂的间隔，如果清除下来的油脂比新的黑得多表明油脂已氧化，应缩短换油脂的间隔。

## C) Bearing Lubrication

The fan bearings are filled with lubricant when they ship from the factory, so the bearings do not require any additional grease to be supplied before starting the fan. The fans that are equipped with pillow block bearing are provided with lubrication fittings, and these fittings allow for additional lubrication to the supplied to the bearings at regular intervals.

The allowable period of time between lubrication of these bearings depends upon the operating speeds and temperatures of the bearing as well as on the type of lubrication. It is recommended to inspect the condition of the grease that is discharged from the bearings when new grease is added. If the discharged grease looks similar to the new grease, then a longer period of time between lubrications is possible. If the discharged grease is much darker than the new grease, this indicates that the grease is being oxidized and more frequent lubrications of the bearings are required.

## 说明

- 1). 送货时须注明风机型号、转速、风量、风压、出风口方向和旋转方向。若需配套皮带、皮带轮、电机、安装底座等配件及其它特殊要求可在订货时提出。
- 2). 在安装前应对风机各部件进行检查，对叶轮、主轴和轴承等主要机件应重点细致检查，如有损伤应修复后再安装使用。
- 3). 检查壳体和其它壳体内部，不应有掉入、遗留的工具和杂物。
- 4). 风机正式运转前，需检查电机的转向是否符合风机转向的要求。
- 5). 风管与出风口之间应采用软连接，接头不得拉紧。
- 6). 风机安装后用手或杠杆拨动叶轮，检查是否过紧或碰撞现象，确认无这些现象时方可进行试转。
- 7). 风机配用电机功率是指在特定工况下，风机轴功率加上机械损失与电机容量安全系数而言，并非出风口全敞开时所需的功率。为防止电机超功率运行而烧毁，严禁风机出风口或进风口不接管路或未加外界任何阻力进行空运转。
- 8). 风机在无较大腐蚀性气体、不含酸（碱）性和尘粒物质小于150mg/m³的气体、-20°C < 温度 < 85°C 的气体环境下使用，风机在运输装卸过程中应小心轻放，防止碰撞挤压。

## Instructions

- 1) When placing the order, it is necessary to state the type of fan, speed, air volume, air pressure, discharge direction, rotation direction, type of electric motor and its specifications.
- 2) Prior to installation, the fan should be carefully inspected. Special care should be taken in checking the shaft, Wheel and bearings. If there is an indication of any damage, the damaged parts should be repaired or repaired before the fan is installed or commissioned.
- 3) The inside of the scroll and casing need to be checked to make sure that there are no foreign objects inside the housing, such as tools or loose parts.
- 4) The rotational directions of the motor and Wheel should be checked to ensure that they are in compliance with the specification and purchase orders.
- 5) A flexible connector should be used between the fan outlet flange and its mating ductwork. The flex connector should not be over-stretched.
- 6) Following the installation, the Wheel should be turned by hand or with the use of a wrench to make sure that it turns freely without colliding with other parts of the fan. Once all this is done, the fan can be commissioned normally.
- 7) The rated motor power as calculated herein might not be sufficient to drive the fan with an unrestricted discharge flow. Operating the fan with an unrestricted discharge outlet will result in flow rate that exceeds the specified fan capabilities. Such operation will quickly burn the motor and damage the fan. Great care must be taken in operating the fan to make sure that the maximum rated flows, as provided on the performance charts in this catalog, are not exceeded.
- 8) The fan is limited for use in areas where air substances are non-corrosive, non-toxic and non-erosive and where dust particles are less than 150mg/m³ with a temperature between -20°C and 85°C. Special care should be taken during transportation, load and unload.



## 技术参数

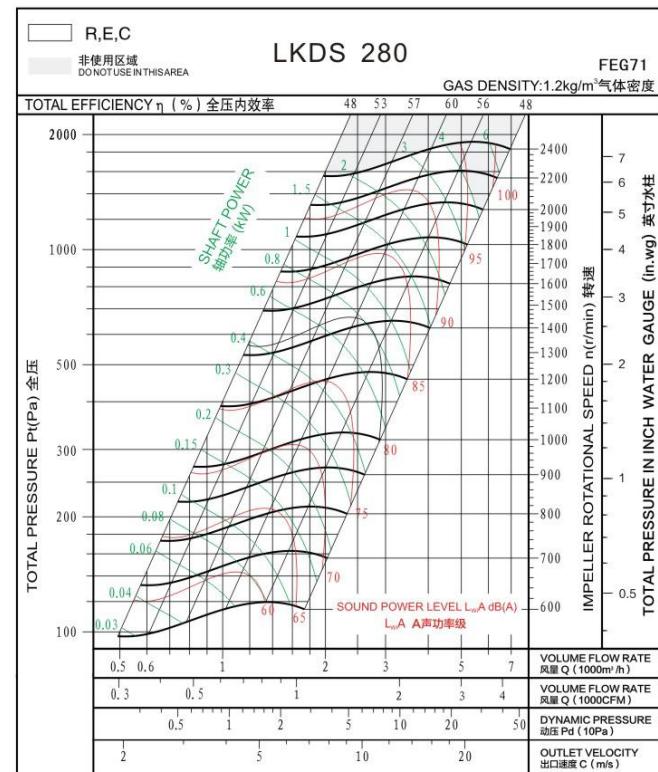
## Technical Data

Wheel diameter 叶轮直径	D = 280 mm	Fan weight 风机质量	m = 30 kg
Moment of inertia 转动惯量	J = 0.032 kg·m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2400 r/min

## 性能曲线

## Performance Curves

经认证的性能是B类安装：自由入口，管道出口。功率额定值(kW)不包括传输损失。各项性能额定值不包括附属物(附件)的影响。所示A加权声音性能额定值已按AMCA International标准301计算。所示值为安装类型B：自由入口，管道出口的声功率级（入口L<sub>w,A</sub>）。



## 技术参数

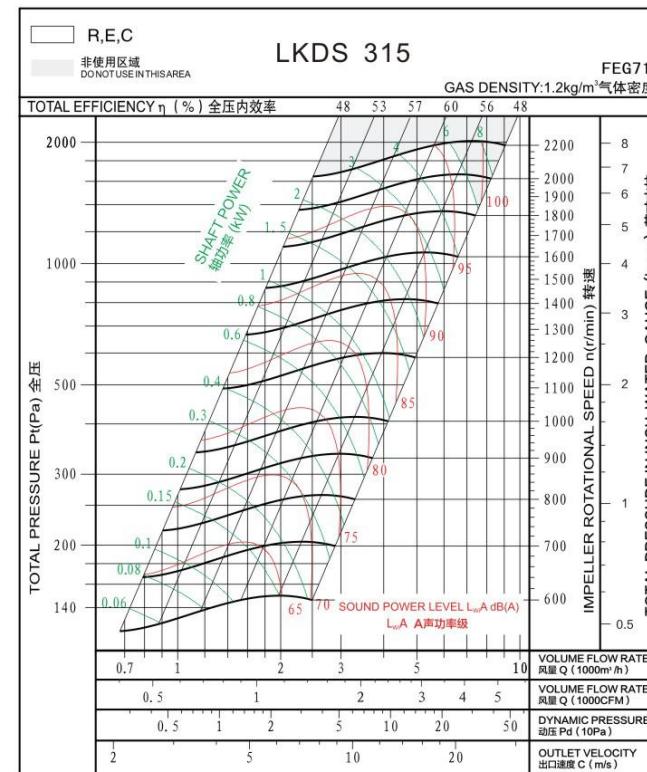
## Technical Data

Wheel diameter 叶轮直径	D = 315 mm	Fan weight 风机质量	m = 33 kg
Moment of inertia 转动惯量	J = 0.055 kg·m <sup>2</sup>	Speed limit 极限转速	n <sub>max</sub> = 2000 r/min

## 性能曲线

## Performance Curves

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## 技术参数

Wheel diameter	叶轮直径	D = 355 mm	Fan weight	风机质量	$m = 48 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.083 \text{ kg m}^2$	Speed limit	极限转速	$n_{\max} = 2000 \text{ r/min}$

## Technical Data

## 技术参数

Wheel diameter	叶轮直径	D = 400 mm	Fan weight	风机质量	$m = 57 \text{ kg}$
Moment of inertia	转动惯量	$J = 0.17 \text{ kg m}^2$	Speed limit	极限转速	$n_{\max} = 1800 \text{ r/min}$

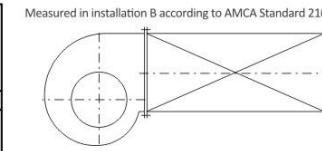
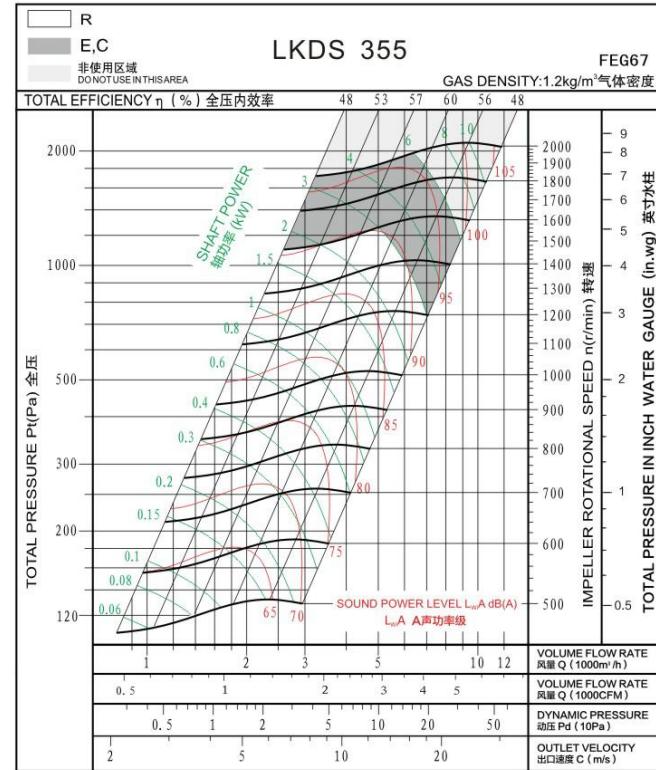
## Technical Data

## 性能曲线

## Performance Curves

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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  $L_{WA}$  sound power levels for installation type B: free inlet, ducted outlet.



## 性能曲线

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