

ABOUT US

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TIME TUNNEL of BAHÇIVAN MOTOR

- 1989

Founder Mr. Omer Faruk BAHÇIVAN and Mr. Mehmet Fethi BAHÇIVAN intended to direct their business to building materials. ‘BAHÇIVAN PAZARLAMA (MARKETING)’ company is set up initially.
- 1991

Production decision was taken earlier 1991 and initially centrifugal fan production started purposed to vacuum in industrial iron machines.
- 1996

New ranges of products were added into the production line as Industrial Fans, Kitchen Fans etc. BAHÇIVAN brand introduced with Turkish Exhibitions and magazines to Turkish market.
- 2004

BAHÇIVAN took cutting edge decision to change its route to export activities. Adding new generation products opened the door of export, BAHÇIVAN started new studies and investments in first year with extreme effort for increasing quality of existing product range, as well as launching many new generation products. Production developments, new product moulds preparations, brand introduction over 50 countries by organizing market search trips continued meticulously. These remarkable hard work composed seeds of BAHÇIVAN success for following years both in local market and abroad.
- 2005

First exhibition was held abroad. Following years BAHÇIVAN attended 10-15 exhibitions abroad each year. BAHÇIVAN also developed itself technically with new projects held with Technical Universities. Technical projects are approved by TUBITAK (The Scientific and Technological Research Council of Turkey) which is the most dominant science authority of the country.
- 2009

The new dynamic team gathered calling technical and administrative people from the sector. BAHÇIVAN entered around 25 countries with small shipments, also started to be called the best ventilation manufacturer company in Turkey by market leaders.
- 2011

BAHÇIVAN moved it’s new production plant covering 15000 square meters. Turkish (Air-conditioning & Refrigeration Manufacturer’s Association) invited BAHÇIVAN to be its member which covers the most prestigious companies in HVAC sector of Turkey. ERP (Enterprise Resource Planning) Software adaptation was finished in the company after 2 years workflow saving, stocking and manufacturing connections.
- 2012

BAHÇIVAN reached 50 countries in Export, and also led the local market beating it’s existing Turkish competitors. Totally 90 exhibitions were attended since 2005. BAHÇIVAN population reached 200 employees and company mentality is driven to the energy saving products, ecological production and green technology.

Available Quality Certificates and Marks:

ISO 9001:2008, ISO 14001, ISO 18001, UKR SEPRO, TSEK, PCT GOST, SGS Approvals, CE, TSE, ROHS.

OUR MISSION

Forwarding fresh air of outside to indoor area with maximum efficiency; while providing the best suited fan to the industrial and construction applications; we are trying to raise awareness of ventilation importance in the society from the aspect of better life quality. We started with the motto of ‘For a fresh of breath’ and working for adding quality to human breath, comfort to applications and value to the life.

BAHÇIVAN philosophy should be representing as following:

- Our Products:

We concentrated to the quality from the first day and combining the best quality materials with state-art-of technology and our experience.
- Our Customers:

They are the source of our power, partners of our way which make us more powerful as long as we run together.
- Our Suppliers:

They are suppliers of our continuous quality, whom take different responsibilities for same targets and are our best supporters.
- Our Team:

Our team is the source, follower and developer of our mission. We try to stand benefit to the community with continuous development desire, precision and hardworking. The top value is the professional ethics we consider more important than everything.

DESING AT BAHÇIVAN

Designing technologies play main role for solving challenges, manufacturing, product developments, creating new technologies and adding value of every single step. While modeling the product, at the same time softwares show us some nonproducible extreme geometric shapes with engineering calculations. BAHÇIVAN invests more for simulation of production processes each passing day in order to increase efficiency. Future production methods and materials are investigated new materials, rapid prototyping and rapid manufacturing technologies, high-speed machining, materials with variable material properties, composite materials are developed with computer simulations. Computer analyzing shortens duration of solutions. Optimization algorithms are developed and improved learning and intelligent algorithms can adapt to new situations. Using analysis programs, working together with physical simulators show components how to effect system vibrations, dynamics, strength, acoustics, basically specifications of the system. Bahçivan; in accordance with policy of continuous improvement, reserves the right to change product specifications and measurements without announcing.

- Some Software used for Bahcivan:

Desining Software:

SOLIDWORKS - AUTOCAD

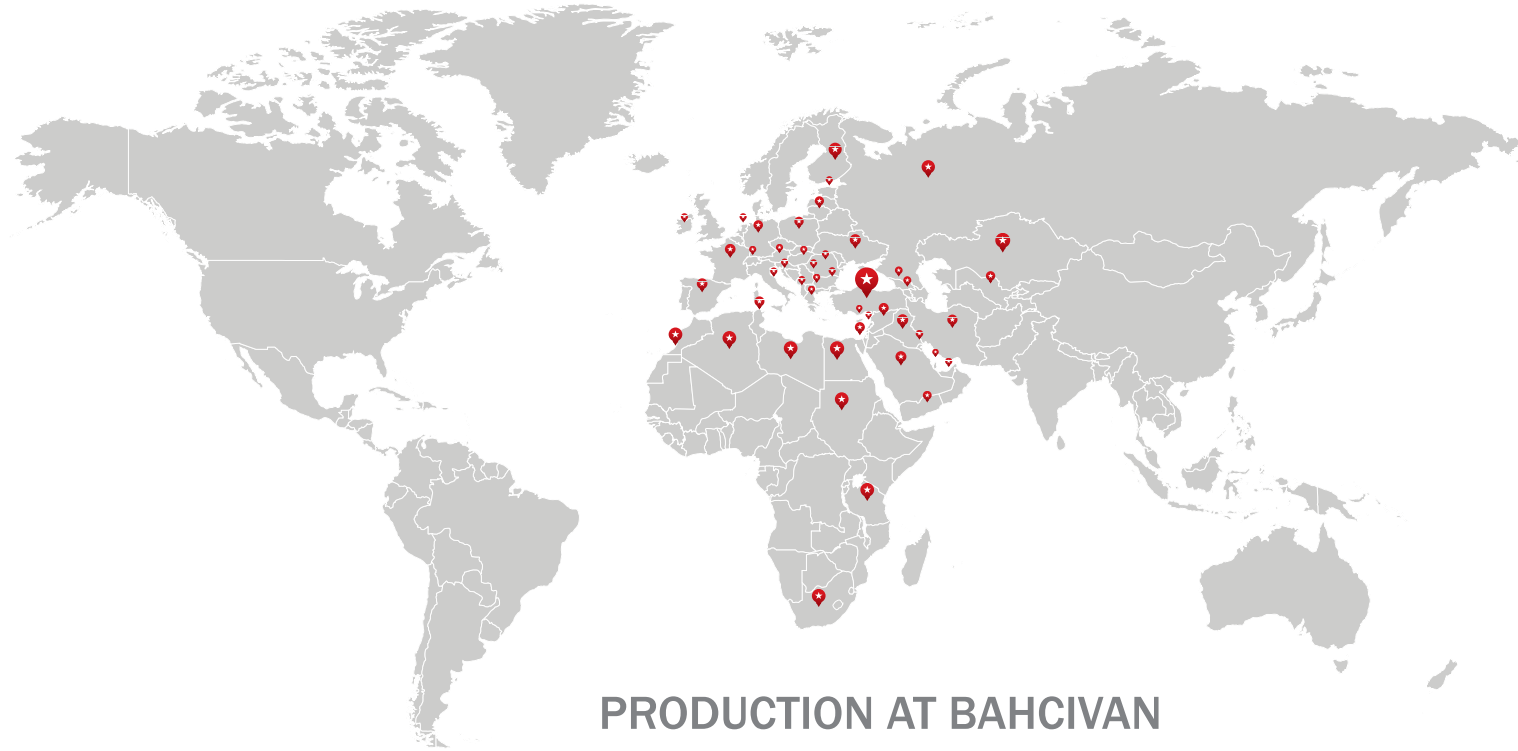
Analyzing Software:

SOLIDWORKS FLOW SIMULATION

Production Software:

POWERMILL - CADMANN





PRODUCTION AT BAHÇIVAN

We meet easily deadlines of shipments both local and abroad sales due to our responsive production mentality. R&D data of new products are planned to become finished product digitally without effecting serial production during adaptation.

CNC Lathe Machines, CNC Punchings, CNC Lasers, CNC spinnings, CNC Bendings are some machines that support direct manufacturing.

CNC vertical milling machines, conventional milling machines, conventional lathes and electrical discharge machining (EDM) are some machines of our stamp production department which are supporting our metal injection machines, plastic injection machines, automatic wiring machines, as well as building special designed hydraulic presses and special assembling machines.

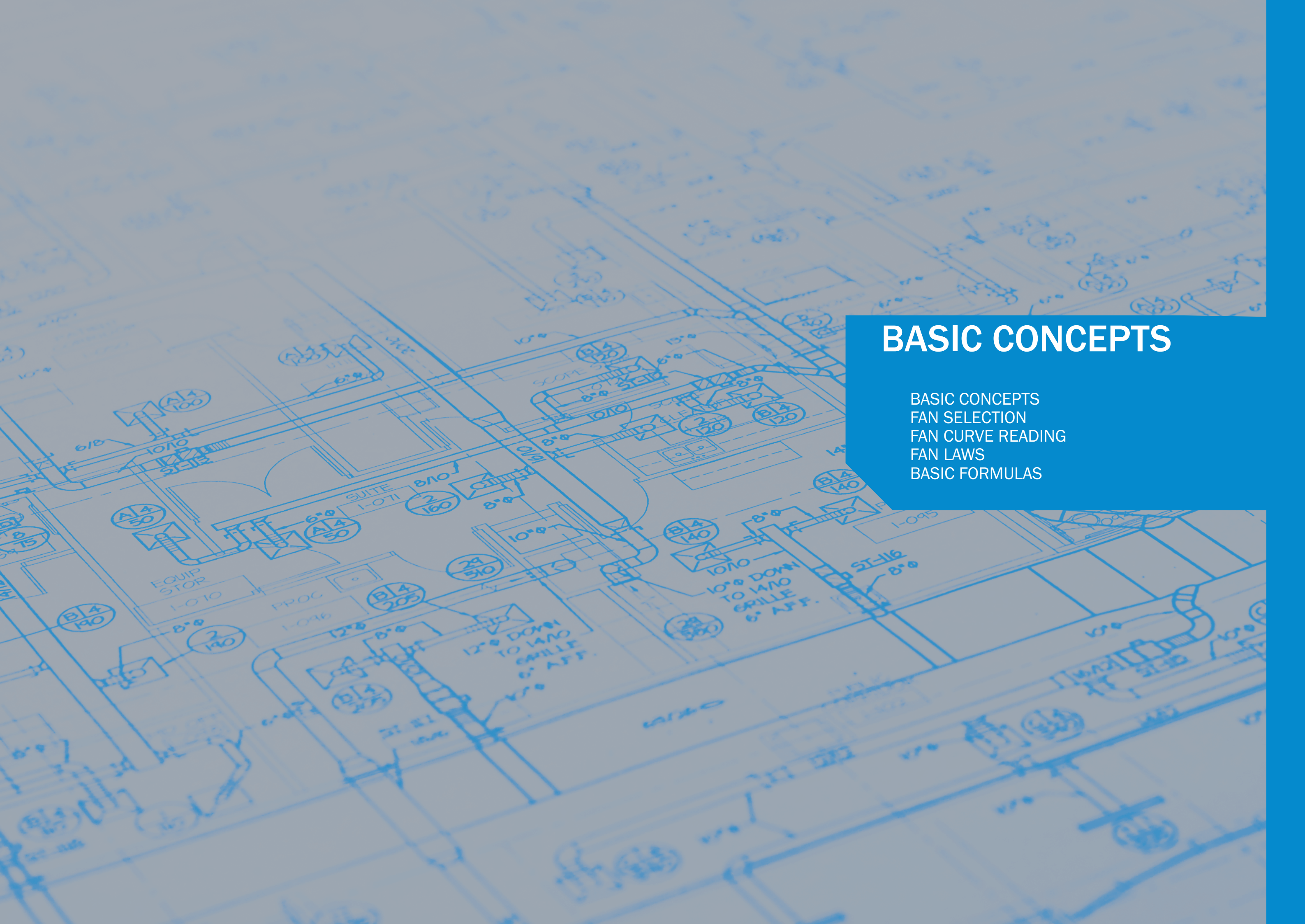
We have a wide experience coming from years regarding fans and relatives products. Thanks to our deep experience and knowledge, we also design and produce special machines which assemble of our fans.

Our wide experience of motor production allows us supplying highest quality and most competitive products to the market.

We are also adding automation machines for our motor productions which are equipped with state of the art technologies.

To keep our high quality stability, we are controlling all used materials with our proper testing devices and quality checking processes according to required standards.





BASIC CONCEPTS

BASIC CONCEPTS
FAN SELECTION
FAN CURVE READING
FAN LAWS
BASIC FORMULAS

BASIC CONCEPTS

AIR FLOW(Q): The air quantity transferred by fan in the unit of time. It is commonly expressed with the units of m³/h, m³/s or C.F.M.
1 m³/h = 3600 m³/s
1 C.F.M. = 1,7 m³/h

The maximum fan flow rate is the flow rate during the moment when fan provides free air flow throughout the shot line of the fan without any barrier in front of it. The maximum fan flow rate given in the technical specifications expresses the state under this circumstance.

NUMBER OF REVOLUTIONS(N): The revolution of rotating field occurring in stator within one minute. It is commonly expressed with the units of min. or Rpm.

PRESSURE(P): The force to which the air is exposed per unit area and which affects the flow reversely during the transfer of air by fan through the enclosed volume (such as air ducts). It is expressed as Pa or mmSS in the characteristic curves of fan.
1 Pa = 1 N/m²
1 mmSS = 9,8 Pa

STATIC PRESSURE(Ps): The forces affecting the unit area due to the effects of frictional force in the internal walls of the duct in the duct where the air flow occurs as well as effects of the equipments (such as damper, muffler, vent-hole and filter) installed in the duct.

DYNAMIC PRESSURE(Pd): The force affecting the unit area due to air flow velocity.

TOTAL PRESSURE (PT): The total of static and dynamic pressures.
PT = Ps + Pd

SOUND LEVEL (dB): Fans emit sound wave around during the operation due to vibration. The said emitted sound waves reduce depending on the distance as getting away from the fan.

INPUT POWER (W): The force pulled by motor from the network. The unit of it is W or kW.
1 HP = 0,75 kW

TEMPERATURE (T): The ambient conditions whose temperature is not higher than +40 °C, whose height is maximum 1000 m(included) and whose relative humidity is not higher than 95% are considered as standard ambient conditions.

The most important factor for the resistance of the insulating materials used for the winding insulation of asynchronous motors is temperature. The insulating materials are divided into classes in the standards in order to ease the selection of appropriate insulating material for the application. Asynchronous motor windings are generally in the insulation class of B,F and sometimes H.

INSULATION CLASS	HEAT INCREASE LIMIT (K)
A	65
E	80
B	90
F	115
H	140

FAN SELECTION

The information which should be obtained by fan manufacturer from the facility authorizer for a right fan selection,

1. Air flow rate (m³/h ,m³/s veya CFM),
2. Static and total pressure required in the operation conditions (Pa or mmSS),
3. The temperature of air (°C) passing through the fan,
4. The features of air to be carried by the fan (dust, humidity, wood chips etc.),
5. Whether the air passing through the fan is corrosive or not,
6. The permanent or temporary operation of business enterprise.

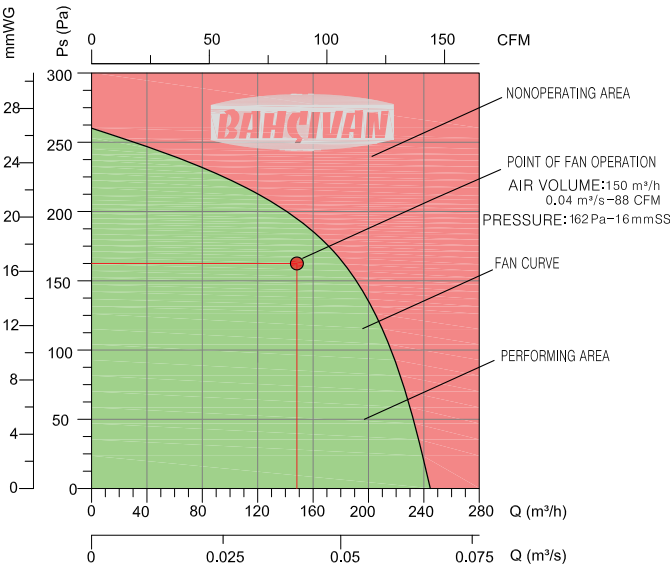
Air Flow Rate (m³/h) = Air Change Coefficient (1/hour) X Location Volume (m³)

LOCATION	AIR CHANGE COEFFICIENT (1/Hour)	LOCATION	AIR CHANGE COEFFICIENT (1/Hour)
Auditoriums	6-8	Laundries	10-20
Classrooms	5-8	Offices	4-8
Libraries	4-5	Indoor Swimming Pools	3-4
Paint Furnaces	25-50	Restaurants	8-12
Safe Box Rooms	3-6	Conference Rooms	6-8
Cinemas and Theatres	5-8	Waiting Rooms	4-6
Domestic Kitchens	15-25	Photocopy Rooms	10-15
Commercial Kitchens	15-30	Machinery Rooms	10-40
Bathrooms	5-7	Stores	4-8
Domestic wcs	4-5	Dry Cleaning	5-15
General wcs	8-15	General Malate Sites	4-8
Meeting Halls	6-8	General Change Rooms	6-8
Foundries	8-15	Rolling Mill	8-12
Gyms	4-6	Laboratories	8-15

In the characteristic curve of fan above: The operation point of the fan operating in the air flow rate of 150 m³/h and under the pressure of 162 Pa is indicated in the green area. The red area on the top part of the characteristic curve of fan is the one which is not appropriate for fan selection.

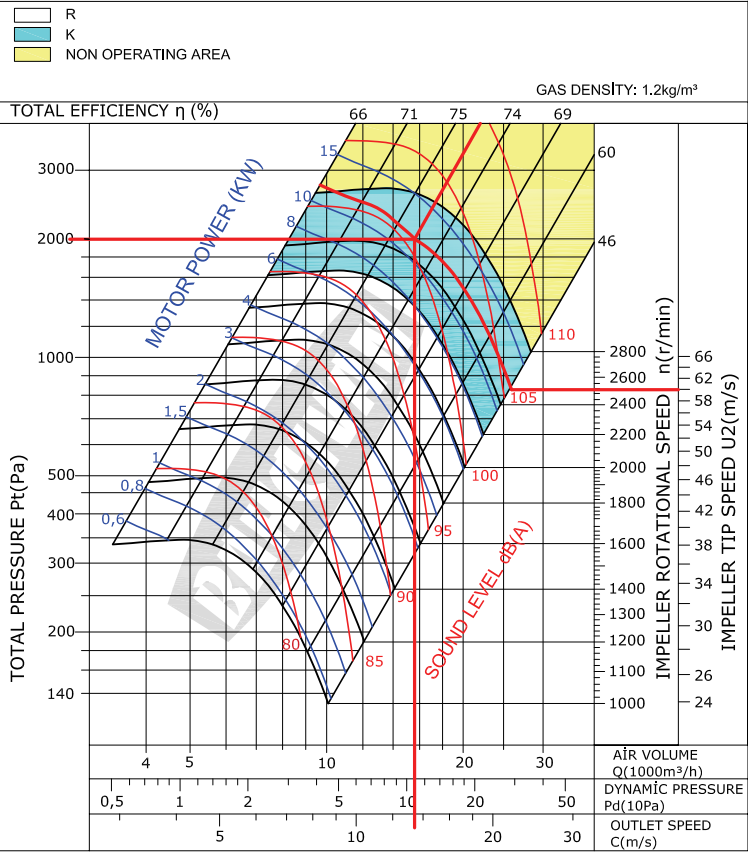
The curves are formed by subjecting each fan model to flow rate and pressure tests and by entering the obtained data into the coordinate axis. The fan curves were formed as static pressure-flow rate axis in order to ease the fan selection. The maximum air flow rate given in the technical specifications is the flow rate under zero static pressure state. This is also called as the free shot state of the fan.

During selection, the closest operation point must be taken into consideration. Attention must be paid to make selection from top and bottom limit points of the curve.



CHARACTERISTIC CURVES OF BELT AND PULLEY DRIVEN FANS

EXAMPLE FAN CURVE READING



AIR VOLUME V= 16000 m³/h
TOTAL PRESSURE Pt= 2000 Pa
DYNAMIC PRESSURE Pd= 110 Pa
OUTLET SPEED C= 13,5 m/s
NUMBER OF SPEED n= 2500 d/d
BLADE SPEED U2= 60 m/s
POWER Pw= 12 Kw
SOUND LEVEL Lwi A=102 dB(A)
EFFICIENCY h= % 74,5

FAN LAWS

	CHANGE OF SPEED	CHANGE OF AIR DENSITY
AIR VOLUME	$Q_2=Q_1(\frac{n_2}{n_1})$	DO NOT CHANGE
PRESSURE	$P_2=P_1(\frac{n_2}{n_1})^2$	$P_2=P_1(\frac{d_2}{d_1})$
POWER	$N_2=N_1(\frac{n_2}{n_1})^3$	$N_2=N_1(\frac{d_2}{d_1})$

BASIC FORMULAS

$P_t=P_{st}+P_{dy}$

$V=\frac{Q}{A}$ (m/sn) $Q:m^3/sn$ $A:m^2$

$P_{dy}=(\frac{V}{4,42})^2 \times d$ (mm/SS) $V:m/sn$ $d:kg/m^3$

$N_{fan}=\frac{Q.P_t}{27000.\eta_t}$ (HP) Verim: $\eta=\frac{N_{fan}}{N_{anma}}$

Output Power for Three Phase Motor= $\frac{VxIxP_fx\eta_m \times \sqrt{3}}{1000}$ (kW)

Input Power for Three Phase Motor= $\frac{VxIxP_fx \sqrt{3}}{1000}$ (kW)

Output Power for Single Phase Motor= $\frac{VxIxP_fx\eta_m}{1000}$ (kW)

Input Power for Single Phase Motor= $\frac{VxIxP_f}{1000}$ (kW)

Output power is the power which main electric network supply to the motor.
Input power is the mechanical power at motor shaft after losses.

Rectangular shaped (axb) duct's equivalent multiplication can be clculated with following formula.

$D=1.265 \sqrt[5]{\frac{(a \times b)^3}{(a + b)}}$ (mm) a:mm b:mm