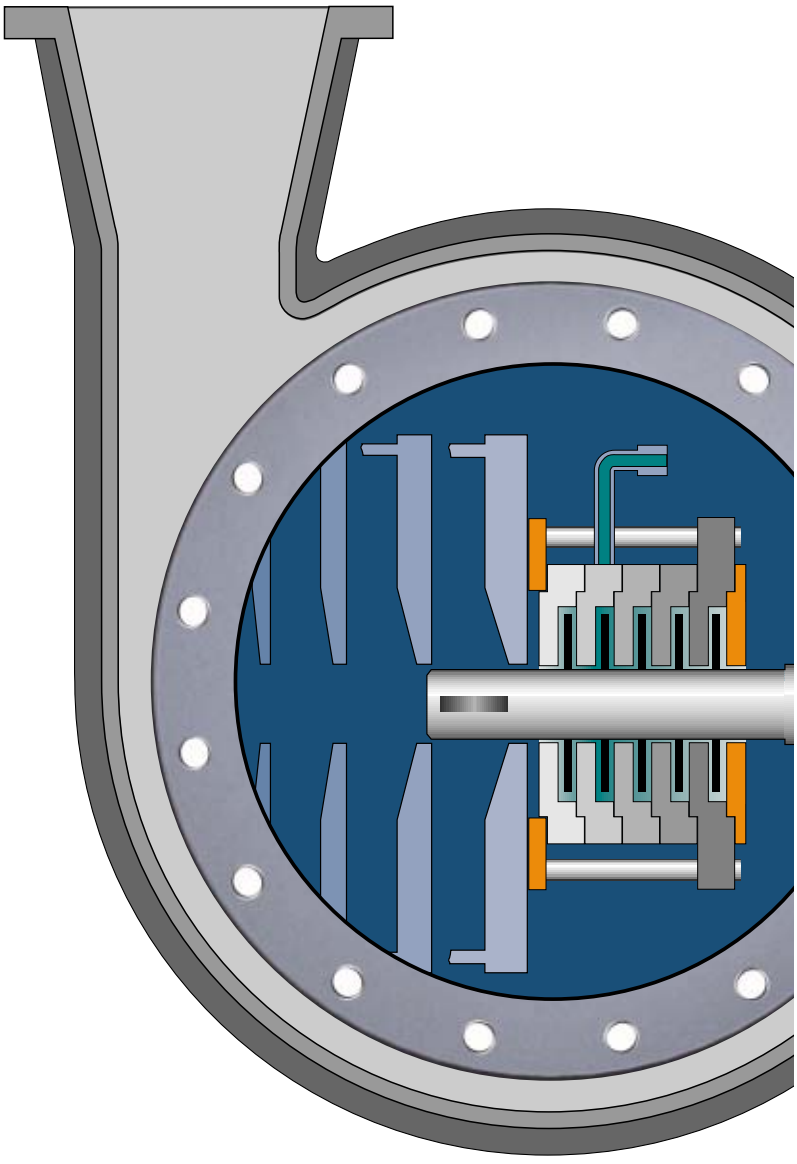
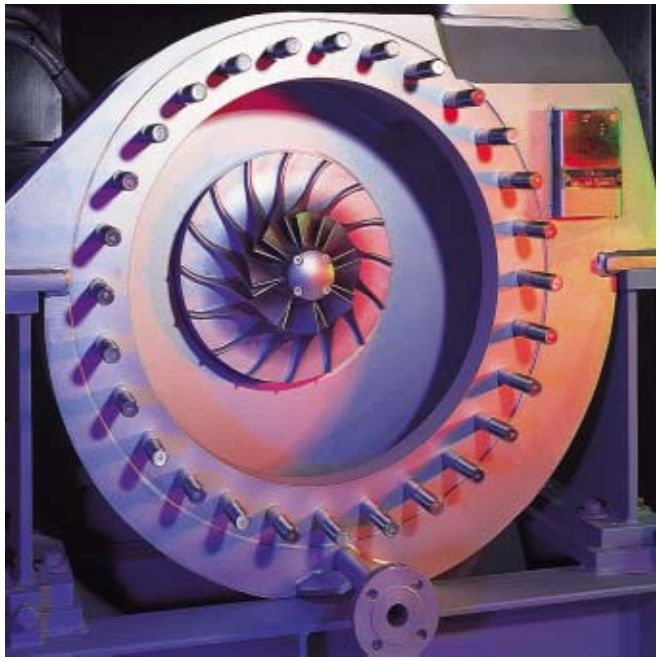
Centrifugal blowers

Assured safety through gas-tight and pressure-resistant casings



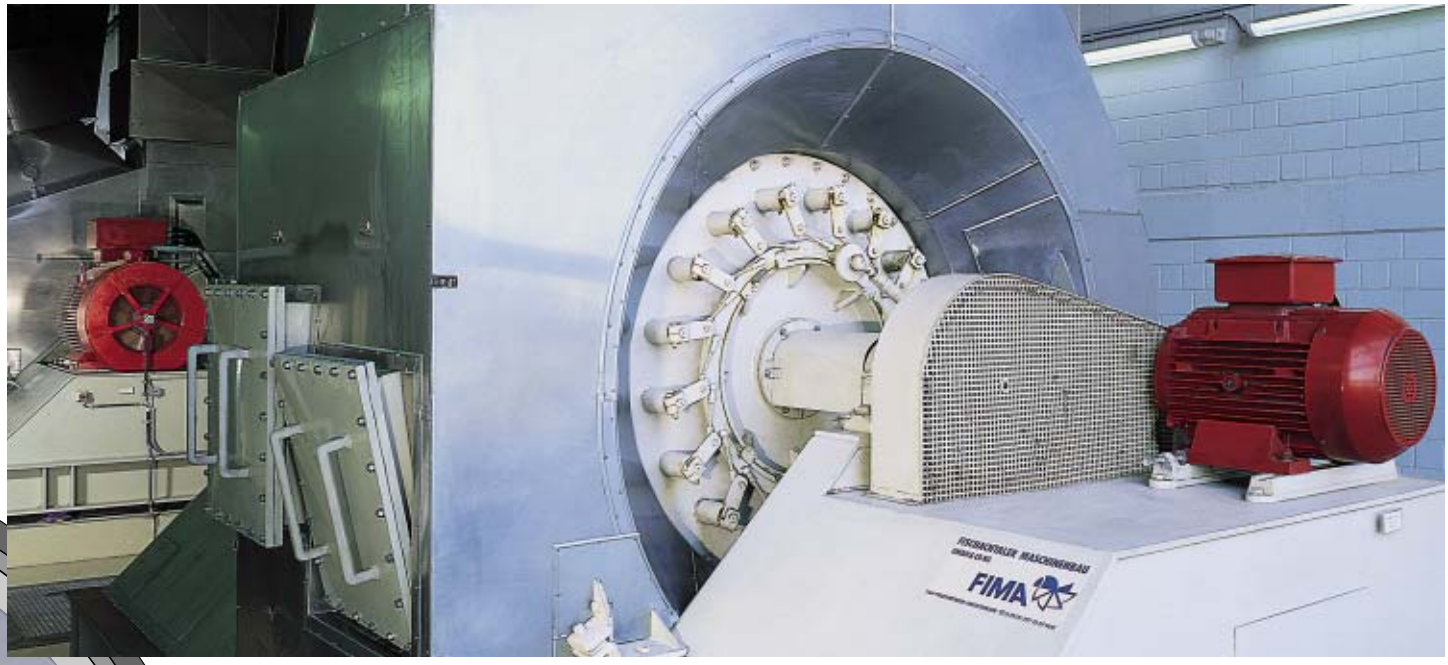


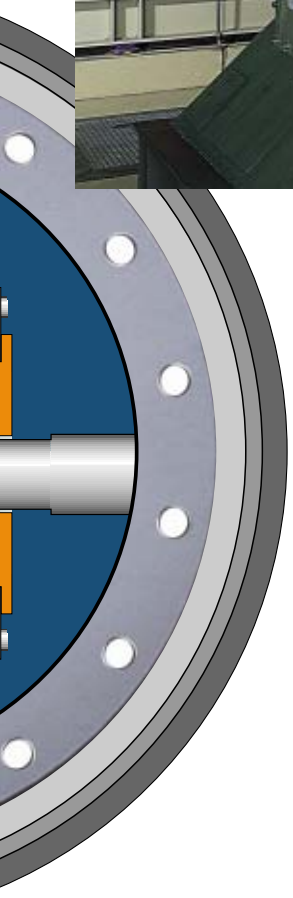
Modified standard components – powerful and reliable.

Conveying and compressing explosive or hazardous process gases imposes special requirements as to the design and the safety aspects of the blowers.

FIMA is one of the leading manufacturers of gas-tight and pressure-resistant centrifugal blowers for highly demanding applications. The blowers are designed and manufactured on the basis of the applicable national and international standards and regulations as well as many years of experience in this area. The use of standardised subassemblies in connection with custom designs permits safe operation at high temperatures and system pressures. Resistance against corrosion and abrasive materials is ensured through specially selected high quality materials and surface coatings.

Centrifugal blowers from **FIMA** are used in the areas of chemistry, environment engineering and the textile industry among many others.





Centrifugal blowers from **FIMA** – the guarantee for high reliability and performance in environment engineering, for example.

Performance range of gas-tight and pressure-resistant centrifugal blowers from FIMA:

- **System pressures ranging from vacuum to 100 bar**
- **Temperatures from –150 °C to +700 °C**
- **Volume flow rates from 20 m^3/h to 200 000 m^3/h**
- **Max. pressure ratio up to 2 – referred to air at ambient conditions, single-stage**
- **Conveying of explosive, corrosive and abrasive gas mixtures**
- **Rotor speed up to 8 000 rpm with coupling/belt drives and up to 20 000 rpm with gear**
- **Drive power up to 4 000 kW**

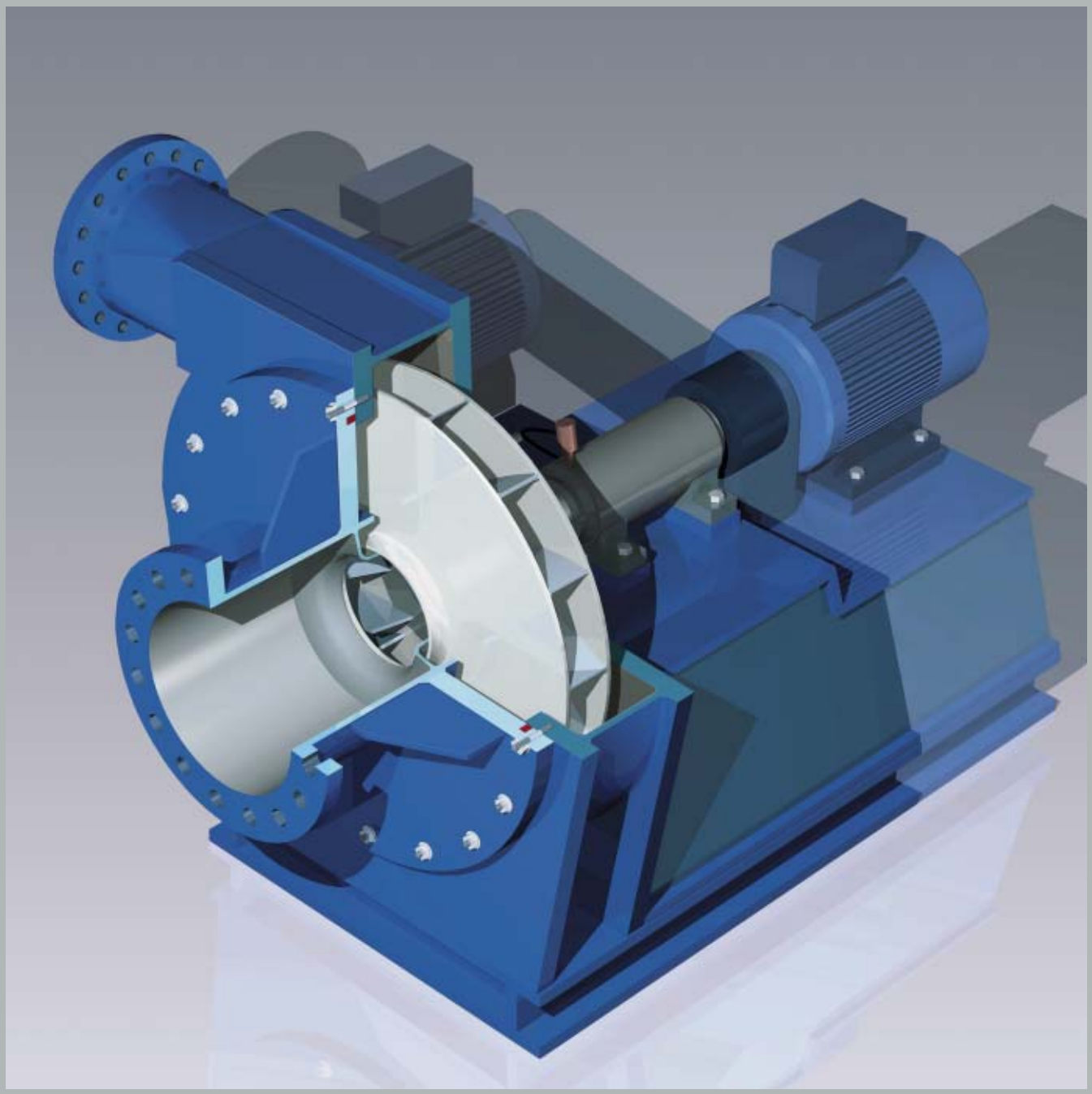
Technical description

The gas-tight and pressure-resistant centrifugal single or multistage blowers are based on a modular system. Standardised and well-proven subassemblies combined with custom designs permit an economically viable machine concept under consideration of the process-dependent operating conditions.

Machines with a direct drive system are available in two different types. In the more simple type, the impeller is fitted directly to the shaft of the drive motor. This type is augmented by coupling machines in which the bearing for the rotor and the seal for the casing may be adapted to specific requirements. The use of belt drives and gears results in compact blowers which can be operated at high speed (over 3 000 rpm). A low space requirement and a higher efficiency make operation of these machines much more economical.

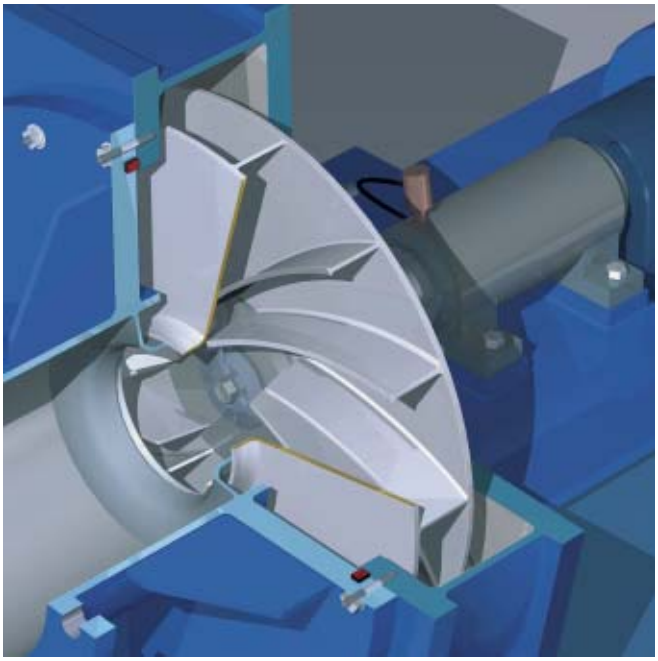
High drive power types are manufactured with splitted casings for the blower and bearings on both sides of the shaft.

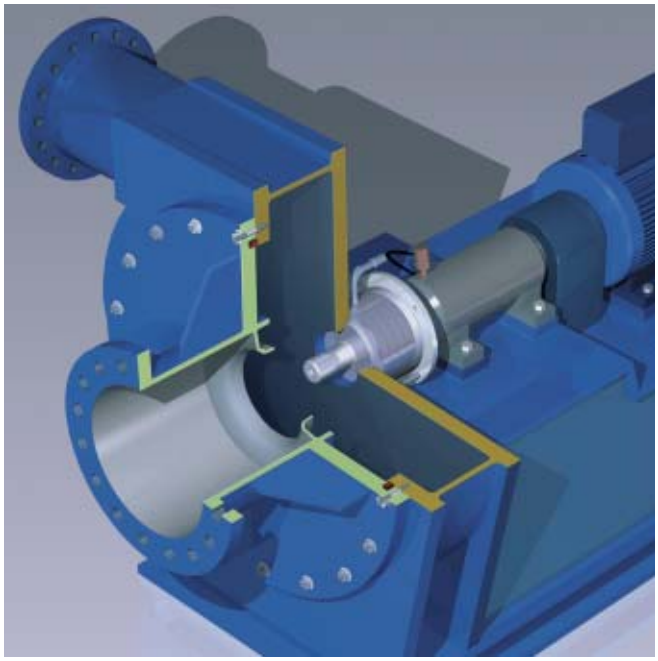
Casing, rotor and drive – a single power pack.



Leakage of the process gas or the entry of air through the passage of the shaft is avoided by means of specially designed carbon rings or mechanical seals.

Both the casing of the blower and the drive unit are mounted on a rigid base frame which has been optimised with respect to low vibrations and low-noise operation. The machined supporting surfaces for the motor and the bearing pedestal assembly or the gear ensure simple, accurate and reproducible alignment of the components for assembly and maintenance work.





Functionality and safety are no secrets. The standardised and well-tested subassemblies form the basis of success.

1. Casings

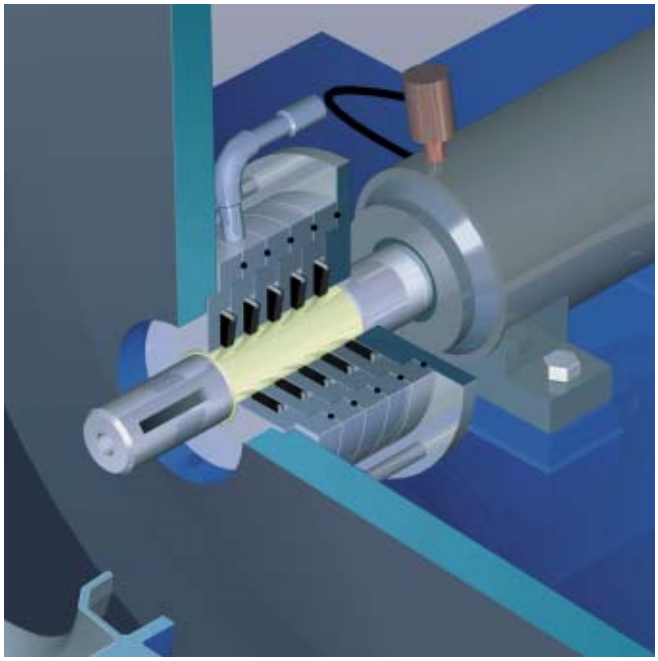
The casings of the centrifugal blowers from **FIMA** are welded and have been optimised with respect to the gas flow. Welding seams extending on both sides increase operational reliability while at the same time avoiding crevice corrosion. Pipe fittings with standardized flanges, gas-tight hatches with even sealing surfaces for cleaning or water injection nozzles to avoid incrustations are standard. The seal between the machined surfaces of the splitted casing is provided through chambered O-rings or flat seals. Threaded pocket holes prevent gas leaks at the flanged casing joints. The casings are designed in accordance with the European regulations for pressure vessels or ASME Pressure Vessel Code.

2. Impellers

The impellers of the centrifugal blowers from **FIMA** are of covered or semi-open design with blades which are curved backwards or ending radially. The selection of a suitable geometrical arrangement for the impeller and the matching casings is the pre-requisite for high efficiency, low noise and long service life.

Welded blade joints extending on both sides prevent crevice corrosion and improve the strength of the impeller. Dynamic balancing ensures smooth running of the blowers.

In most applications covered impellers with blades which are curved backwards are used. Semi-open impellers with radially ending blades are used to convey gases with a high particle content. This substantially avoids any imbalances due to incrustations.



3. Shaft seals

The shaft seal for the standard blowers is provided through the specially developed **FIMA** turbo-labyrinth seal. The efficiency of this seal may be adapted to the particular requirements in each case by changing the number of carbon rings, the admission of purge gas or a relief line connected to the suction nozzle.

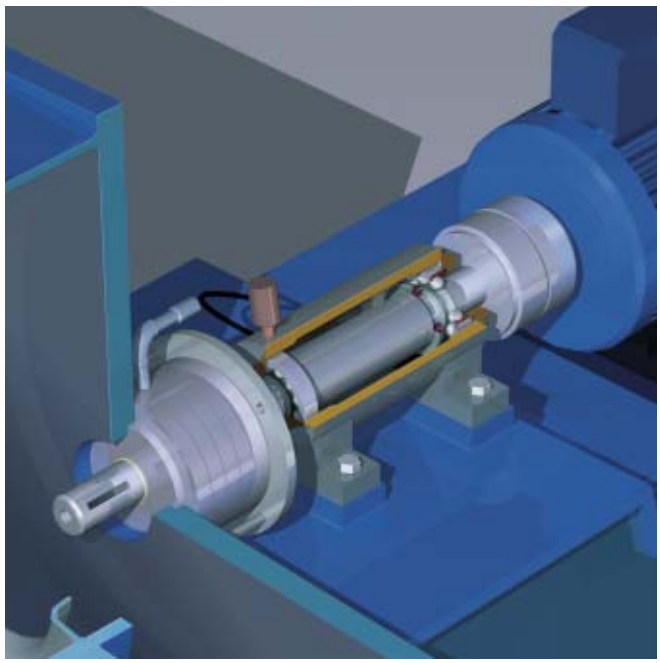
In the case of especially stringent requirements as to the shaft seal we recommend the use of gas or liquid-lubricated mechanical seals.

These sealing systems avoid leakage also at standstill and reduce the quantity of purge medium required.

4. Bearing units

The **FIMA** blowers excel by their bearing pedestals developed by **FIMA** for shaft diameters from 40 up to 90 mm. A modular system permits the use of various types of antifriction bearings in the same bearing pedestal casing with either grease or oil lubrication. The gray cast iron casing is equipped with threaded connections for temperature and vibration sensors.

In the case of high-power drives, individual pedestal bearings may be used which are equipped with oil-lubricated antifriction or sleeve bearings.



Control and monitoring facilities
Control units are required when the blowers are operated under variable load. Depending on the characteristics of the production system, inlet guide vanes, diffuser or speed controllers are installed. Process parameters are used as the input signals for the actuators or the frequency converters.

The high reliability of the blowers is achieved by continuous monitoring of the bearing temperatures and the vibrations. By monitoring the current state variables and by comparing these to the set points, any irregularities can be determined at an early stage and thus critical operating conditions can be avoided.

Production and quality assurance
Being a traditional company, **FIMA** has at its disposal over 50 years of experience in the development and production of blowers and compressors. A consistent quality assurance management and the quality awareness of our experienced staff guarantee a high manufacturing standard and the successful operation of **FIMA** products. This quality standard is guaranteed by the certification according to EN ISO 9001. A highly qualified welding department (with HP 0 and CODAP approval) is certified for manufacturing of various materials.

Blower –
30 bar operating pressure

Materials
Severe and hazardous processes require materials which are highly resistant against chemical attack and mechanical wear. In the case of complex tasks the suitable material is often jointly selected with the customer. Standard materials are ferritic and austenictic steels as well as aluminium alloys. Special types of stainless steel, high alloy nickel base materials and titanium alloys form a high proportion of the materials used. These offer a high degree of resistance at extreme temperatures.

Gas mechanical seal

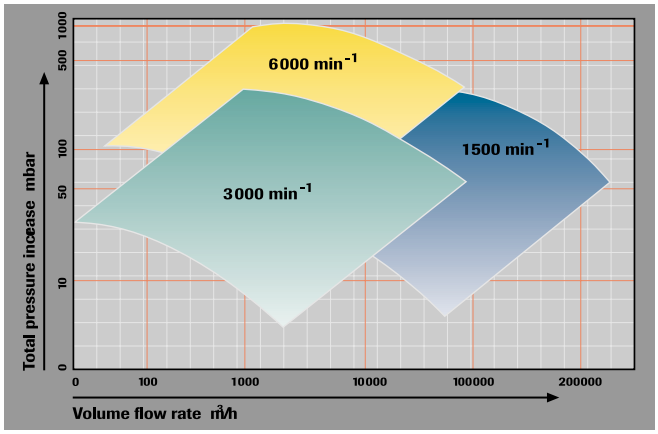
If required, special coatings and claddings of the surfaces in contact with the process gas may be specified. The range of materials proven in practice span from PTFE, PVDF, PFA, Halar und Fluorshield to various soft and hard rubber linings.

Magnetic coupling

Service
The services which are available through our trained experts comprise world-wide installation and commissioning of the machines and systems which are delivered. Maintenance and repair work is performed at the customers location or in our factory through the engineers and technicians from **FIMA** in a competent manner and at short notice. The inventory of standardised spare parts and wearing parts ensures the long-term availability of **FIMA** blowers on the production line.

Drive unit with turbo-labyrinth seal

Performance range:



The broad range of gas-tight and pressure-resistant centrifugal blowers from **FIMA** offers highly individual system solutions. Elevated pressures up to 1000 mbar may be implemented equally well as increases in the volume flow of up to 200000 m^3/h and drive powers up to 4000 kW.

Consistent development work resulting in innovative solutions for the benefit of the customer.

FIMA looks back on more than 50 years of engineering tradition as well as many years of experience in the processing of special high-quality materials. Highly qualified staff combined with team experience are an important requirement for the reliability and quality of our products – from the industrial fan to the centrifuge dryer.

You are cordially invited to come to our idyllic country side home, in order to get an impression of our company, our staff and our first class products.

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