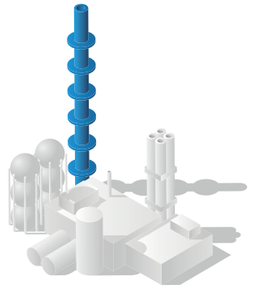
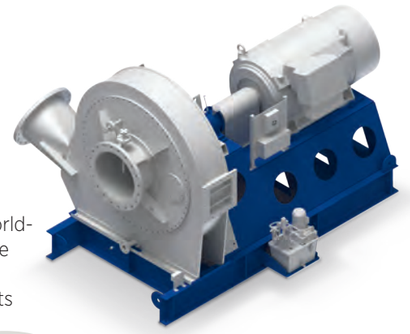
fima®

Moving gases safely and sustainably

Products & Services made in Germany

HIGH TECH BY FIMA





Reliable, competent, forward-thinking – **A strong FIMA team at your side**

Let our FIMA team help you.

Our team is the heart of our company

In all of our divisions, we profit daily from a colorful mix of creative young employees and experienced, seasoned specialists. We work together to develop optimum solutions and benefit from each person's unique skills. Our company is characterized by an open corporate culture with flat hierarchies and short decision-making paths as well as a trusting work atmosphere. We always keep our social responsibility towards our employees in mind.

Diversity and respect as the recipe for success

Our corporate culture is marked by mutual respect and a sense of responsibility in our actions. Our true colors are revealed by our signing of the "Charter of Diversity" – and by our workforce. At FIMA, employees of all different ages, religions, and origins work successfully together. Together, we achieve the best possible results for the company and, even more importantly, for our customers.

Promoting skilled workers

Tomorrow's skilled workers are not only a breath of fresh air and a source of innovation but also the guarantee for a successful future for our company. For this reason, we maintain relationships with colleges and universities in the region, e.g., by regularly participating in career fairs. There, we make first contact with possible employees and support high-potential candidates right at the outset of their careers. Our top priority is always to build up long-term relationships. This also applies to our apprentices. As a certified apprenticeship partner, we offer quality apprenticeships and support our apprentices every step of the way – giving them a solid basis for a career at FIMA.

Advanced training as a success factor

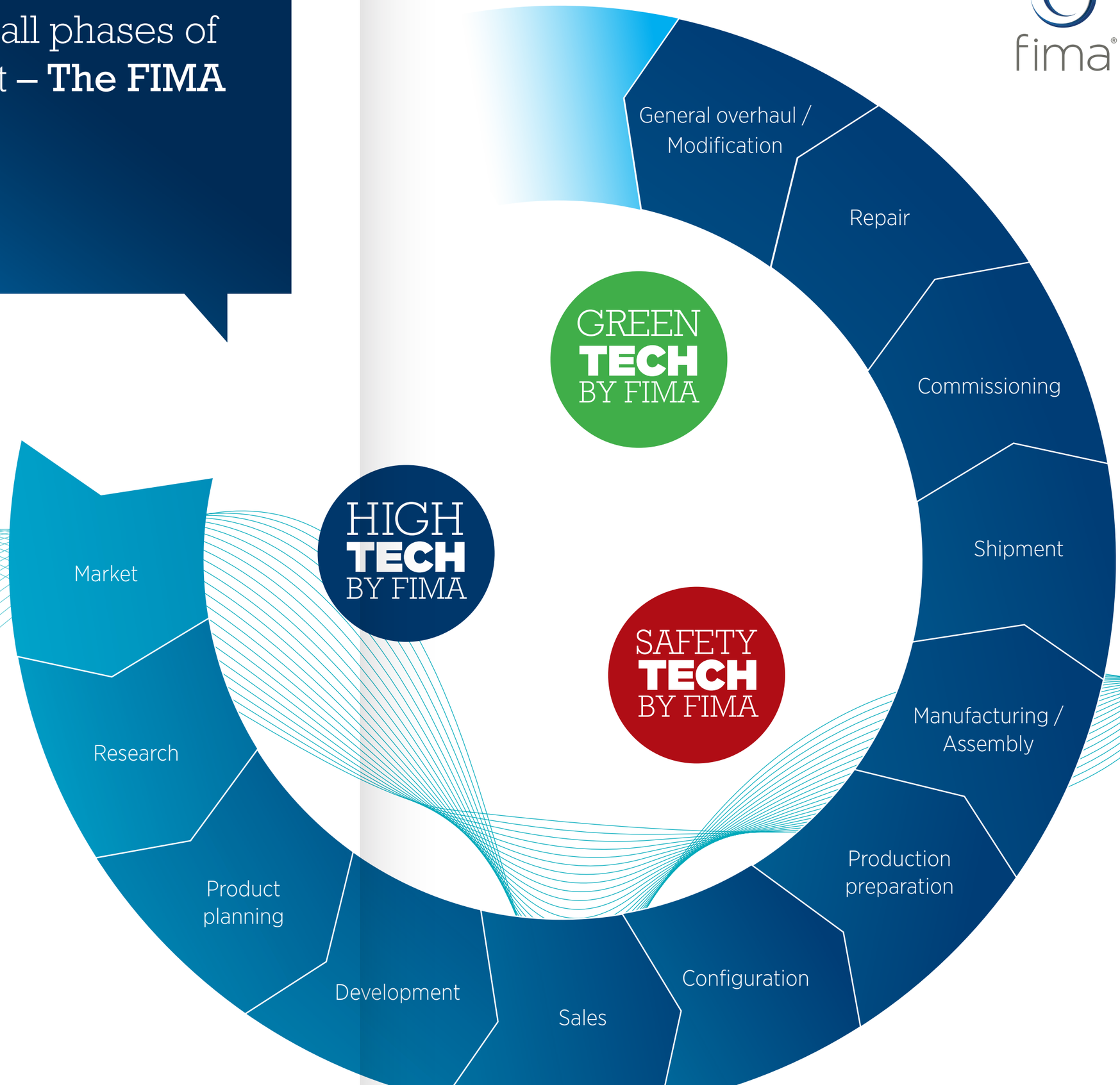
For the construction and maintenance of our high-tech machines, specific experience and specialized knowledge of a number of topics are needed. That's why ongoing training of our employees is so important to us. Whether internal or external offerings – diverse further training options are available to our employees.

FIMA gives me the opportunity to expand my know-how through advanced training – the basis for the continued top quality of our products.

Sustainable Values

Planning / Development / Production

Real 360° thinking in all phases of a sustainable product – **The FIMA product life cycle.**



360° for your solution

It pays to develop individual solutions with FIMA. After defining all project-relevant criteria with you, we get to work. We design reliable systems and system components that perfectly match your requirements. Our manufacturing department produces a customized solution that meets the highest standards for your task. We follow this up by offering you individualized 360° support over the entire life cycle of your FIMA machine. Through regular inspection and maintenance, we ensure the economical, smooth, and reliable operation of your plant. You benefit from our experience in the replacement and repair of individual components as well as in the general overhaul of complete fans and compressors.

A perfect match for your requirements – FIMA technology meets FIMA quality.

Precise analysis. Tailored conceptual design.

Fluid mechanics is a complex field. In our analyses, we draw on decades of fluid mechanics and process knowledge in such fields as petrochemical, chemical, pharmaceutical, iron and steel, and energy.

We take the time to discuss everything in detail with you. In these individualized meetings, we harness our experience to come up with new possibilities that yield additional technical advantages for you.

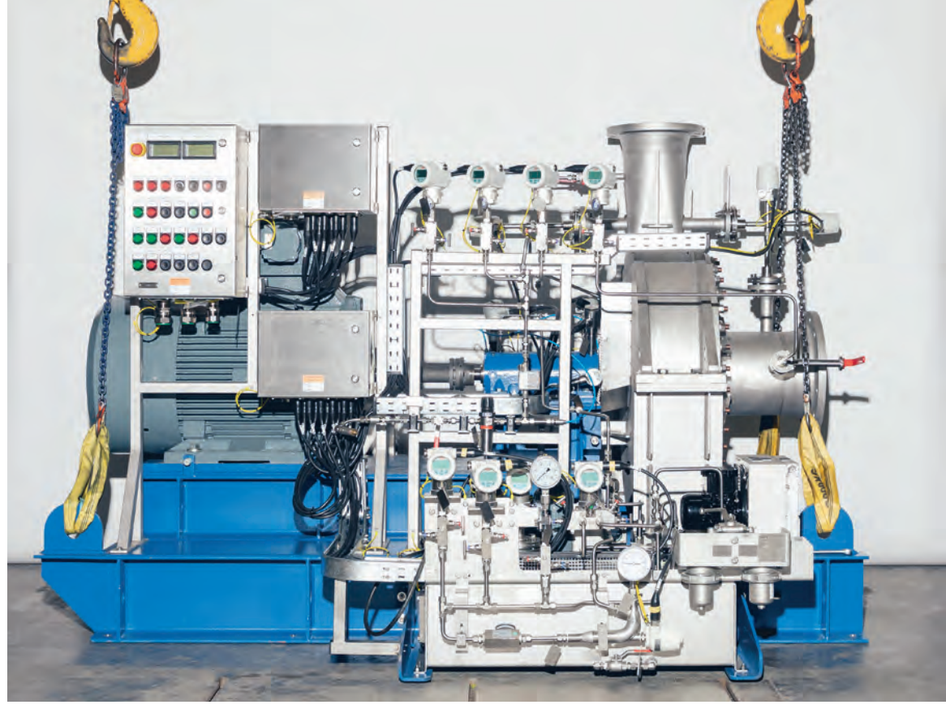
As an avowed solution-oriented company, we are guided in our work by the central principles of technological compatibility and flexibility. That's another reason why it pays to develop individualized solutions with FIMA. After defining all project-relevant criteria with you, we get to work and design reliable machines and machine components that perfectly match your requirements.

GREEN TECH BY FIMA

HIGH TECH BY FIMA

SAFETY TECH BY FIMA

Green tech, high tech, safety tech: FIMA is a leader in all relevant technologies and is constantly optimizing its products for its customers.

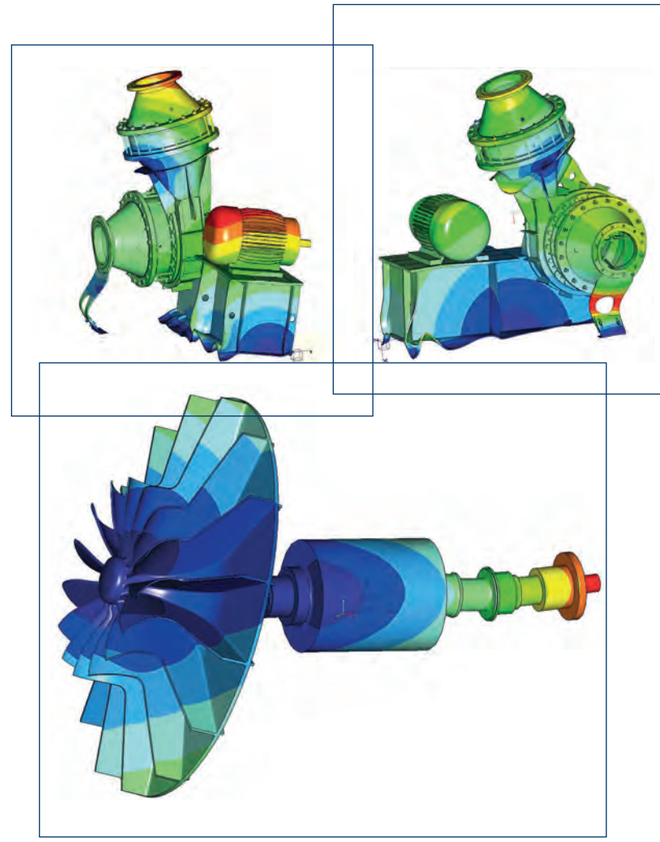


Flow-optimized impellers. Improved efficiencies.

As a quality-oriented, innovative company, we focus not only on finding new product solutions but also on improving efficiencies via flow simulations. Energy savings are a positive side effect that benefits both our customers and the environment. Through our foresighted actions and forward thinking, we face the challenge of making our contribution to sustainability and resource conservation on a daily basis.

Wide range of test methods. Test compressor in use.

High tech efficiency and consistent performance require innovative research and development and an extensive range of test methods. Strength and flow analyses are conducted with a specially developed test compressor. The modular design enables prototype tests of all different impeller designs and sizes in the FIMA portfolio with up to 44,000 revolutions per minute.



FEM modal analysis of various components

Technology & Quality

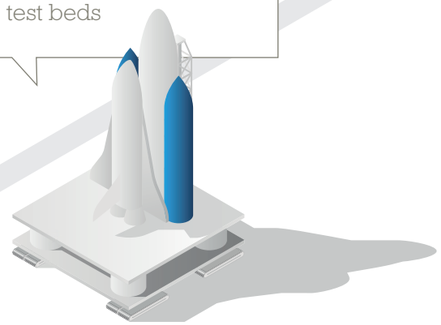
FIMA Products

As diverse as the FIMA products – **Our customer industries**

Every industry, and every process within a given industry, places different demands on our FIMA machines. Our customer orientation and flexibility constantly brings forth solutions that meet the process demands. Whether in the oil and gas, chemical, or pharmaceutical industry; customers around the world trust in us and our products.

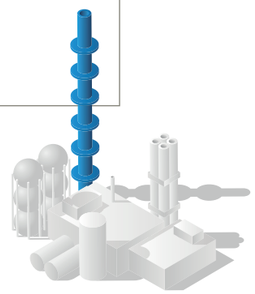
Aerospace industry

- Thermal conditioning unit (TCU)
- Satellite test beds



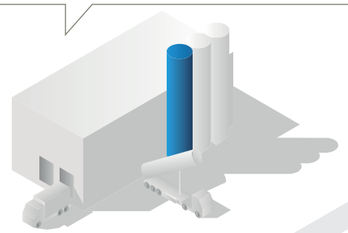
Chemical industry

- Polyamides (PA)
- Silica (MDI)
- Sulfuric acid
- Carbon black
- Acrylic acid



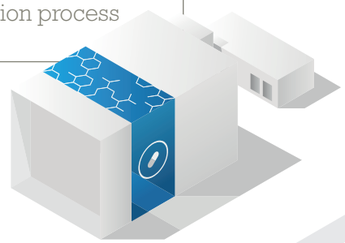
Food industry

- Mechanical vapor recompression (MVR)
- Industrial baking processes



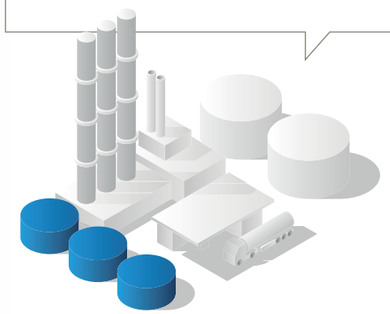
Pharmaceutical industry

- Coating
- Fluidized bed drying
- Sterilization process



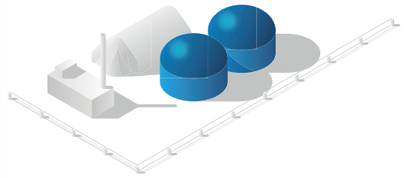
Refineries

- Continuous catalyst reforming (CCR)
- Propane dehydrogenation (PDH)
- Combustion air
- Reforming gas
- Sulfur recovery unit



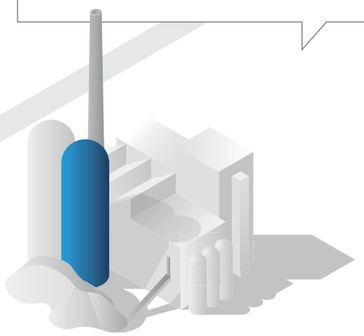
Energy supply

- Seawater desalination
- Solar energy
- Power to x (e.g., ammonia)



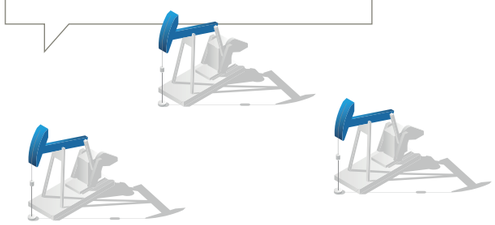
Iron and steel industry

- Acid recovery
- Coke oven gas
- Highly corrosive recycle gases
- Combustion air
- Air separation units



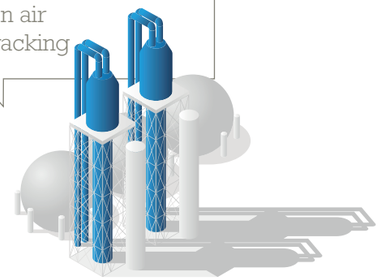
Oil and gas industry

- Offshore
- Boil-off gas (BOG)
- Liquefied natural gas (LNG)



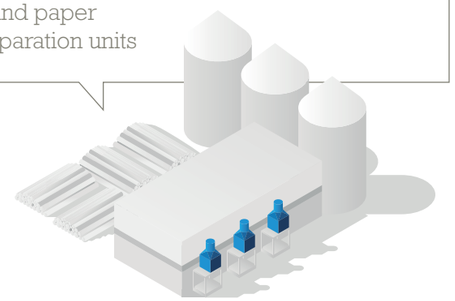
Petrochemical industry

- Polyolefins (PP, PE)
- Polycarbonates (PC)
- Polystyrenes (PS)
- Combustion air
- Naphtha cracking



Wood and plastics processing industry

- Mechanical vapor recompression (MVR)
- Laminate manufacturing
- Pulp and paper
- Air separation units



The FIMA product series

F1 Series

Single-stage blowers and compressors P. 18

Our F1 Series covers the largest range of radial blowers and compressors within the FIMA product series. As the best-selling series, it offers a wide range of products for diverse industries and application areas.

F2 Series

Hermetically encapsulated blowers and compressors P. 34

Our HETICO® (Hermetically Tight Compressor) and MACOUCO® (Magnetic Coupling Compressor) machines are specially built to guarantee an absolute seal. No gases can enter the process from the outside and no gases can escape from the process.

F3 Series

Multistage blowers and compressors P. 36

In contrast to single-stage radial blowers and compressors, multistage variants from FIMA each have multiple impellers mounted on a rotor. This allows extremely high pressures to be generated in a relatively small space.

F4 Series

Explosion-proof blowers P. 40

Explosion-proof blowers are used in areas and applications in which the gases to be conveyed and the surrounding atmosphere present a temporary, long-term, or constant explosion hazard. FIMA machines are ATEX-certified and thus protect plants and especially personnel from dangers.

F5 Series

Centrifuges and bottom valves P. 42

Separation of suspensions and emulsions is often done using centrifuges. With the FIMA centrifuge dryer, the additional process of drying of the substance takes place at the same time in a closed system. The dead space-free bottom valves from FIMA are also special. This type of valve is specifically designed to close with the piston flush with the inner wall of the tank.

F6 Series

FIMA Basics P. 44

FIMA offers individualized solutions as well as an economical solution for predefined performance ranges. Our FIMA Basics machines are characterized by their extremely stable construction.

F7 Series

Cross flow blowers P. 46

With cross flow blowers, the air is drawn in over the entire length of the fan impeller, flows to the inside of the impeller, and is deflected and accelerated through the air vortex generated by the impeller rotation. The advantages offered by this fan design are mainly utilized in the food industry.

F8 Series

Axial blowers P. 47

Unlike radial blowers, axial blowers are often used when it comes to transporting large volume flows in connection with low pressures. This property is put to use by FIMA, for example, in wind tunnel fans to ensure an extremely homogeneous flow distribution.

F1 Series: Single-stage blowers and compressors

VARECO

(Vapor recovery compressor)

HIGH TECH BY FIMA

During the closed process of liquid evaporation, the vapor is fed through our VARECO, where its temperature and energy level are increased, and then fed back to the process. Thus, its valuable energy is not lost. The self-contained process allows volatile liquids to be evaporated while valuable products are retained.

Our VARECO is used in the chemical industry in recovery processes for alcohols such as isopropanol and methanol. One example of its application is in the production of biofuels.

Performance data

		Compressors	Blowers
Max. system pressure	[bar]	≤ 10	≤ 10
Circumferential mach number	[–]	≤ 1	≤ 1
Motor/drive output	[MW]	≤ 5.0	≤ 5.0

F1 Series

F1 Series: Single-stage blowers and compressors

SULCO

(Sulfur compressors)

API STANDARD

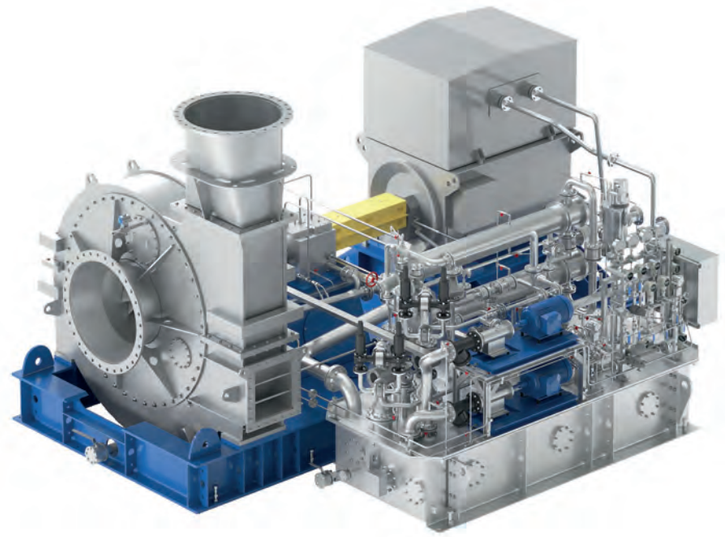
Our SULCO fans are used in sulfuric acid plants, sulfur combustion, acid regeneration, metallurgical processes, and numerous other applications in the sulfur industry.

In the production of sulfuric acid (H_2SO_4), the machines and the entire process system are exposed to highly aggressive acidic substances. We especially take this into account in designing our state-of-the-art machines. Our main gas blowers and combustion air fans guarantee maximum safety, availability, reliability, and stability.

Performance data

		Compressors	Blowers
Flow rate	[m^3/h]	≤ 300,000	≤ 500,000
Max. pressure	[bar]	150	100
Pressure ratio/increase	per stage	≤ 2.5	≤ 1.7
Rotational speed	[min^{-1}]	≤ 10,600	≤ 4,000
Motor/drive output	[MW]	≤ 10.0	≤ 10.0

F1 Series



F1 Series: Single-stage blowers and compressors

Polyethylene (PE)

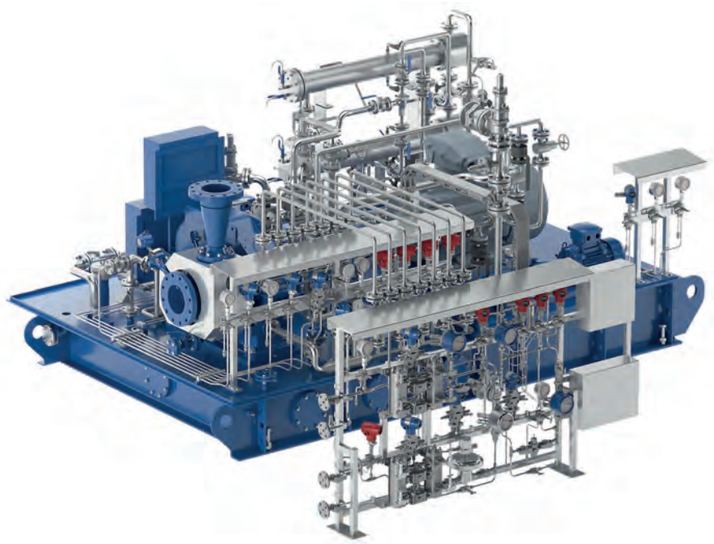
The plastic polyethylene (PE) is an extremely versatile product of the chemical industry. PE is used to make films of all kinds, beverage packaging, canisters, and even pipe jackets. The partially crystalline, nonpolar thermoplastic is divided up into different main types based on density. Through the selection of the polymerization conditions, the molecular weight, molecular weight distribution, kinetic chain length, and degree of polymerization are affected.

Our F1 Series single-stage compressors are used in applications such as the licensed “Innovene G” process from Ineos for the production of linear low-density polyethylene (LLDPE). FIMA supplies the ejector boosters and the ethylene compressors for this process.

Performance data

		Compressors
Mass flow	[kg/h]	60,000
Max. pressure	[bar]	50
Pressure ratio/increase	per stage	2.0
Rotational speed	[min^{-1}]	20,000
Motor/drive output	[MW]	5.0

F1 Series



F1 Series: Single-stage blowers and compressors

Polypropylene (PP)

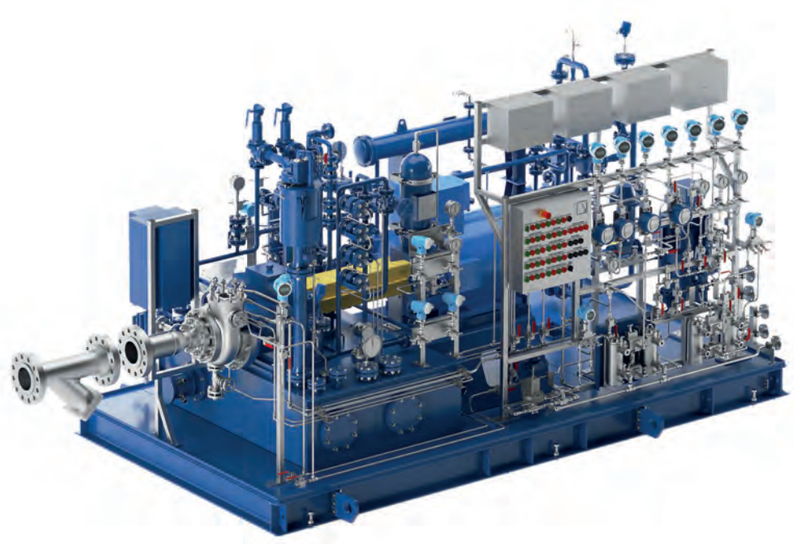
Compared with PE plastic, polypropylene (PP) is harder, is stronger, and can withstand higher thermal loads. Thanks to its special properties, PP has an extraordinarily wide range of applications. It is used in everything from vehicle interiors to food and cosmetics packaging, to pressure and drainage pipes.

The licensed Novolen process from Lummus Novolen Technology for producing PP is just one example of the use of recycle gas compressors from FIMA. In general, these compressors return the unconverted propylene gas to the reactor. Smaller single-stage compressors are often used for homomer plants. So-called cascade compressors are also used in PP production. They are installed in the multistage variant (see FIMA F3 Series).

Performance data

		Compressors
Mass flow	[kg/h]	100,000
Max. pressure	[bar]	50
Pressure ratio/increase	per stage	2.0
Rotational speed	[min^{-1}]	21,000
Motor/drive output	[MW]	5.0

F1 Series



F1 Series: Single-stage blowers and compressors

CCR UOP

(Continuous catalytic reforming)

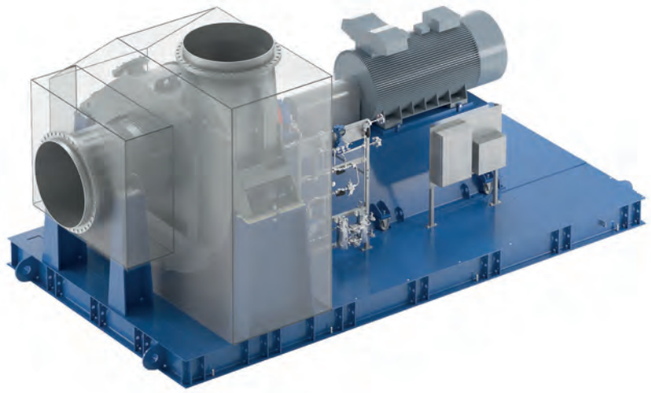
Catalytic reforming is a refining process in which aromatic compounds and branched alkanes are produced. The aim is to increase the octane number and produce higher-grade compounds. The reformate, or main liquid product, consists primarily of benzene, toluene, xylenes, aromatics, and alkane compounds.

In the licensed UOP system, the four reactors are stacked. The catalyst flows from the top of the first reactor to the bottom of the fourth reactor due to gravity alone.
FIMA supplies fans for the CCR Platforming™ process and the CCR Oleflex™ process. Hot-gas, or regenerative, blowers operated at a process temperature of approximately 600 °C are mainly used here. Apart from the main blower, fines removal blowers and cooler blowers are integrated and are available from FIMA for all UOP unit sizes.

Performance data

		Blowers
Flow rate	[m³/h]	115,000
Design pressure	[bar]	4.5
Design temperature	[°C]	600
Rotational speed	[min⁻¹]	3,600
Motor/drive output	[kW]	540

F1 Series



F1 Series: Single-stage blowers and compressors

CCR Axens

(Continuous catalytic reforming)

With the licensed CCR process from Axens, too, the goal is to increase the octane number and at the same time generate higher-quality aromatics and alkane compounds.

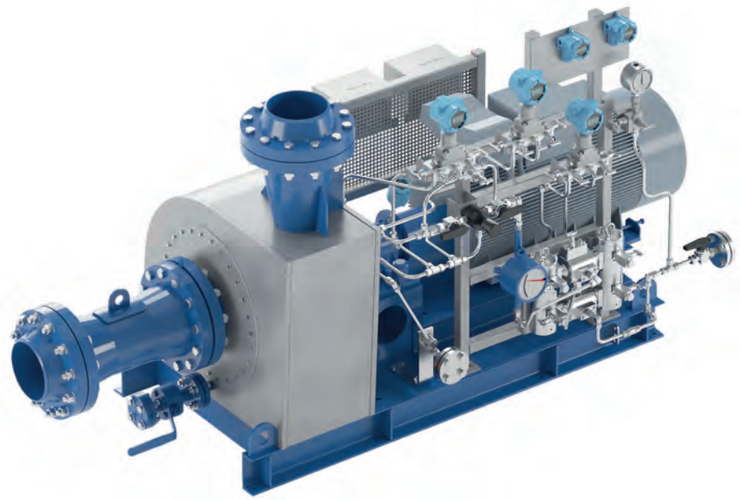
Axens uses a horizontal reactor setup similar to that used in the semi-regenerative process. The catalyst is transported by a lift system from the bottom of one reactor to the top of the next reactor. The cleaning and regeneration of the catalyst plays an important role in the process.

FIMA recirculation blowers are used to maintain and accelerate the regeneration process in the reactor.
In addition, FIMA elutriation blowers are used in a secondary process for removal of oxidation residues and dust from the regenerated catalyst.

Performance data

		Blowers
Mass flow	[kg/h]	7,000
Design pressure	[bar]	10
Design temperature	[°C]	450
Rotational speed	[min⁻¹]	6,000
Motor/drive output	[kW]	30

F1 Series



F1 Series: Single-stage blowers and compressors

Methylene diphenyl diisocyanate (MDI)

As chemical compounds from the group of aromatic isocyanates, methylene diphenyl diisocyanates are normally mixtures of several constitutional isomers. They differ in terms of the positions of the isocyanate groups. MDI is one of the most commonly produced isocyanates worldwide and is a key raw material for the production of polyurethane, polyamide and flexible foam, insulating foam, and adhesives.

FIMA supplies single-stage radial blowers for the production of MDI. Products include containment, air extraction, and exhaust gas fans. The machines are manufactured from high-grade materials and realized in sophisticated designs.

Performance data

		Blowers
Flow rate	[m^3/h]	200,000
Max. pressure	[bar]	10
Pressure ratio/increase	per stage	1.3
Rotational speed	[min^{-1}]	6,000
Motor/drive output	[MW]	1.5

F1 Series

F1 Series: Single-stage blowers and compressors

Toluene-2,4-diisocyanate (TDI)

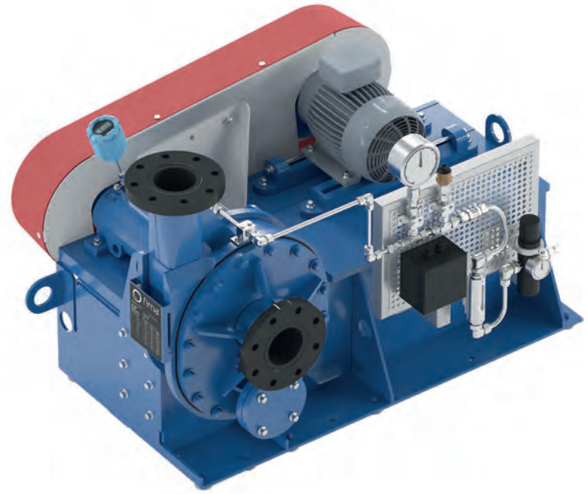
TDI is another important isocyanate besides MDI and a key intermediate in the plastics industry. It is produced either by nitration and subsequent hydrogenation or by oxidative dehydrogenation of formamides. TDI is needed in the chemical industry for the production of adhesives, foam materials for mattresses and upholstery, polyurethanes, elastomers, coatings, and high-grade paints as well as for the production of lubricants.

Due to the phosgene in the gas mixture, the fans must meet extremely high tightness and material requirements, which our machines can easily do. As exhaust gas, air extraction, or containment fans in the TDI production process, our machines provide the optimal solutions for the chemical process industry.

Performance data

		Blowers
Flow rate	[m^3/h]	100,000
Max. pressure	[bar]	10
Pressure ratio/increase	per stage	1.3
Rotational speed	[min^{-1}]	6,000
Motor/drive output	[kW]	500

F1 Series



F1 Series: Single-stage blowers and compressors

Nitrogen (N_2)

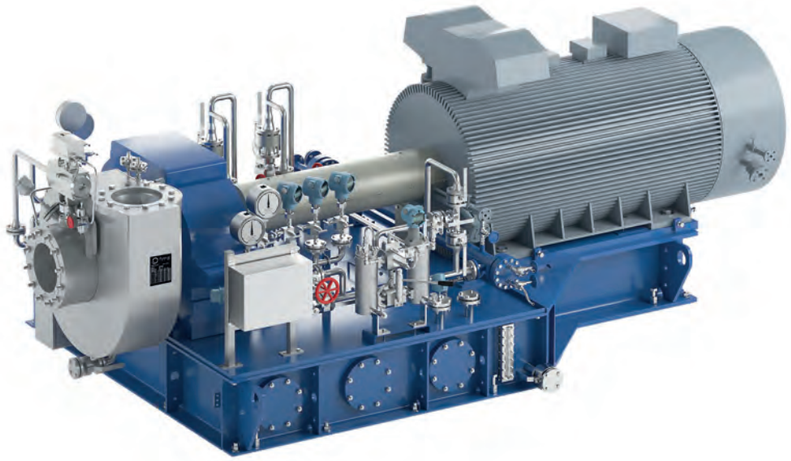
Nitrogen is an odorless and colorless gas used in a multitude of applications. For example, it is a main component in fertilizers and refrigerants and is used in its purest form for inerting.

FIMA fans and compressors are also used in combination with nitrogen in a multitude of processes: as regenerative gas blowers in polymerization processes for regenerating nitrogen, as nitrogen booster compressors in steel production, and as startup blowers for inerting, e.g., of methanol and hydrogen plants.

Performance data

		Compressors	Blowers
Flow rate	[m³/h]	200,000	200,000
Max. pressure	[bar]	20	20
Pressure ratio/increase	per stage	< 2.0	≤ 1.4
Rotational speed	[min⁻¹]	25,000	7,500
Motor/drive output	[MW]	5.0	5.0

F1 Series



F1 Series: Single-stage blowers and compressors

Hydrogen (H_2)

Hydrogen is one of the most important chemical elements and is a component of nearly all organic compounds. In response to the challenges of the energy transition, numerous new hydrogen-based processes are emerging, thereby building on the already significant role of hydrogen in numerous chemical processes.

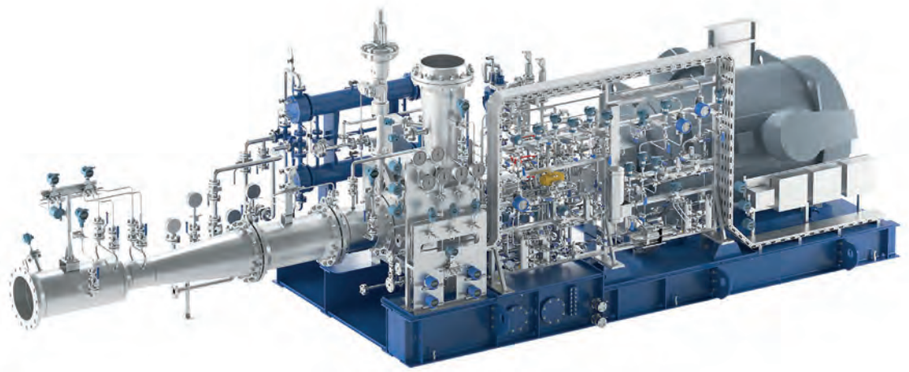
One example is oxo synthesis, also known as hydroformylation. The large-scale process is used to produce aldehydes. Hydrogen serves as one of the starting products of the process. The resulting aldehydes are usually hydrogenated to form alcohols and are ultimately used as plasticizers, raw materials for laundry detergents and cleaning agents, or solvents. Because the process gas has a high hydrogen content, the material's resistance to hydrogen embrittlement by the medium poses a special challenge.

Performance data *

		Compressors	Blowers
Flow rate	[m³/h]	50,000	100,000
Max. pressure	[bar]	100	25
Pressure ratio/increase	per stage	1.3	1.1
Rotational speed	[min⁻¹]	40,000	7,500
Motor/drive output	[MW]	5.0	5.0

*Data based on gas mixture with molar mass of 10 g/mol

F1 Series



F1 Series: Single-stage blowers and compressors

Chlorine gas (Cl_2)

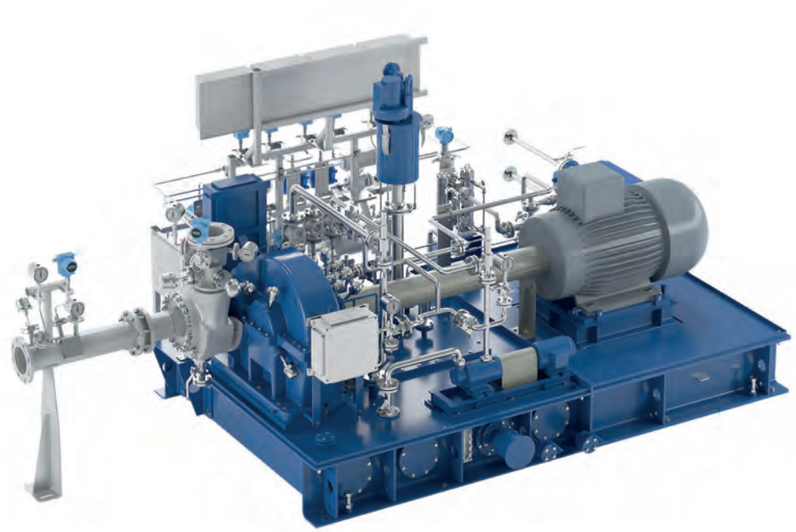
Due to its high reactivity, chlorine (Cl_2) is an important basic chemical in the chemical industry. The aggressive green-yellow gas with a pungent odor is used for the production of organic and inorganic compounds such as hydrochloric acid or chlorides. It is also used as an oxidizing agent, a bleaching agent, and a disinfectant. Chlorine gas reacts with minute amounts of water (e.g., humidity) to form hydrochloric acid and is therefore highly corrosive to most metals when wet.

FIMA chlorine gas compressors are used, for example, in rubber production plants. The machines compress the chlorine gas needed by the process for the reactor. They are generally suitable for all chemical processes in which chlorine gas is transported.

Performance data

		Compressors	Blowers
Mass flow	[g/h]	9,500	9,500
Max. pressure	[bar]	10	10
Pressure ratio/increase	per stage	1.9	1.4
Rotational speed	[min^{-1}]	25,000	5,000
Motor/drive output	[kW]	200	200

F1 Series



F1 Series: Single-stage blowers and compressors

Nitric acid (HNO_3)

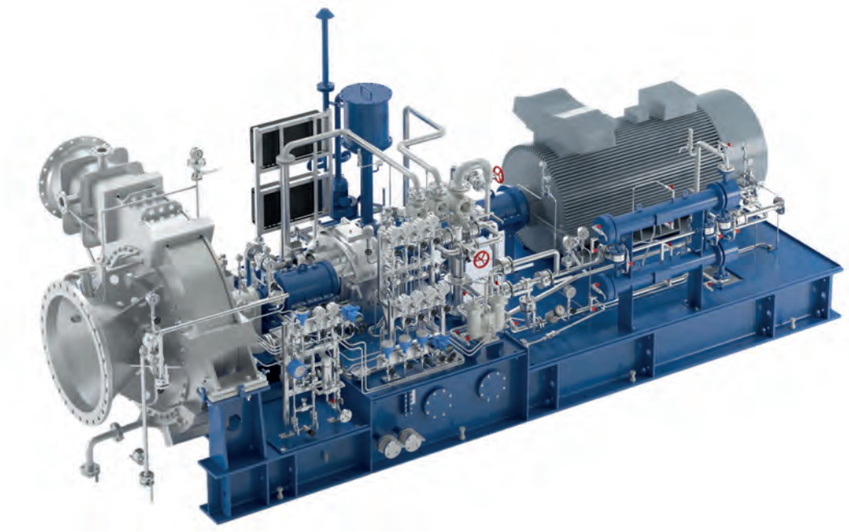
Nitric acid is one of the three most important basic chemicals in the chemical industry. It is produced by catalytic oxidation of ammonia in the Oswald process. Nitric oxide is produced as an intermediate product, which reacts with oxygen to form nitrogen dioxide, which then reacts with water to form nitric acid. As a starting product for the Oswald process, ammonia is produced from natural gas and air in the Haber–Bosch process. FIMA also supplies blowers and compressors for this process.

Our machines are also used as NOx blowers in nitrite plants, where they transport the gaseous oxides of nitrogen (NOx). In this waste-free process, NOx is removed from the exhaust air and recovered. For this process, FIMA supplies exhaust gas and neutralization blowers.

Performance data

		Compressors	Blowers
Flow rate	[m^3/h]	63,641	58,140
Max. pressure	[bar]	1.294	1.370
Pressure ratio/increase	per stage	1.461	1.475
Rotational speed	[min^{-1}]	6,378	2,985
Motor/drive output	[MW]	1.15	1.0

F1 Series



F1 Series: Single-stage blowers and compressors

Acid recovery plant (ARP)

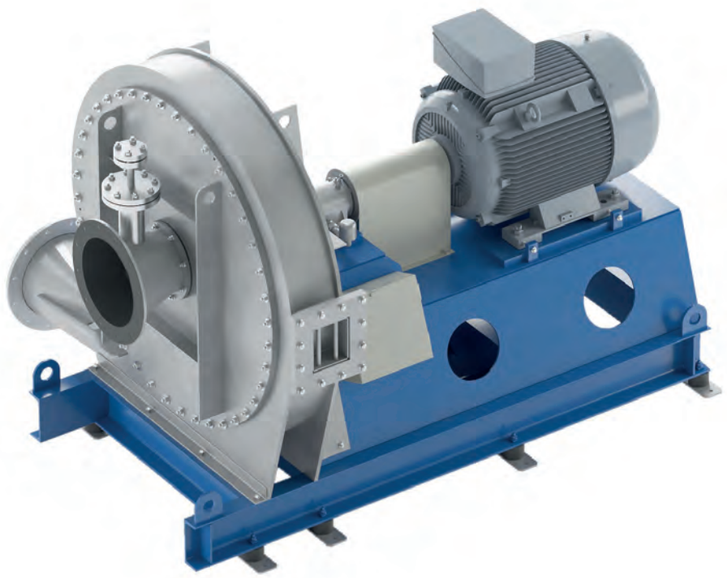
When steel is heated or rolled, an adherent blue-green layer composed of different iron oxides forms on the surface of the metal. This so-called mill scale can cause corrosion in downstream processing steps and therefore has to be removed. Pickling is used to free the metal from the layer of scale (bright pickling).

The contaminated iron-rich acid is converted in a reactor (spray roasting or fluidized bed process) and separated from the iron content in an acid regeneration plant. The regenerated acid is then returned to the pickling process. In the acid regeneration process, FIMA industrial fans are used as exhaust gas and flue gas blowers. Through the recycling of the hydrochloric acid, FIMA contributes to a closed process cycle.

Performance data

		Blowers
Flow rate	[m³/h]	153,400
Max. pressure	[bar]	0.5
Pressure ratio/increase	per stage	1.3
Rotational speed	[rpm]	3,600
Motor/drive output	[kW]	1,500

F1 Series



F1 Series: Single-stage blowers and compressors

Highly dispersed pyrogenic silica

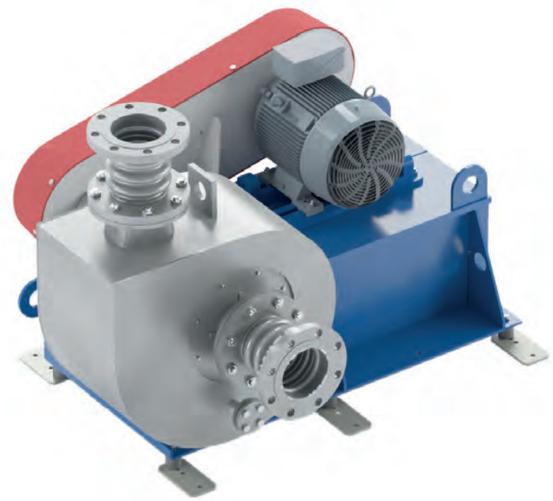
In chemical terms, pyrogenic, or fumed silica is an extremely pure amorphous silicon dioxide (SiO_2). It exists as a loose, voluminous white powder. It can be found, for example, in dyes, toners, food, and pharmaceutics and is used in many everyday products. It is also used as a corrosion inhibitor in paints and is frequently used to modify rheological properties.

A variety of FIMA blowers are used in the silica production process. Because hydrochloric acid is a byproduct of production, some of the blowers are exposed to extremely harsh process conditions. Examples are the process gas blowers 1 & 2 and the exhaust blowers 1 & 2. In both cases, the two fans are connected in series. In this application, the conveyed gas has a very high hydrochloric acid (HCl) content.

Performance data

		Blowers
Inlet flow rate	[m³/h]	25,000
Inlet pressure	[mbar abs]	760
Outlet pressure	[mbar abs]	1,360
Design temperature	[°C]	350
Motor/drive output	[kW]	315

F1 Series



F1 Series: Single-stage blowers and compressors

Fluidized bed drying

(Pharmaceutical blowers)

A widespread and commonly used drying method in the pharmaceutical industry is fluidized bed drying. This technical process is used to dry solids. A bed of solid particles such as powders, granules, or even pellets, tablets, or capsules is kept in motion by an upward flow of air. This airflow can be heated and thus transport away moisture in or on the particles and dry the product.

The centrifugal blowers are used for drying solids in the pharmaceutical industry. They can also be made of austenitic stainless steel (1.4404) or other materials.

Performance data

		Blowers
Flow rate	[m³/h]	4,212
Max. pressure	[mbar]	1,059
Pressure ratio/increase	per stage	0.06
Rotational speed	[min⁻¹]	3,575
Motor/drive output	[kW]	15

F1 Series

F1 Series: Single-stage blowers and compressors

Liquefied natural gas

(LNG)

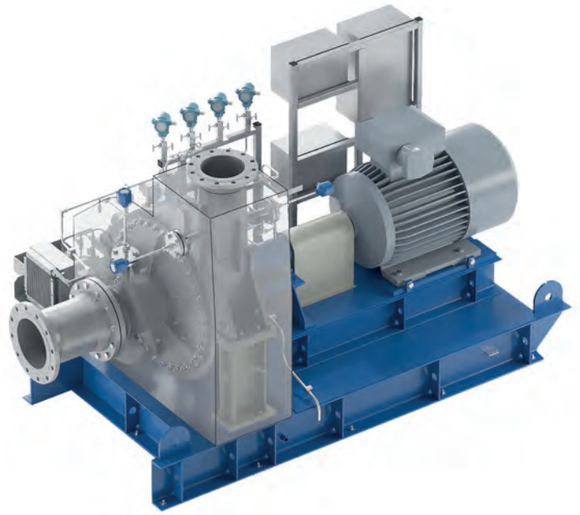
Liquefied natural gas (LNG) is natural gas that has been liquefied by being cooled down to −161 to −164 °C (112 to 109 K). LNG has about one six hundredth of the volume of gaseous natural gas and therefore offers great advantages, especially for transport and storage. In a gas liquefaction plant or LNG terminal, the natural gas is stored, processed, and finally liquefied. The LNG is then pumped onto special ships, which move it to another LNG terminal.

FIMA boil-off gas (BOG) compressors and blowers are used to ensure that there is no negative pressure or vacuum in the tanks of the transport ship during unloading. They transport boil-off gases (BOG) from the LNG storage tanks back to the transport ship.

Performance data

		Compressors	Blowers
Flow rate	[m³/h]	40,000	30,000
Max. pressure	[bar]	10	10
Pressure ratio/increase	per stage	1.7	1.35
Rotational speed	[min⁻¹]	35,000	6,000
Motor/drive output	[kW]	2,000	500

F1 Series



F2 Series: Hermetically encapsulated blowers and compressors

HETICO®

In the FIMA HETICO®, the impeller and the drive are both encapsulated in a single casing. In this way, dynamically loaded seals between the process area and the surroundings are avoided. The special gas-tight design of the HETICO® ensures that in applications with positive pressure, no process gas escapes into the outside atmosphere. Conversely, it prevents outside air from entering the process in vacuum applications.

The explosion-proof design makes it suitable for use in explosive atmospheres and for conveyance of explosive media. It satisfies the requirements of Pressure Equipment Directive PED 2014/68/EU. The HETICO® is already being successfully deployed not just in laminate manufacturing, in thermal power stations, and in thermal exhaust gas treatment plants but also in satellite test beds. In a number of processes, it is used as a recirculation blower.

Performance data

		Compressors
Flow rate	[m³/h]	20,000
Max. pressure	[bar]	150
Pressure ratio/increase	per stage	1.15
Rotational speed	[min⁻¹]	20,000
Motor/drive output	[kW]	160

F2 Series

F2 Series: Hermetically encapsulated blowers and compressors

MACOUCO®

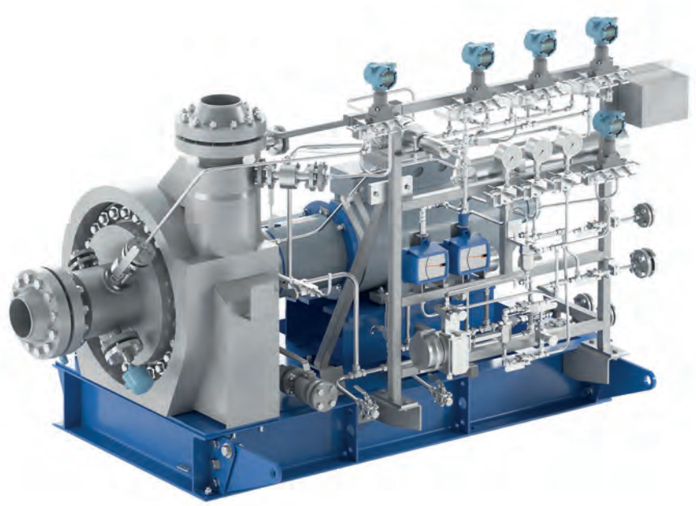
Due to the basic design of the magnetic coupling, the FIMA MACOUCO® is more environmentally compatible than conventional machine types are. In the MACOUCO®, the magnetic coupling and the bearing unit are flanged directly to the compressor housing, which is separated from the bearing unit through a gas-tight thermal insulation barrier. The hermetically sealed construction prevents dangerous gases from escaping into the environment. Without the need for dynamic seals, it is possible to obtain leak rates of less than 10-6 mbar*L/s with the FIMA MACOUCO®.

Areas in which our MACOUCO® is used include polyolefin plants (catalloy, spherilene process), chlorine gas, regeneration, recovery, and recycling processes, and sterilization plants for surgical and medical instruments.

Performance data

		Compressors
Flow rate	[m³/h]	30,000
Max. pressure	[bar]	320
Pressure ratio/increase	per stage	1.15
Rotational speed	[min⁻¹]	8,000
Motor/drive output	[kW]	250

F2 Series



F3 Series: Multistage blowers and compressors

PP cascade (2-stage)

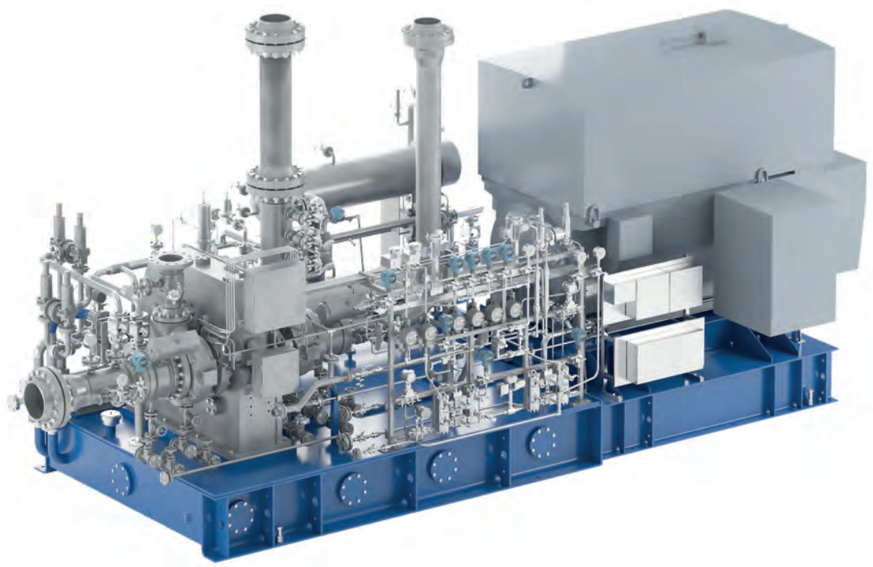
If several process steps are connected in series and the starting product from each step is further processed in the next step, then this is referred to as a cascade. This method is also used in the production of polypropylene.

In plants using the PP cascade process, recycle gas compressors from FIMA are also installed. If higher pressure increases are required, two-stage compressors are used. FIMA uses a single pinion compressor design in which the axial forces of the two stages balance each other out. This guarantees optimal efficiency and an optimum machine service life. For applications that require intermediate cooling, FIMA supplies complete solutions that include special cooling systems.

Performance data

		Compressors
Mass flow	[kg/h]	150,000
Max. pressure	[bar]	50
Pressure ratio		3
Rotational speed	[min^{-1}]	25,000
Motor/drive output	[MW]	7.0
Design temperature, min./max.	[°C]	-48/+160

F3 Series



F3 Series: Multistage blowers and compressors

Methanol/ Ethanol (2-stage)

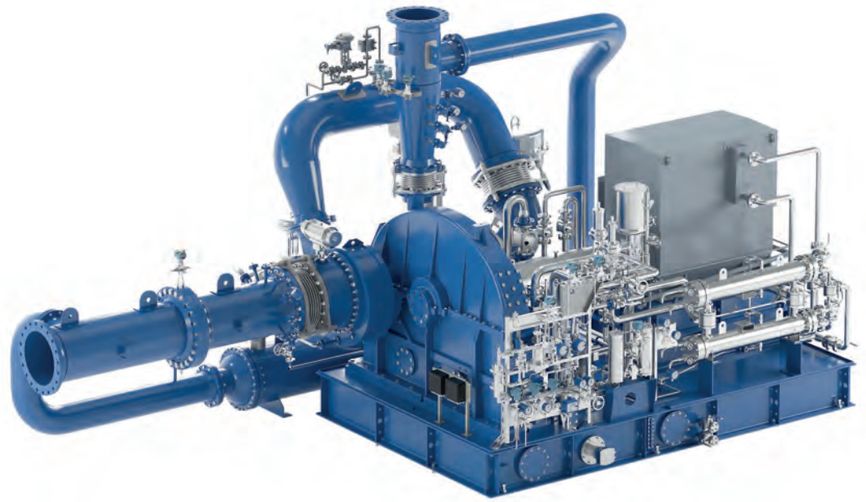
Methanol is produced using syngas or CO and H_2 in a large-scale process. In terms of range of applications and production volume, methanol is the most important alcohol. It serves as a precursor product for organic syntheses, e.g., of plastics. Besides being produced through the fermentation of biomass, ethanol can also be synthetically produced. In this case, it is frequently processed further into solvents, antifreeze or fuel.

The sample performance data originate from a methanol plant in Brazil in which a FIMA two-stage integrally geared compressor is used to compress and transport the methanol vapor in a secondary process.

Performance data

		Compressors
Mass flow	[kg/h]	50,000
Max. pressure	[bar]	10
Pressure ratio		3
Rotational speed	[min^{-1}]	15,000
Motor/drive output	[MW]	3.0
Design temperature, min./max.	[°C]	0/+200

F3 Series



F3 Series: Multistage blowers and compressors

Hot gas compressors (2-stage)

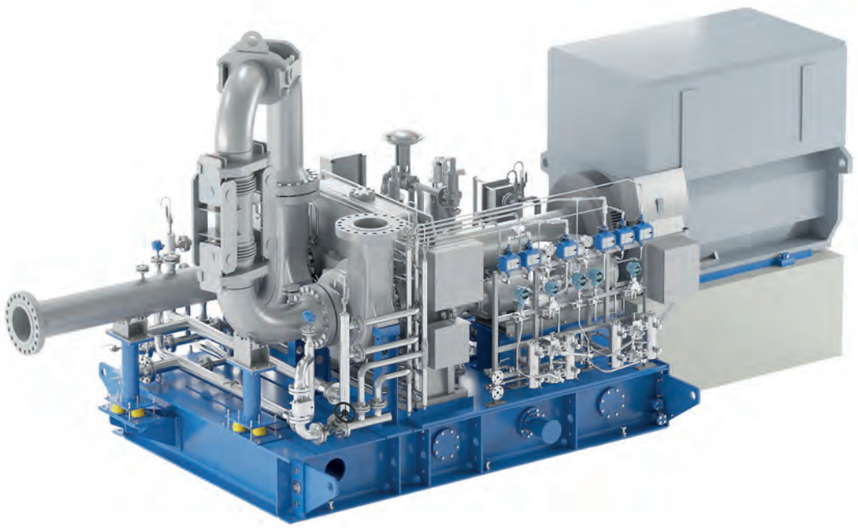
Two-stage compressors with precisely specified performance data at high pressure and temperature are a unique offering from FIMA, otherwise very hard to find on the market. In one example, thanks to its decades-long experience in the process gas industry and in manufacturing of machines for various application areas, FIMA was the only company able to design and build the compressor.

The compressor recycles combustion exhaust gas in a gas turbine test rig. The customer thus is able to test its gas turbines under full load. At the same time, operating costs are lowered because the exhaust gas no longer has to be mixed artificially. With our technical know-how and resourceful employees, FIMA is ready to take on challenges and find customer-oriented solutions that go beyond the possibilities of the competition.

Performance data

		Compressors
Flow rate	[m³/h]	24,000
Max. pressure	[bar]	30
Rotational speed	[min⁻¹]	18,000
Motor/drive output	[MW]	3.7
Max. temperature	[°C]	650

F3 Series



F3 Series: Multistage blowers and compressors

Air compressors (2-stage)

One use for two-stage FIMA air compressors is for fermentation air. The fermentation air compressors are used in such applications as the production of citric acid. The air can be drawn in via intake filters, compressed in two compressor stages, and then fed to the process.

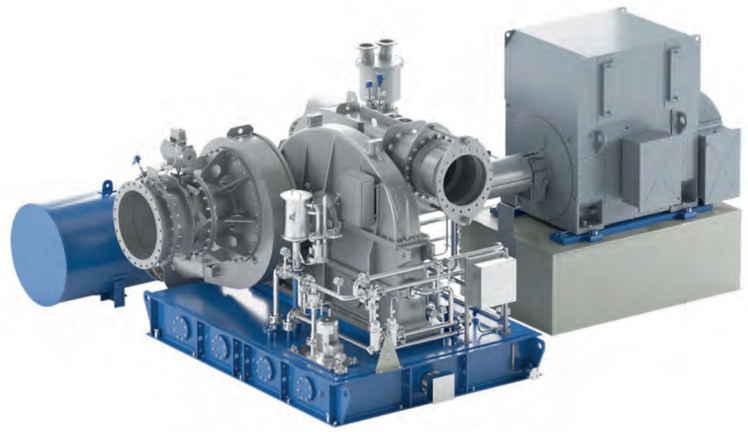
These types of compressors are used, for example, for aeration or supply of atmospherically operated plants. In these biotechnological applications, the static and dynamic pressure losses must be overcome.

Two-stage air compressors are also used for vapor recompression in methanol applications.

Performance data

		Compressors
Flow rate	[m³/h]	63,235
Max. pressure	[bar]	3.3
Pressure ratio/increase	per stage	2.1/1.6
Rotational speed	[min⁻¹]	8,500
Motor/drive output	[MW]	3.3

F3 Series



F4 Series: Explosion-proof blowers

Zone 0

As world leaders (2010) in Zone 0 blowers, we are aware of the high risk associated with the conveyance of continuously explosive gases. In the conveyance of gases in Zone 0, the plant is constantly exposed to an explosion hazard. Thus, in light of this explosion hazard, safety is one of the most important aspects of our blowers.

Our machines have type approval for explosion groups IIA, IIB, and IIB3. We cover T1–T4 temperature classes for the gas–air mixtures. Our blowers can be found in tank terminals as well as loading, exhaust air combustion, wastewater treatment, and flaring and landfill gas plants, among others..

Performance data

		Blowers
Flow rate	[m³/h]	< 12,000
Inlet temperature	[°C]	< 100
Inlet pressure, abs.	[mbar]	< 1,300
Pressure increase	[mbar]	< 300
Motor/drive output	[kW]	< 132

F4 Series

F4 Series: Explosion-proof blowers

Zone 20

In contrast to Zone 0, Zone 20 covers areas in which explosive atmospheres made up of dust–air mixtures are present constantly, for long periods, or frequently. In cases in which the explosive atmosphere contains combustible dust, a higher risk level must be assumed.

Prescribed measures for tertiary explosion protection (limiting the impact of explosion) actually exclude the use for blowers for conveying Zone 20 atmospheres. The Zone 20 blowers developed by FIMA are based on Machinery Directive DIN EN 14986 and defined requirements of a notified approval body. They are used as conveying blowers, e.g., for conveying carbon black.

Performance data

		Compressors
Flow rate	[m³/h]	< 20,000
Max. pressure	[bar]	10
Max. flow rate	[kg/h]	6,000
Rotational speed	[min⁻¹]	< 3,600
Motor/drive output	[kW]	< 300

F4 Series

F5 Series: Centrifuges and bottom valves

Centrifuge dryers

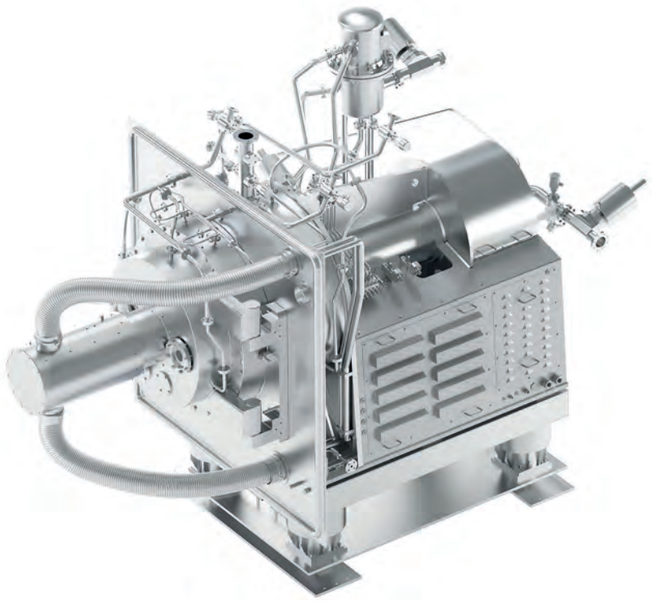
Centrifuges are used in a variety of areas, for instance, for separation of suspensions, emulsions, and gas mixtures. The uniform circular movements and the associated centrifugal force allows the substances to be separated from one another.

FIMA centrifugal dryers separate components in solid–liquid suspensions and dry them in a single machine. The specific machine construction guarantees a hermetically sealed product chamber that can be inerted and sterilized. Thus, foreign particles in the product are avoided and simple, gentle product handling is ensured.

Performance data

Fill weight	[kg]	< 240
Drum diameter	[mm]	< 1,000
Drum width	[mm]	< 500
Rotational speed	[min^{-1}]	< 900
Relative centrifugal force	[g]	< 453

F5 Series



F5 Series: Centrifuges and bottom valves

Bottom valves

The dead space-free bottom valves from FIMA enable easy discharge, dosing, and dead space-free sealing. The valve is designed in such a way that via the lipstick-like rotating and lifting movement of the piston, the discharge pipe cross section is opened up or sealed off. In closed state, the piston is flush with the tank inner wall.

This specific type of valve is used in the biochemical, pharmaceutical, and food industries as well as in the fine chemical industry. FIMA bottom valves meet the high technical demands of these industries. They are suitable for powdered, granular bulk materials as well as for liquids, suspensions, and free-flowing paste products.

Sizes

	TBV 100	**TBV 150**	**TBV 200**	**TBV 250**	**TBV 300**
Tank flange **Lid height h** **Connection Ø D2 37**	DN 100 35 Ø 129	DN 150 40 Ø 179	DN 200 40 Ø 234	DN 250 50 Ø 279	DN 300 50–60 Ø 329
Down spout/flange DIN 2576 **Down spout Ø D3**	DN 50 Ø 54.5	DN 80 Ø 80	DN 125 Ø 125	DN 150 Ø 150	DN 200 Ø 200
Piston Ø D1	Ø 70	Ø 120	Ø 160	Ø 200	Ø 240
Angle of rotation/stroke H	180°/55	180°/70	180°/95	180°/120	180°/160
Down spout height H1	400	520	550	600	700

F5 Series

F6 Series: FIMA Basics

Standardized blowers

The Basics Series combines reliability, quality, and a good return on investment. With standardized components, we can offer you an inexpensive alternative for predefined performance ranges. Standard blowers can be used in a multitude of applications. They can be used, for example, in paint booths, in washing and drying systems, in smoke extraction systems, or for classic building air supply. They can also be used as simple conveying blowers for air and process gas applications.

The radial blowers meet all safety-relevant requirements and offer a stable construction as well as workmanship that satisfies FIMA quality standards. The FIMA Basics product range includes standardized blowers with first-class basic features. The blowers also meet all necessary safety standards and ensure the smooth running of the processes.

The FIMA Basics Series offers three different types for predefined performance ranges. In the MB machine, the motor is positioned on the base frame and the impeller is mounted right on the motor shaft. In the KBG machine, there is an elastic coupling between the motor and the block bearing. The impeller is positioned on the block bearing shaft. The RGP variant is belt-driven and has a block bearing as well as an impeller mounted on the block bearing shaft such as the KBG machine.

F6 Series

100% BASICS BY FIMA

Machine data

		MB Machine
Material		1.0038, 1.0570, 1.4301, 1.4404, 1.4571 (+ Naxtra impellers)
n_max	[min^{-1}]	3,600
T2	[°C]	< 200
P2	[bara]	< 1.5
Max. impeller Ø D2	[m]	< 1.2
Max. motor size		MB 250

Machine data

		KBG Machine
Material		1.0038, 1.0570, 1.4301, 1.4404, 1.4571 (+ Naxtra impellers)
n_max	[min^{-1}]	3,600
T2	[°C]	< 200
P2	[bara]	< 1.5
Max. impeller Ø D2	[m]	< 1.2
Standard coupling		N-Eupex

Machine data

		RGP Machine
Material		1.0038, 1.0570, 1.4301, 1.4404, 1.4571 (+ Naxtra impellers)
n_max	[min^{-1}]	3,600
T2	[°C]	< 200
P2	[bara]	< 1.5
Max. impeller Ø D2	[m]	< 1.2
Max. motor size		MB 250

F7 Series: Cross flow blowers

Baking lines

GREEN TECH BY FIMA

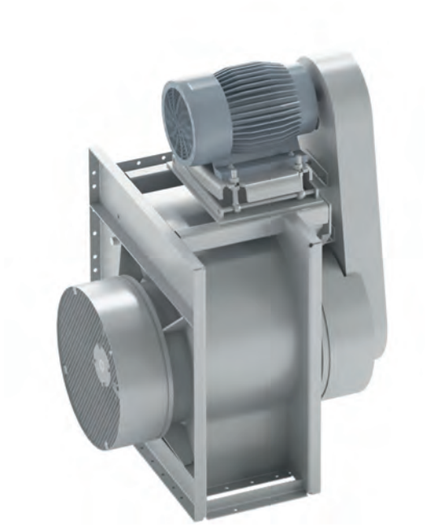
Cross flow blowers, also known as tangential fans, are special types of blowers. This type of blower has a very long impeller. The tangential fan's design allows it to provide a uniform airflow over a large area.

The FIMA cross flow blowers are used in the baking industry as well as other fields. With their homogeneous airflow, the fans contribute to a constant quality in the industrial production of baked goods. The solid construction is designed to withstand high temperatures.

Performance data

		Blowers
Flow rate	[m^3/h]	24,000
Total pressure difference	[mbar]	12.4
Rotational speed	[min^{-1}]	1,033
Motor/drive output	[kW]	15/18
Temperature	[°C]	350

F7 Series



F8 Series: Axial blowers

Wind tunnel blowers

Wind tunnel blowers are used in performance tests and driving simulations with vehicles on chassis dynamometers to simulate the actual wind conditions that would be present outside of the simulation environment.

In addition to the usual wind tunnel blowers, FIMA manufactures and supplies machines with an L-shaped design. This space-saving variant provides an extremely homogeneous flow distribution and makes the simulation flow conditions reproducible. At the same time, the verified uniformity of the outlet velocity is guaranteed. Braking and acceleration can be simulated in real time with no delay times.

Performance data

		Blowers
Flow rate	[m^3/h]	182,458
Max. pressure	[bar]	0.20
Pressure ratio/increase	per stage	1.021
Rotational speed	[min^{-1}]	1,543
Motor/drive output	[kW]	160

F8 Series

Service from the Original

Installation / Operation / Maintenance

Excellent engineering deserves excellent service.

FIMA service is flexible, fast, and sustainable.

If you are specialized in the construction or operation of complex plants, you need one thing above all to go along with your customized special machines: the best service possible for the given requirements. Our qualified and dedicated service teams take care of all our customers' needs – at customer sites or in-house at FIMA.

Flexibility and customer orientation as well as precision craftsmanship, diligence, and comprehensive technological know-how are what set us apart. Fast, solution-oriented service from the original manufacturer guarantees the best support for our customers.

Service from the original manufacturer. Service@FIMA.

The new Service@FIMA covers everything from test runs to installation and commissioning to maintenance and modifications. FIMA service goes far beyond the typical. The technical help desk is just one example of this and is available at all times free of charge to answer all of your technical questions.

… We value FIMA's know-how … The machine tests were performed with the highest degree of professionalism …

Makhteshim Chemical Works, Israel

Whether for regular maintenance or for complex problem solving – **FIMA service is right for you.**

We supply you with all important replacement parts, from small parts to key components.

Original, reliable, worldwide

We give our all for our customers. In addition to our worldwide service – which we offer on site or remotely – replacement parts from the original manufacturer can only be obtained from us. We are also your competent partner for replacement machines. Plug-and-play, modernized, or overhauled machines from FIMA offer everyone a perfect solution.

Worldwide service

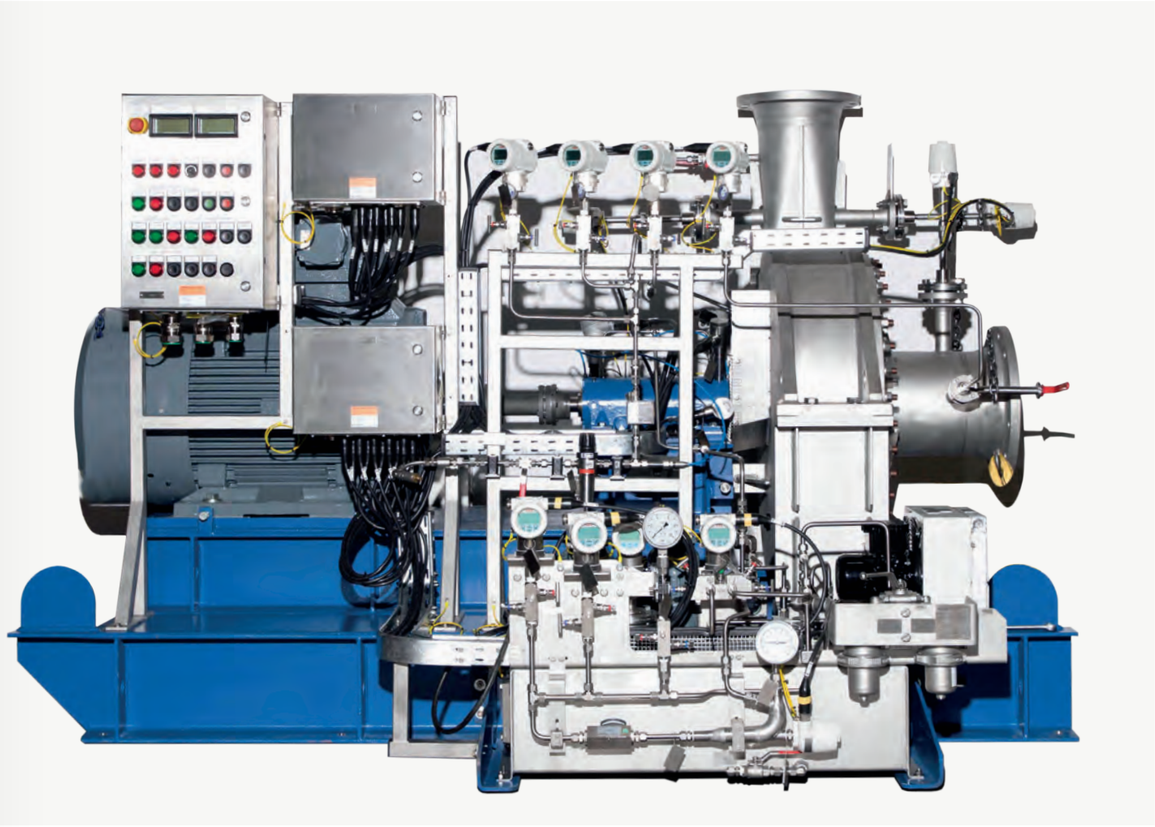
Whether in person or digitally: our service employees are available to you around the clock as competent partners. As a customer, you benefit from the lengthy experience and technical know-how of our employees. Our own FIMA service teams in Germany, China, India, and Canada are supported by additional FIMA service representatives. We have service technicians with various specializations positioned around the world to be at your site quickly. Our specialists can also offer you remote support as an alternative to our on-site service.

Replacement machines

If your FIMA machine has been in operation for several decades and needs to be replaced, we will be happy to offer you a replacement machine. At FIMA, we make sure that you receive the same machine model with identical connection dimensions and the most modern and efficient technology. Thus, the new machine can be integrated into your existing system quickly and easily – plug and play. At the same time, downtimes are minimized and costs of downtime reduced. Upgrading to the latest technology with identical reliability and quality is guaranteed with Service@FIMA.

Original replacement parts from FIMA

FIMA offers a fast and reliable replacement parts delivery service for your FIMA machine. We guarantee replacement parts with OEM quality. With our large inventory of replacement parts, we can guarantee availability at short notice and convenient exchange. If you need special or modified replacement parts, we can directly access our in-house manufacturing capabilities. From housings to drive shafts: the required replacement parts for your machine are manufactured in the shortest possible time.



For a smooth flow in your company – **FIMA service is perfectly adapted to your needs.**

Modernization

It isn't always necessary to replace an installed FIMA machine. Thanks to their robust design, the main components of your FIMA machine can still be used after decades of operation and can be used for reconditioning. For this, FIMA offers a plethora of modernization options that increase your machine's efficiency and sustainably conserve resources. We offer not only reconditioning but also overhaul or modification of your machine. Our Service@FIMA experts would be happy to answer all your questions on the topic of modernization and support you in making an active contribution to environmental protection.

Repairs by FIMA

As an original manufacturer, Service@FIMA draws on the resources at the FIMA headquarters for repairs. Our repairs are carried out in the production buildings in Obersontheim. This has the decisive advantage of enabling fast and uncomplicated completion. The equipment inventory and our trained specialists ensure that your repair order is handled without any problems. In many cases, our employees already participated in building the machines and are accordingly very familiar with all the machine details. This means that machine downtimes are kept low and you can put your machine back into operation in the shortest time possible.

Preventive maintenance contracts and service agreements

Like you, we want your FIMA machine to operate smoothly. Within the framework of preventive maintenance contracts and service agreements, Service@FIMA makes sure that your machine is kept in optimal condition. Different types of service agreements cover different needs. Apart from simple long-term inspection options, full-service packages are also offered. We define the services, the execution methods, and any costs for special services in our contracts so that you can profit from our 100% cost transparency. As a result, there are no unpleasant surprises.

Impeller competence center

At our impeller competence center, everything revolves around the impeller of your FIMA machine. On the basis of fluid dynamics models and CFD analyses, our experts optimize impellers for your individual process requirements free of charge. Optimized impellers increase the efficiency and effectiveness of your machine and ultimately ensure a higher yield. At the same time, fewer resources are needed. Our FIMA experts can answer your questions on impeller optimization and would be happy to advise you – so there is nothing stopping you from optimizing your production processes.

Flexible, safe, fast. Our FIMA service team is on the road to you, rain or shine, to ensure the smooth operation of your plants with minimal downtime.

We still have a lot to do on the world markets.
When will you get to know our strengths?

75

More than 75 years of experience in moving gases safely and sustainably is a first-class reference for your future project.

Over the last 75 years FIMA Maschinenbau GmbH has evolved from a small business with an agricultural focus in mechanical engineering to a medium-sized company and global player. The first step in this direction was taken with the manufacturing of industrial fans. With the production of compressors and radial fans in the 1980s, FIMA gained a foothold in the process gas industry. Worldwide locations and a network of long-standing sales partners provide for optimal customer service today. More and more customers are looking to FIMA as a competent partner for moving their process gases.

FIMA Milestones

1946 Company is established for the repair of agricultural machines.
1955 Manufacturing of hay dryers is started.
1960 Manufacturing of industrial fans is started.
1970 Industrial fan product range is expanded.
1975 Manufacturing of fans for the chemical industry is started.
1977 Welding certification according to AD leaflet HP 0 is obtained.
1980 Start of development and manufacturing of compressors and radial fans.
1999 DIN ISO 9001 certification is obtained.
2002 Owner change and company is renamed: FIMA Maschinenbau GmbH
2004 Sales office is opened up in Shanghai, China.
2006 HETICO is developed.
2008 A new fan and compressor testing facility is built.
2010 Company becomes world leader in explosion-proof blowers for Zone 0 and radial compressors for low flow rates.
2010 The first MAHECO compressor with magnetic bearings is shipped.
2011 Sales office is opened up in Rio de Janeiro, Brazil.
2012 Company enters into “fgt–FIMA Greatall Turbomachinery” joint venture in China.
2013 FIMA India opens up in Mumbai.
2013 First hot gas compressor with operating temperature of 630 °C is manufactured.
2015 FIMApro opens in Denizli, Turkey.
2018 FIMApro and FIMA (Wuhan) Turbomachinery Co., Ltd. become wholly owned subsidiaries.
2019 Production floor space and machinery inventory are extended through relocation of FIMApro.
2020 FIMA representative is appointed for the ACH region.
2021 FIMA North America sales office opens.
2021 Fontes Mittelstandskapital GmbH becomes new owner of FIMA.

FIMA made in Germany.
Our references.

Concept/design:
Quandel Staudt Design GmbH
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