

**ROBUSCH®**

by Gardner Denver

# Environmental Solutions





**ROBUSCHI®**



# Wastewater Treatment

## Biogas

## Sewage Handling

## Tertiary Treatment for Wastewater

In a competitive and evolving global market, our long history of supplying aeration equipment in wastewater treatment plants that best meets customer specific requirements, makes Robuschi a trusted and reliable partner for the environmental industry. Cost-effective solutions for new plants or refurbishments of existing installations are a major focus of our product excellence and application expertise.

Nowadays, our strategy of combining products and services extends to an ever-wider array of environmental solutions, such as -biogas, mechanical vapor recompression, sewage handling and many more.

Therefore, as a global supplier of environmental solutions, we lead the market in developing innovative technologies that support our customers in reducing life cycle costs, increasing efficiency, meeting legal requirements and, finally, improving the quality of product or services they want to provide to their own customers.

Ecological sustainability is part of the Robuschi strategy, focusing on promoting environmentally friendly solutions, enhancing energy saving and protecting natural resources.

- **Top energy efficiency**
- **Low life cycle costs**
- **Low noise operation**
- **Compactness**
- **Ease of maintenance**
- **Tailor-made offer**

*Robuschi - the perfect partner for your evolving needs.*

# Environmental Specialist

- **Energy efficiency**

In wastewater treatment plants power consumption mainly comes from aeration machines.

Robuschi screw compressors can provide significant energy saving, depending on plant configuration.

Additionally the Robox Energy combines the technological advantages of Robuschi screw compressor and permanent magnet motor with Smart Process Control tool to halve wastewater treatment plant running costs.

- **Oil free**

Environmental processes require clean and oil free air.

Robuschi packages are totally oil free

(Class 0 certification, according to ISO 8573-1).

- **Flexibility**

More and more applications demand high turn down capability along with intermittent mode operation.

Robuschi PD blowers and screw compressors perfectly fit this requirement.

- **Low noise**

Low noise emission is one of the main evaluation criteria for residential areas and industrial facilities.

All Robuschi packages have been designed for reducing the noise impact, satisfying customer requirements.

Reduced in space and footprint: Robuschi equipment compact layout reduces the space requirements. Robox Energy needs 30% less space compared to similar solutions.

- **User and maintenance friendly**

Thanks to its simple and robust design, all Robuschi equipment demands little maintenance during its operation and when the machines need to be serviced; every operation is easy and quick.

- **References**

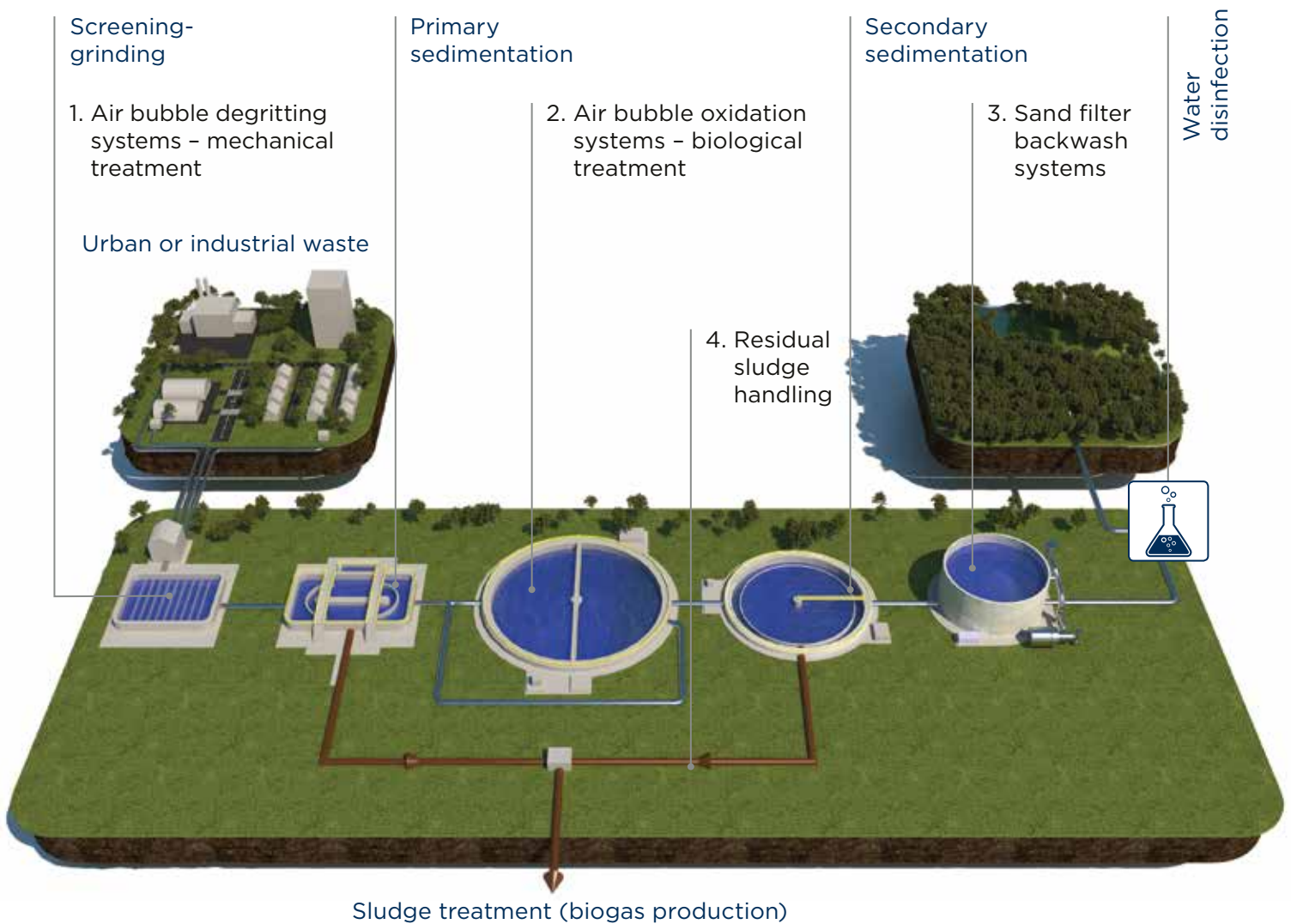
We are one of the leading suppliers of state-of-the art vacuum and pressure technology for environmental applications.

Robuschi customers, all over the world, from municipalities to consultants, have put their trust into our engineers and products.

We are the benchmark for the industry and will continue to work closely with our business partners around the globe.

# Robuschi Solutions

## Wastewater Treatment\*



### 1 PD Blower

RBS – Robox Lobe – pressure up to 1,000 mbar (g) – capacity up to 25,000 m<sup>3</sup>/h

#### Screw Compressor

Robox Screw up to 2,500 mbar (g) – capacity up to 10,100 m<sup>3</sup>/h

### 2 PD Blower

RBS – Robox Lobe – pressure up to 1,000 mbar (g) – capacity up to 25,000 m<sup>3</sup>/h

#### Screw Compressor

Robox Energy – pressure up to 1,000 mbar (g) – capacity up to 4,200 m<sup>3</sup>/h

Robox Screw up to 2,500 mbar (g) – capacity up to 10,100 m<sup>3</sup>/h

### 3 PD Blower

RBS – Robox Lobe – pressure up to 1,000 mbar (g) – capacity up to 25,000 m<sup>3</sup>/h

#### Screw Compressor

Robox Screw up to 2,500 mbar (g) – capacity up to 10,100 m<sup>3</sup>/h

### 4 Centrifugal Pump

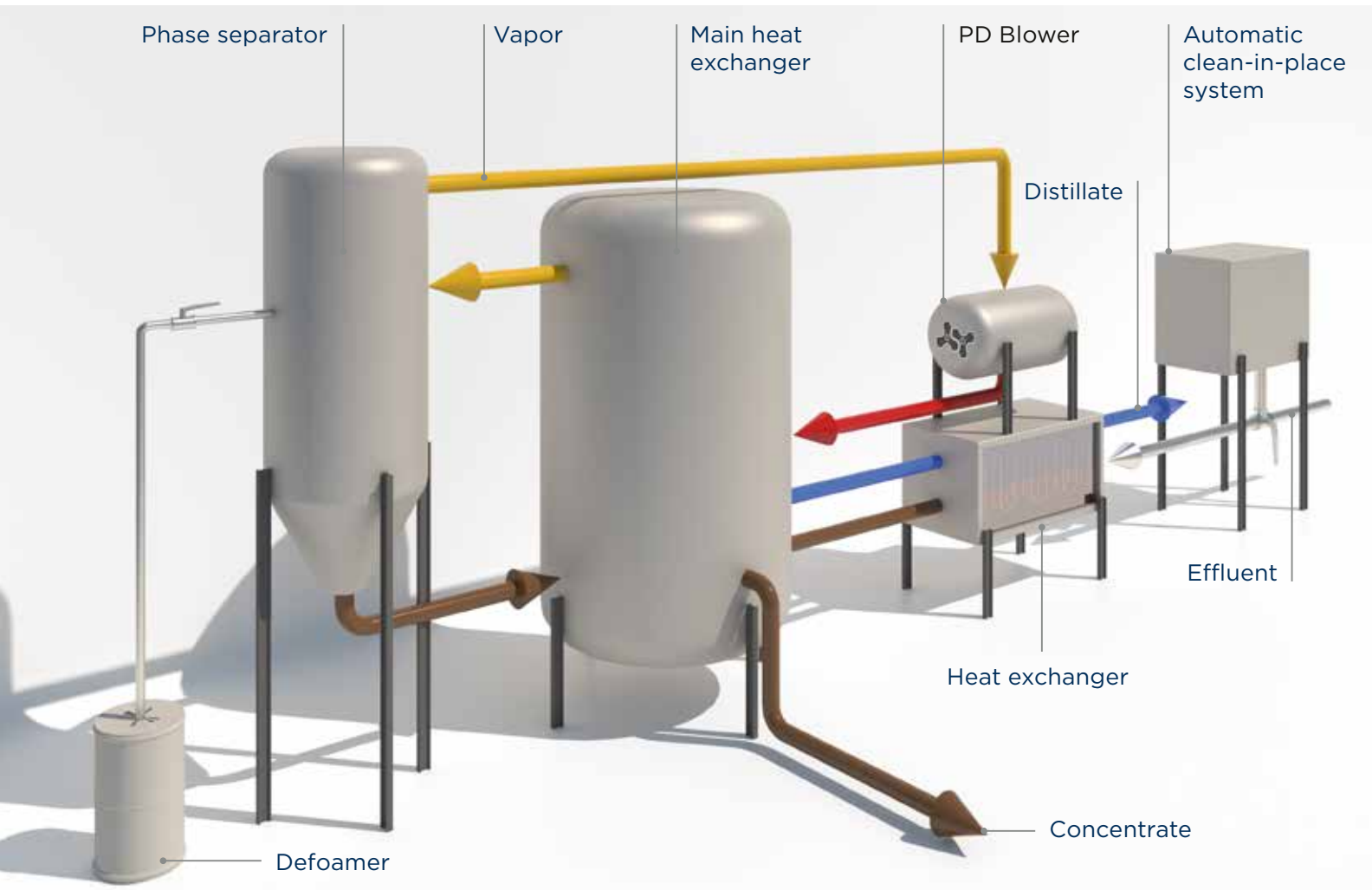
Promix - UNI PN 10 – capacity up to 2,000 m<sup>3</sup>/h

\* It refers to a possible plant layout

# Robuschi Solutions

## Tertiary treatment for Wastewater\*

### Mechanical vapor recompression



#### PD Blower

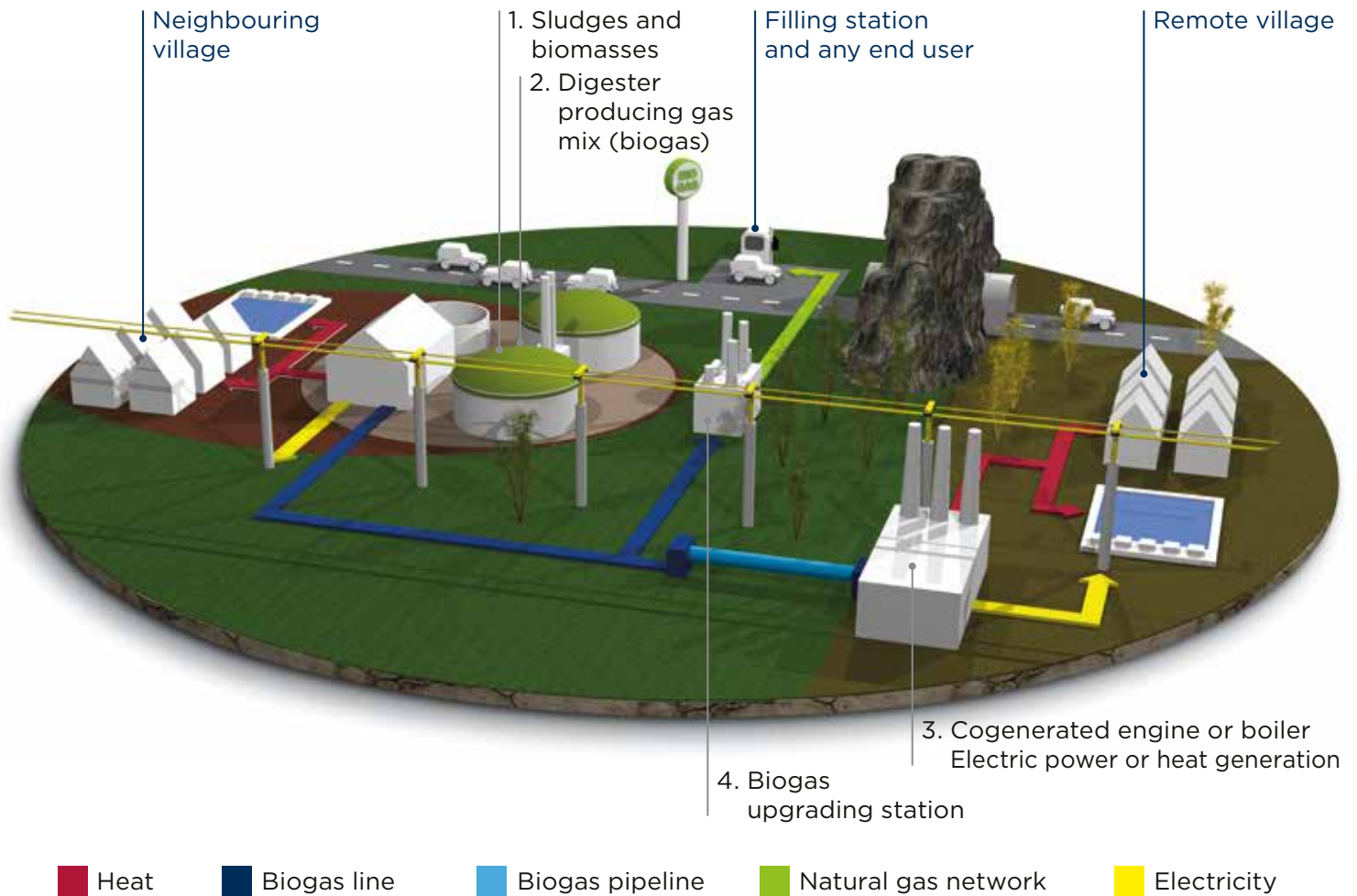
- RBS Inox – pressure up to 1,000 mbar (g) – vacuum up to 200 mbar (a)
- capacity up to 14,000 m<sup>3</sup>/h

Tertiary treatment includes reverse osmosis, desalination and ozone processes. Robuschi PD blowers are ideally suited to respond to specific plant requirements.

\* It refers to a possible plant layout

# Robuschi Solutions

## Biogas\*



### 1 Centrifugal Pump

Promix (stainless steel execution) - UNI PN 10 - capacity up to 700 m<sup>3</sup>/h

### 2 Liquid Ring Compressor

RVS - pressure up to 2,000 mbar (g) - capacity up to 4,200 m<sup>3</sup>/h

### 3-4 PD Blower for Biogas

CRBIO - GRBIO up to 400 mbar (g) - capacity up to 3,280 m<sup>3</sup>/h






Robox Lobe Biogas up to 1,000 mbar (g) - capacity up to 2,850 m<sup>3</sup>/h

\* It refers to a possible plant layout



# Effective Solutions for Environmental Processes

The spectrum of applications and the process complexity in the environmental industry need the choice of specific products. Thanks to its wide range of technologies, Robuschi manages to offer the most suitable one, providing a solution that combines superior efficiency, small footprint, minimum maintenance and operating costs, long service life and low noise emission.

Application	Description	Products
<p><b>Primary sedimentation</b></p>	<p>In the primary sedimentation stage, sewage flows through large tanks. These tanks are used to settle sludge while the grease and oil rises to the surface and is skimmed off. Primary settling tanks are usually equipped with mechanically-driven scrapers that drive the collected sludge continually towards a hopper in the base of the tank where it is pumped to treatment facilities using PD blowers or similar technologies. As a result biological materials remain on the surface and the heavy components (mainly sand) are isolated.</p>	<p><b>PD Blowers</b> <b>Screw Compressors</b></p>  
<p><b>Aeration process in wastewater treatment plants</b></p>	<p>The aeration tanks in wastewater treatment plants are activated with oxygen by using compressed air. A thorough mixing of the sludge with oxygen increases the gas yield and reduces its retention time in the tank. Even better results are achieved with warm compressed air. Blower or screw blower technologies can be found in various types of wastewater treatment plants, including aerobic activated sludge systems, SBR, nitrification-denitrification in a single basin and MBR.</p>	<p><b>PD Blowers</b> <b>Screw Compressors</b></p>  
<p><b>Desalination</b></p>	<p>Desalination is the process of removing dissolved salts from seawater or brackish water. Desalting technologies can be used for many applications, most commonly to produce potable water for domestic or municipal purposes.</p>	<p><b>PD Blowers</b> <b>Screw Compressors</b></p>  



**Application**

**Description**

**Products**

**Slurry liquid pumping**

Using slurry pumps, tough, abrasive, viscous liquids and particles in suspension can be transferred from one tank to another of the wastewater treatment plant.

**Centrifugal Pumps**



**Back washing sand Filtration**

Air is used to expand the filter bed, breaking up compacted material. Clean backwash water is pumped in, suspending the loose material from where the particles are lifted through and carried away.

**PD Blowers  
Screw Compressors**



**Biogas production**

The biomass produced in activated sludge and clarifying tanks is stabilised in the digestion tower and used to produce biogas. A thorough mixing of the sludge increases the gas yield and reduces its retention time in the reactor. During the process, gas is withdrawn from the upper part of the digestion tower, compressed and reintroduced through the nozzles at the bottom.

**Liquid Ring  
Compressors  
Centrifugal Pumps**



**Biogas recovery**

This is the process of transferring the biogas from the digester to the endothermic coogenerating engine or from digestors to upgrading stations.

**PD Blowers Biogas**



**Slurry drying process**

Farm processes install a phase-separation plant to dry slurry using PD blowers for vapour recompression processing.

**PD Blowers**





### Application

### Description

### Products

#### Fish pond aeration

The water's oxygen content can be substantially increased using PD blowers, which increases the volumes of fish that can be kept in a pond. In this process, air is drawn from the atmosphere and forced through an inlet into the tube aerator. It is then diffused into the water through tiny openings and rises in fine bubbles. The oxygen in the water causes the fish to grow and multiply more rapidly, significantly increasing the yield.

#### PD Blowers Screw Compressors



#### Landfill gas recovery

The digestion of covered household waste produces landfill gas. The gas is collected and removed from the landfill, where it is compressed by gas compressors or blowers. This gas can then be used as a heating fuel, converted into electricity or used as liquefied gas.

#### PD Blowers Biogas



#### Soil gas extraction

This is an approved method for the reclamation of soil polluted with hydrocarbons. Depending on the volume, distribution and saturation pressure of the pollutants and the air flow through the soil, vacuum blowers are used with operating depth range between 10 - 80 m. Disposal of the extracted air must be carried out in compliance with air quality legislation.

#### Vacuum Blowers





**Application**

**Description**

**Products**

**Suction vehicles for wastewater**

Vacuum pumps provide suction pressure for removing and flushing out contaminants in wastewater and for cleaning sewer networks.

**Vacuum Blowers**



**Mechanical vapor compression & recompression**

This process uses thermo-compression to extract water as clean condensate from polluted fluids. Because only the heavy residuals are required to be sent for further treatment, a considerable amount of water is recyclable.

**PD Blowers**



The distillation process acts inside an evaporator, where a PD blower is used to pressurise the vapor, in order to produce clean water condensate. Since this vapour is generally acidic and chemically aggressive, the PD blower must be encased in stainless steel and use special seals, to avoid the vapour contact the oil pumps.

**Truck-Hydroexcavation**

The process uses pressurised water and an industrial-strength vacuum to excavate and evacuate soil simultaneously. After the soil is broken up, it is conveyed by vacuum, along with the water slurry to a debris tank.

**Vacuum Blowers**



# Product Range

## Screw Compressors

The low-pressure compressor unit, ROBOX Screw, combines unique characteristics of the “oil-free” RSW screw compressor, with the consolidated characteristics of Robox compact units.

It is available in the following versions: **Robox Energy** and **Robox Screw** up to 2,500 mbar.

- Efficient thanks to its unique RSW patented rotors, which reduce the number of revolutions and enhance the capacity-pressure ratio
- Maximum energy savings, in Robox Energy improved, thanks to the combination of the permanent magnetic motor and the integrated frequency converter (30% compared to rotary lobe technology). The efficiency level is on the top, compared to other available technologies, more than Super Premium Efficiency IE4
- Robox Energy Smart Process Control tool can reach further cost reduction up to 30%, through setting up the compressors so as to provide just the right amount of air needed at different steps of a process
- Low noise as a result of high-efficiency internal compression, silencers and advanced enclosure
- Reduction in space and footprint by 30% for Robox Energy
- Simple installation
- Flexible to ensure the operation at the point of best efficiency
- Oil free for a more environmentally-friendly operation (Class 0 certification, according to ISO 8573-1)
- Ease of maintenance thanks to its simple and robust construction
- Customised with a wide range of options available



# Product Range

## PD Blowers

**RBS** is the innovative three-lobe rotary positive displacement blower equipped with a special low pulse system to reduce pressure pulsations.

**Robox Lobe** is the low pressure blower package, based on RBS series, operated by an electric motor through a special belt drive, including all accessories and noise enclosure.

- Robust
- Cost efficient
- Dry running
- Maintenance friendly

**CRBS - GRBS** consist of table top blower packages with RBS series and fitted with all the necessary accessories.

**Robox Lobe Biogas** and **CRBIO - GRBIO** are blower packages, especially developed for the conveying and compression of biogas, as well as natural and landfill gases.

- Reliable
- Safe
- Resistant
- Full range of accessories
- ATEX certification
- Customised solutions for different biogas applications

### RBS Inox

All components in the PD blower series are constructed from stainless steel (AISI 316 or DUPLEX), to provide excellent corrosion resistance in a variety of heavy-duty applications such as wastewater treatment, ozone and evaporation processes.

- Different configurations available with various sealing systems
- Excellent resistance to corrosion
- Maintenance friendly

**RB-DV** (air injection vacuum blower) are three-lobe rotary blowers suitable to operate as dry exhausters up to 90% of vacuum.

- Patented and unique air inlet design
- Low noise
- Cool operating temperatures (not overheating on a dead head)
- Low maintenance thanks to its robustness and heavy-duty operation



## Product Range

### Liquid Ring Vacuum Pumps and Compressors

The **RVS** series are liquid ring vacuum pumps, able to suck gas as well as vapours, achieving up to 33 mbar (a). Furthermore, the vacuum portfolio is wide-ranging with complete packages (LRVS, CRVS, KRVS) in total or partial water and oil recirculation versions. They can also be used as compressors for pressures up to 2 bar g. max.

- Reduced noise and vibrations
- Separation of service liquid from compressed gas
- No contact between cooling and service liquid (KRVS packages)
- Easy installation and maintenance



### Centrifugal Pumps











The **Promix** family is capable of conveying any type of inert, aggressive, viscous liquid containing high percentages of suspended solid particles including sludge and the **Prochem** series is suitable for conveying clean or slightly murky liquids.

- Large inlet nozzle, allowing slurry suction and reducing the wear of the impeller
- Shaft protected from the conveyed liquid, preventing any corrosion event
- Stainless steel version and special models available











# Performances












## Pressure (mbar g)

<b>Robox Screw</b>		400	1000	2000	2500
<b>Robox Energy</b>		400	1000	2000	2500
<b>RBS</b>		400	1000	2000	2500
<b>Robox Lobe</b>		400	1000	2000	2500
<b>CRBS - GRBS</b>		400	1000	2000	2500
<b>Robox Lobe Biogas</b>		400	1000	2000	2500
<b>CRBIO - GRBIO</b>		400	1000	2000	2500
<b>RBS Inox</b>		400	1000	2000	2500
<b>RVS - LRVS - CRVS - KRVS</b>		400	1000	2000	2500
<b>Promix - Prochem</b>		Available in PN 10 - PN 16 compliance			

## Vacuum (mbar a)

<b>Robox Screw</b>		500	300	200	100	33	20	0	0,001
<b>RBS</b>		500	300	200	100	33	20	0	0,001
<b>Robox Lobe</b>		500	300	200	100	33	20	0	0,001
<b>CRBS - GRBS</b>		500	300	200	100	33	20	0	0,001
<b>Robox Lobe Biogas</b>		500	300	200	100	33	20	0	0,001
<b>RBS Inox</b>		500	300	200	100	33	20	0	0,001
<b>RB-DV</b>		500	300	200	100	33	20	0	0,001
<b>RVS - LRVS - CRVS - KRVS</b>		500	300	200	100	33	20	0	0,001

## Capacity (m³/h)

<b>Robox Screw</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>Robox Energy</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>RBS</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>Robox Lobe</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>CRBS - GRBS</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>Robox Lobe Biogas</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>CRBIO - GRBIO</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>RBS Inox</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>RB-DV</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>RVS - LRVS - CRVS - KRVS</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000
<b>Promix - Prochem</b>		300	700	800	2.600	2.850	3.280	4.100	4.200	9.400	10.100	10.500	14.000	25.000

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