



Moving Biogas to Energy

Gas Pressure-Booster Blowers



Biogas innovation for the 21st century

The right equipment, for reliable biogas transfer

In today's environment, biogas is an attractive, energy neutral fuel source. However, raw biogas is very caustic as feedstocks break down during the anaerobic digestion process. In fact, even after it is purified, biogas remains corrosive and can still harm equipment. That is why the right equipment solution is crucial at every phase of production.

Spencer equipment is designed and built to be an integral part of production, from helping to process raw biogas to boosting it once it is purified. Our experienced technical team understands that even though requirements may differ and feedstocks can vary from yogurt whey to animal waste to treated wastewater, the challenge is the same: provide a reliable, durable design that withstands corrosive gas. Our engineers work with you to determine requirements, and then custom design the right equipment for your application.

Spencer equipment solutions can effectively and efficiently process and boost biogas at a variety of production stages, helping to complete the transfer to combined heating and power usage; or to use as vehicle fuel for buses, police cars, waste transfer trucks and other municipal fleets. Spencer blowers can also be used in sludge drying to make compost and fertilizer.



Skid packages designed for the toughest requirements

Spencer gas pressure-booster blower skid packages play an integral role in biogas production. Our blowers are custom designed and fabricated out of special materials that resist the corrosive effects of the gas. This means Spencer equipment solutions can be used at any stage of production. Whether the biogas is to be used as vehicle fuel, building heat, or plant power, our skid packages are designed specifically to meet the toughest production requirements.

The heart of the package is Spencer's multistage, hermetically sealed, centrifugal blower. The blower is fabricated from materials that withstand the corrosive nature of the gas – the housing and stationary internal parts are made of stainless steel, the impellers are anodized aluminum, and the equipment includes an Inconel electrical connector. An explosion-proof motor is located inside the housing, where it is cooled by the biogas flow, extending its life and enhancing performance. The hermetic design provides for zero leakage to the environment and odor-free gas delivery.

Gas pressure-booster packages are supplied as turnkey modules, with components mounted on a common skid, ready for hookup to on-site piping and electrical systems. In addition to the hermetically sealed blower, each package has its own control panel, isolation valves and other optional customized components, as needed, to satisfy the specific application.

Components include a gas filter separator to deliver clean, dry fuel to the process, while protecting the blower and other components from corrosion. A recirculation loop returns gas back into the blower inlet after passing through an intercooler allowing continuous booster performance down to zero biogas supply. Packages may also include drip traps, inlet pressure switches, load control, starter/disconnect, ammeter, and other various process monitoring components. Based on our customer's needs, Spencer engineers will design a comprehensive package system to meet specific process requirements.

Spencer hermetically-sealed gas pressure-booster blowers handle pressure to 5.5 psig (38 kPa); volume to 7,000 icfm (198 m³/min); and power to 150 hp (112 kW).



Power Mizer® blowers for greater pressure and higher volume



For biogas transfer to energy systems that have higher gas volumes or require a greater gas pressure boost, Spencer's Power Mizer multistage cast centrifugal blowers can meet that demand.

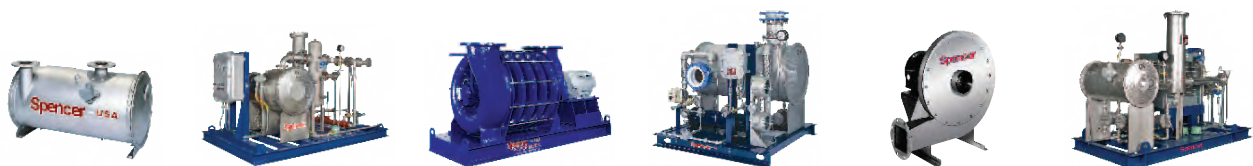
The energy-efficient Power Mizer series of blowers features an inlet section, return channels and discharge section of cast iron offering excellent strength, chemical resistance and long-term reliability. Spencer's uniquely shaped impellers, return channels with airfoil-shaped vanes, remodeled inlet and discharge passages, and vaneless diffusers all contribute to a peak adiabatic efficiency that is above 80%.

Should your application require corrosion resistance other than the standard materials of construction offered, blowers may be supplied with optional stainless steel shafts, Heresite®-coated internal components and labyrinth or carbon ring seals. The machine can be equipped with variable frequency drives (VFD), and designed for 50 or 60 Hz operation, depending upon requirements.

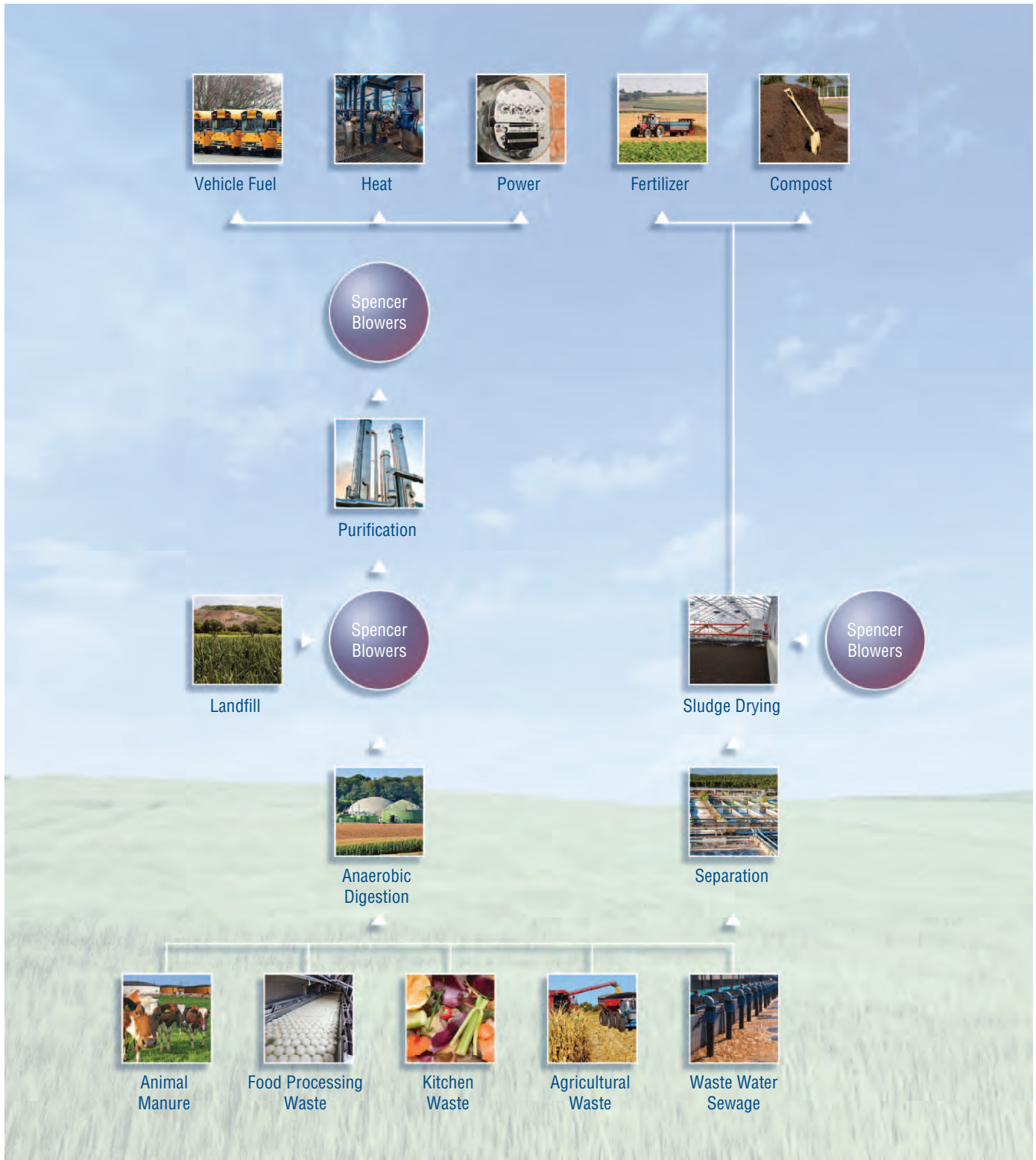
Spencer Power Mizer blowers are available with pressure to 28 psig (193 kPa); volume to 35,000 icfm (991 m³/min); and power to 2000 hp (1491 kW).



An extensive, customizable selection of product options



Spencer is an integral part of moving biogas to energy



Spencer can custom design and fabricate blowers out of special materials that handle highly corrosive gas. This is why our equipment solutions play an integral part in delivering biogas to boilers, gas turbines, generators, and fuel cells, or for sludge drying. At any point in production, when raw or purified biogas is ready to be transferred to the next phase, Spencer gas pressure-booster blowers meet the most demanding requirements.



What is purified biogas?

Biogas is the byproduct of any number of various biomass feedstocks – complex organic animal or plant waste that is high in moisture content, such as animal manure, food-processing wastes, sewage, and switchgrass or other plant compost. The biogas is captured through anaerobic digestion, a biochemical process by which different types of bacteria work together to break down the feedstocks within an oxygen-free environment.

However, raw biogas is not high quality enough to be used as a fuel source, as it has too much moisture, is too corrosive and has chemical residue. The solution is the use of biogas upgrading or purification processes whereby contaminants in the raw biogas stream are absorbed or scrubbed, leaving more methane per unit volume of gas.

In some cases, feedstocks may not be completely consumed in the biogas capturing process – for example, sludge in waste-water treatment plants. The sludge can be dried by blowers and sold for fertilizer or compost, further maximizing efficient use of biomass.

Purified biogas is gaining popularity in many parts of the world as an alternative, energy neutral fuel source, but its use is not new. Humans have known the value of composting biomass for fuel since ancient times. Today's increasingly efficient technology increases potential energy output.



Today, New York City's renewable energy includes the use of biofuel for transportation and various forms of biomass for space heating and hot water. The Spencer gas pressure-booster blower installed in a Brooklyn waste-to-energy plant uses an air-cooled heat exchanger for gas cooling, complemented by pressure and temperature gauges and switches for process control with stainless interconnecting piping for corrosion resistance.

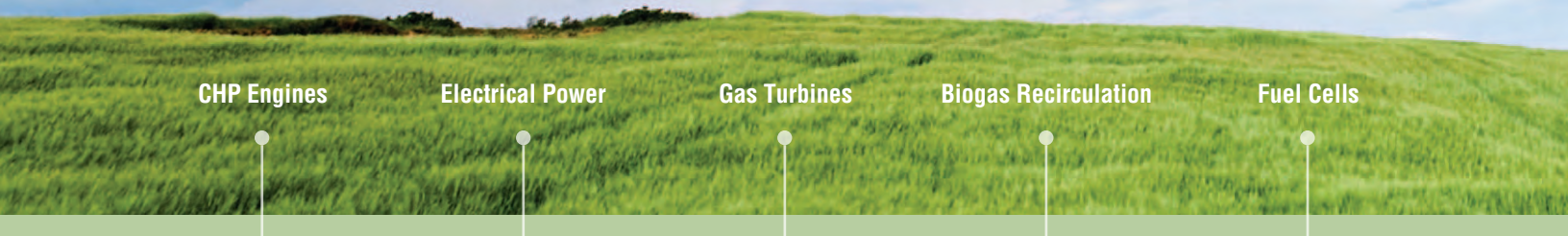


A Spencer gas pressure-booster blower is hard at work delivering biogas to a boiler at a California wastewater treatment facility. The skid includes the blower and a shell and tube heat exchanger that uses plant effluent as a sustainable source for gas cooling. Other options include pressure switches connected to an explosion proof skid mounted junction box with an electric actuated recirculation valve to provide continuous operation down to zero gas supply.

Air and gas handling expertise



Spencer gas pressure-booster blowers are instrumental in moving biogas - a clean, renewable energy source.





Equipment solutions from an industry leader

Today as customers in the biogas industry face a broad range of issues from energy policies to availability of feedstock options, to competition from other forms of alternative fuels, Spencer's nearly 120 years of experience is especially valuable. Since 1892, our dedicated engineering group has applied its air and gas handling experience to determine requirements and solve problems for our customers.

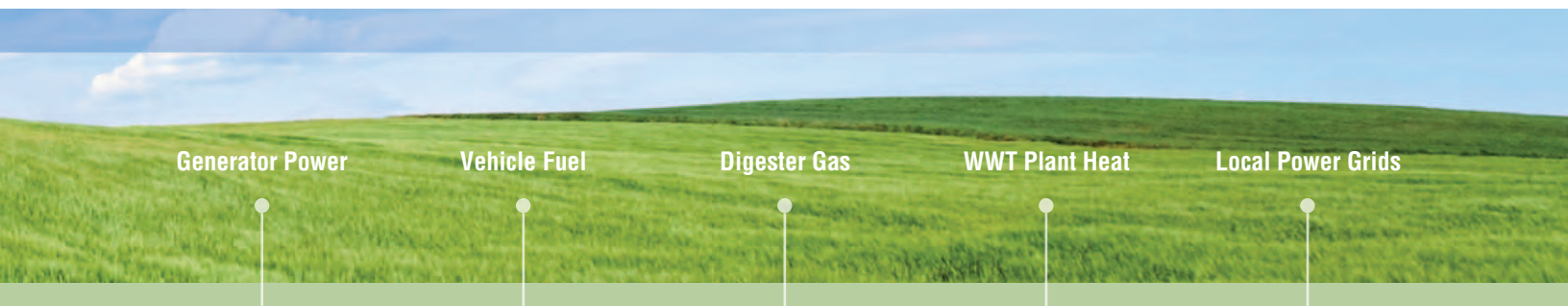
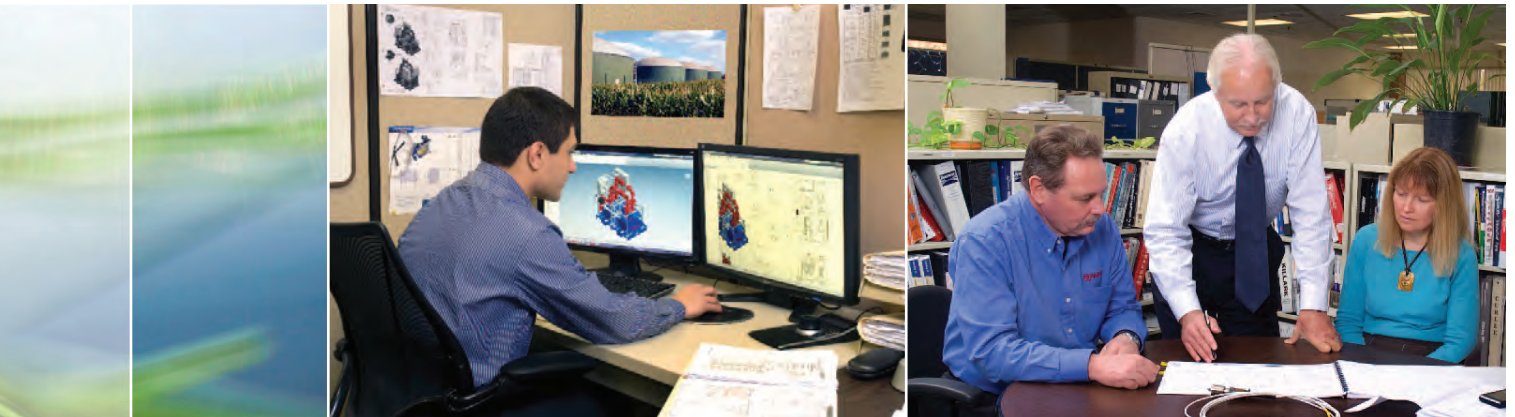
In addition, customers who bring their application requirements to Spencer benefit from our in-house research and testing laboratory, where our expert team conducts application studies and testing programs to fabricate the right equipment with innovation and precision.

Our industry-leading network of technical sales and service representatives is available to assist and support you in all projects that need to move biogas to energy.

A key part of a sustainable solution

Purified biogas is a reliable, energy neutral fuel source. Its use is an ingenious way to power local facilities at reduced cost, while also setting up the potential to sell surplus electricity to others. In addition, blowers can be utilized in the drying of wastewater treatment plant sludge, which can be sold for fertilizer or compost. Spencer is a key part of this sustainable, efficient solution in a world where energy demand will only increase.

Only Spencer offers the biogas industry more choices, more options and more experience in providing gas pressure-booster blowers. Single-stage scroll blowers and regenerative blowers are available for very low-pressure requirements. For a full range of product choices, refer to Spencer Bulletin 510.





The 200,000 sq. ft. Spencer headquarters in Windsor, CT houses the product design, R&D and testing operations and manufacturing facilities for Spencer blowers, vacuum systems and electrical control panels, plus administrative, sales and engineering offices.

Spencer Products and Services

Industrially rated products offering effective solutions for air and gas handling applications:

- Multistage centrifugal blowers
- Single-stage centrifugal blowers
- High-speed turbo blowers
- Gas boosters
- Regenerative blowers
- Custom-engineered products with special materials for extreme temperatures and pressures

Complementary accessories with single source convenience and compatibility:

- Standard and custom electrical control panels
- Valves, gauges, couplings, shrink sleeves, vibration isolators and other system components

Comprehensive engineering and other customer support services:

- The industry's largest complement of technical specialists in air and gas technology
- Global parts and service organization
- Application research and testing facility

Global organization of sales representatives and distributors offering:

- Product selection, installation and operation assistance
- Comprehensive system design services
- Follow-up services and troubleshooting

For product selection assistance, please email marketing@spencer-air.com or visit our website at www.spencerturbine.com to locate the Spencer representative in your area.

Power Mizer® is a registered trademark of The Spencer Turbine Company.

