UNISON

SOLUTIONS

LEADERS IN BIOGAS TECHNOLOGY

Unison Solutions, Inc., founded in 2000, is an industry leader in biogas conditioning, BioCNG and distributed generation. Located in Dubuque, Iowa, Unison is uniquely positioned in the industry to provide all facets of a renewable energy project including equipment, design, fabrication, automation and controls, and ongoing maintenance support.

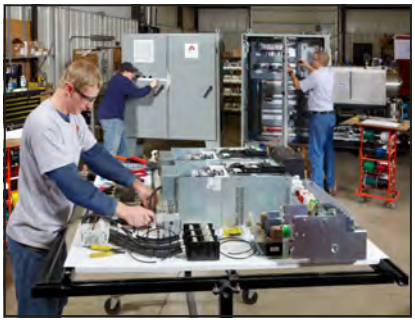
Unison's systems are installed around the world at landfills, wastewater treatment facilities, industrial digesters, dairies, and food processing plants.

EQUIPMENT DESIGN

Unison Solutions' biogas conditioning systems are custom designed and fabricated based on site specific data. All biogas conditioning systems are built with a Class I, Division 1 or 2 rating, depending on the application.

Each of our systems is extensively tested before leaving our facility. We provide detailed O&M manuals to insure that any operator will quickly become comfortable with the operations and maintenance of our equipment.

Our engineers are highly experienced in biogas applications. They understand the science of gas behavior and its thermal properties; we have proven success in areas that have challenged others.



AUTOMATION AND CONTROLS

Unison Solutions' automation and controls team works jointly with engineering and fabrication to produce the highest quality and safest biogas conditioning equipment on the market. Our in-house, UL-508A, UL-698A, and UL-1203 panel shop gives us the flexibility to design and build custom control panels that meet the specifications of each individual biogas system installation. Each system undergoes a full shop test run at our production facility before shipment.

VESSELS AND CUSTOM FABRICATION

Unison Solutions offers custom vessel design and fabrication services. We are a certified ASME manufacturing shop in compliance with the ASME Section VIII, Division 1, Code U & R Stamp, using The Hartford Steam Boiler Company as our authorized inspector. Unison Solutions specializes in stainless steel fabrication.

BIG OX SIOUXLAND, NE

COMPRESSOR SYSTEMS

Using technology from the sour gas industry, Unison Solutions has developed gas compression systems that resist the destruction caused by biogas. These systems are used on turbine, fuel cell, and biogas pipeline projects.

- Skids designed for any gas flow at pressures up to 200 psig
- Two stage condensate removal
- Particulate free delivery with relative humidity less than 25%

Emerald Park LF, WI

BLOWER SYSTEMS

Low pressure blower systems are designed to treat gas for use in boilers and internal combustion engines such as CAT, GE Jenbacher, GE Waukesha, Cummins, MWM, Liebherr, MAN, and Guascor.

- Skids designed for any gas flow and for vacuum or positive inlet pressures
- Rotary lobe or multi-stage centrifugal blowers
- Conditioning options available such as after-cooling and drying

DRYING SYSTEMS

If compression is not required, we can provide the same level of gas conditioning for use with an existing blower or compressor. Whether filtration, condensate removal, or heat transfer is required, we can build a system for the specific application.

TAYLOR COUNTY LF, GA - Drying Systems

CUSTOM SYSTEMS

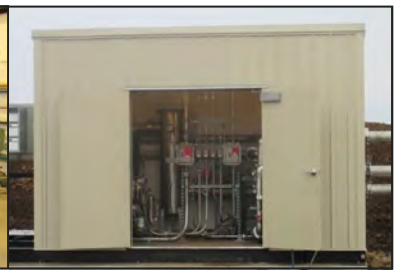
Unison Solutions can develop your custom concept into an effective system, even if it is not related to biogas. We utilize our in-house engineering, design, automation and controls, and fabrication departments to create unique, custom solutions.

Examples include:

- VOC Extraction from vent gas
- NO_X Reduction from flue gas

ENCLOSURES

Unison Solutions' custom enclosures are as varied as our customers. No matter what the final location or application, we will design and build each enclosure to meet your specific requirements. Enclosures we've incorporated for systems range from fabricated panels to modified shipping containers, all designed to meet each site's unique needs. For biogas applications, we still maintain a Class I, Division 1 environment.



BioCNG™

Unison Solutions' patented BioCNG conditioning system economically produces a biogas-based fuel to power vehicles designed for compressed natural gas (CNG). These systems utilize either landfill or digester gas and provide purification of the biogas to meet SAE J1616.

Model	Biogas Inlet Flow (scfm)	Fuel Production (GGE/day)	Fuel Production (DGE/day)
BioCNG 50	50	185-300	160-260
BioCNG 100	100	370-600	320-520
BioCNG 200	200	740-1,200	640-1,040
BioCNG 400	400	1,480-2,400	1,280-2,080



HYDROGEN SULFIDE REMOVAL

Hydrogen Sulfide (H_2S) and organic sulfur removal from biogas is often necessary to prevent corrosion, decrease maintenance of downstream equipment and lower SO_x emissions. H_2S can also inhibit the effective removal of siloxanes.

Unison Solutions offers several different sulfur removal technologies depending on the concentration levels and application. Technologies range from "scavenger-type" media based systems to biological systems.

SILOXANE REMOVAL

Nearly all digester and landfill gas contains one or more species of siloxanes. These are chemicals used extensively in industrial products such as lubricants and in personal care products.

When biogas containing siloxanes is combusted in gas turbines, boilers, fuel cells, or internal combustion engines, deposits of solid silica (SiO_2) collect within the equipment. Damage inflicted by siloxane deposits can be profound, causing more frequent maintenance and lower generation capacity.

BIOGAS TESTING AND MEDIA

Knowing the quality of biogas is an important first step in the system design process. Biogas testing is also used to monitor systems after they are operating. Unison has teamed up with environmental laboratories to offer the following biogas tests: Major constituents, Siloxane testing by species, Sulfur by species, and VOC by species.

Once gas testing is complete, our experts will evaluate the results and determine the proper equipment and filtration media for each specific system. We inventory large quantities of our media products to provide quick delivery.

Unison Solutions also offers the following services:

- Maintenance service contracts
- Capstone turbine sales and maintenance
- Remote monitoring and troubleshooting
- Start-up, commissioning, and training

BIOGAS SAMPLING AND SHIPPING MATERIALS

CARBON MEDIA

UNISON SOLUTIONS

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