



BIOGAS CONDITIONING AND UPGRADING SYSTEMS



430+ systems since 2000

Made in the USA

IQS INTEGRITY
QUALITY
SERVICE

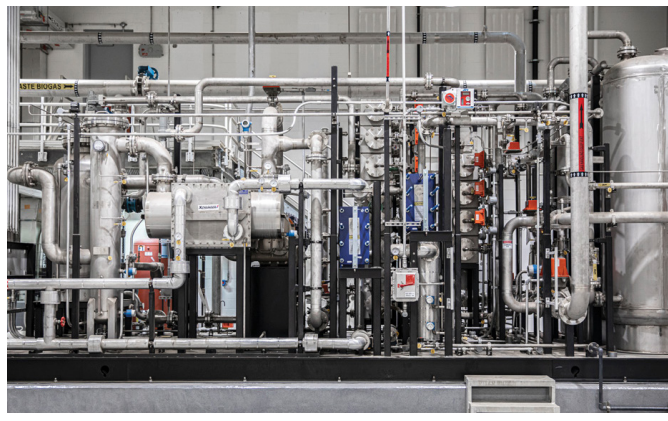
EMPLOYEE OWNED • CUSTOMER DRIVEN

PROVEN EXPERTISE

Since 2000, Unison Solutions has engineered more than 430 biogas conditioning and upgrading systems. They have been installed at landfills, wastewater treatment facilities, agricultural digesters, and food processing plants across the U.S. and Canada.

We specialize in hydrogen sulfide removal, compression, moisture removal, siloxane and VOC removal, CO₂ removal, and gas quality monitoring.

Every system is engineered, manufactured, and factory-tested in-house at our 90,000-square-foot facility in Dubuque, Iowa.



EQUIPMENT DESIGN

Unison's 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 undergoes Factory Acceptance Testing (FAT) in-house before leaving our facility. We provide detailed O&M manuals to ensure that any operator will quickly become comfortable with the operation 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 & CONTROLS



698A & 508A

Unison's 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 & CUSTOM FABRICATION

Unison 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 specializes in stainless steel fabrication.



COMPRESSOR SYSTEMS

Using technology from the sour gas industry, Unison 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%

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.

CUSTOM SYSTEMS

Unison 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
- NOX Reduction from flue gas



SITE-SPECIFIC ENCLOSURES

Unison's 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's 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 (H₂S) and organic sulfur removal from biogas is often necessary to prevent corrosion, decrease maintenance of downstream equipment and lower SO_x emissions. H₂S can also inhibit the effective removal of siloxanes.

Unison 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 (SiO₂) 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 also offers the following services:

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



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Contact our engineers to discuss your specific requirements: sales@unisonsolutions.com

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