



Alternate Energy Systems, Inc.

A Corporation devoted to Your Energy Needs

GlassGas™-Controller

**Natural Gas Standby and Backup
Systems Specifically Designed
for the Glass Industry**

- **Produces Synthetic Natural Gas (SNG)**
- **Emergency Backup for entire Plant**
- **Natural Gas Pressure Stabilization**
- **Natural Gas Enrichment (or Dilution)**
- **Automatic Operation**
- **Superior Reliability**
- **Low Maintenance**
- **Small Footprint**
- **Rosemount Transmitters, Allen-Bradley or SIEMENS PLC.**
- **Option: Peak Shaving Controller.**
- **Option: Complete System Integration with Vaporizers.**
- **Option: Automatic Control of Wobbe Index of combined NatGas/SNG gas stream.**



POM-40 with integrated GraviBlend-3E explosion-proof Gravimeter and AccuBlend automatic mixture control.

What are GlassGas™-Controllers ?

Natural Gas (NatGas) fired Glass Plants worldwide rely on continuously available NatGas at a minimum delivery pressure of approximately 30 psi (2 bar). If the NatGas pressure drops below 30 psi (2 bar; the setpoint is adjustable), or if NatGas supply is completely interrupted (due to catastrophic events or equipment breakdown on the supply side), GlassGas™ controllers start producing Synthetic Natural Gas (SNG) to secure uninterrupted gas supply to the process. The SNG is a blend of LP vapor and air that is directly compatible and interchangeable with NatGas.

If NatGas is available, but its pressure is below the minimum, GlassGas™ controllers come automatically on-line and inject “just enough” SNG to supply the plant with the minimum gas pressure. If NatGas becomes completely unavailable, GlassGas™ controllers supply SNG to the entire process. When NatGas service at sufficient pressure is restored, the GlassGas™ controller goes automatically off-line until it is needed again.

GlassGas™ controllers can also be equipped with a NatGas Stabilization function. This function constantly monitors the properties of the incoming NatGas and starts injecting SNG (“rich” or “lean”, depending on the NatGas properties) into the plant supply if the NatGas properties (Calorific Value or Wobbe Index) deviate too much from their nominal values.

This function is particularly useful in countries where the Calorific Value (CV) of the NatGas can vary so much that the process burners are unable to compensate for these changes.

A unique feature of the GlassGas™ controllers is that they monitor the gas stream downstream of the tie-in with the SNG and then adjust the SNG properties and the SNG flow rate, until the Wobbe Index of the combined stream of NatGas and SNG exactly matches the desired value. When the Wobbe Index of the NatGas returns to “normal”, the GlassGas™ controller goes automatically off-line until it is needed again. This feature ensures that as little as possible of the more expensive LPG is used.

GlassGas™ controllers also offer a PeakShaving function. This function allows to limit the “draw” of NatGas from the grid to an adjustable flow rate. In many countries, the ability to reduce plant consumption in peak demand times is rewarded with lower NatGas prices. The savings from the lower NatGas prices are often sufficient to pay for the initial investment for the plant standby system and the GlassGas™ controller within a very short period of time, and thereafter improving the bottom line through significant reductions of the energy cost.

GlassGas™ controllers can be used for any type of glass plant (Float; Container; Flatware; Fiber; ...) and for many similar applications, such as Ceramics Plants, Metal Annealing; and any other application that requires tight monitoring and control of the NatGas properties.

Hardware and Software

GlassGas™ controllers are a combination of Hardware and Software. A typical GlassGas™ controller consists of the components listed below. Generally, GlassGas™ controllers can be configured to meet the requirements of (almost) any glass or ceramics plant anywhere around the world.

- AES LP/Air Blender POM-30 to POM-80: Produces a mixture of LP vapor and air that is directly compatible and interchangeable with natural gas.
- GraviBlend™-3 Gravimeter: Measures the properties of the LP/Air mixture.
- AccuBlend™-Controller: Positioner and Controller to modify the blending ratio (properties) of the LP/Air mixture.
- Grid Pressure Transmitter: Measures the pressure of the incoming NatGas.
- Flow Control Valve: Adjusts the flow of SNG into the plant grid between 0% and 100% of plant consumption.
- Calorific Value and Wobbe Analyzer: Measures the properties of the gas supply (NatGas; LP/Air; or mixture of NatGas and LP/Air).
- Programmable Logic Controller (PLC): AES uses PLCs from leading manufacturers, such as Allen-Bradley and Siemens.
- Operator Interface: Full-graphic 10-inch Color LCD Displays with Touch Screen are standard on all GlassGas™ controllers. Larger screen sizes (12-inch; 15-inch; 17-inch; 19-inch; 21-inch) are available.
- Control Software: AES-designed control program for all controller components.

How do AES GlassGas™ Controllers work?

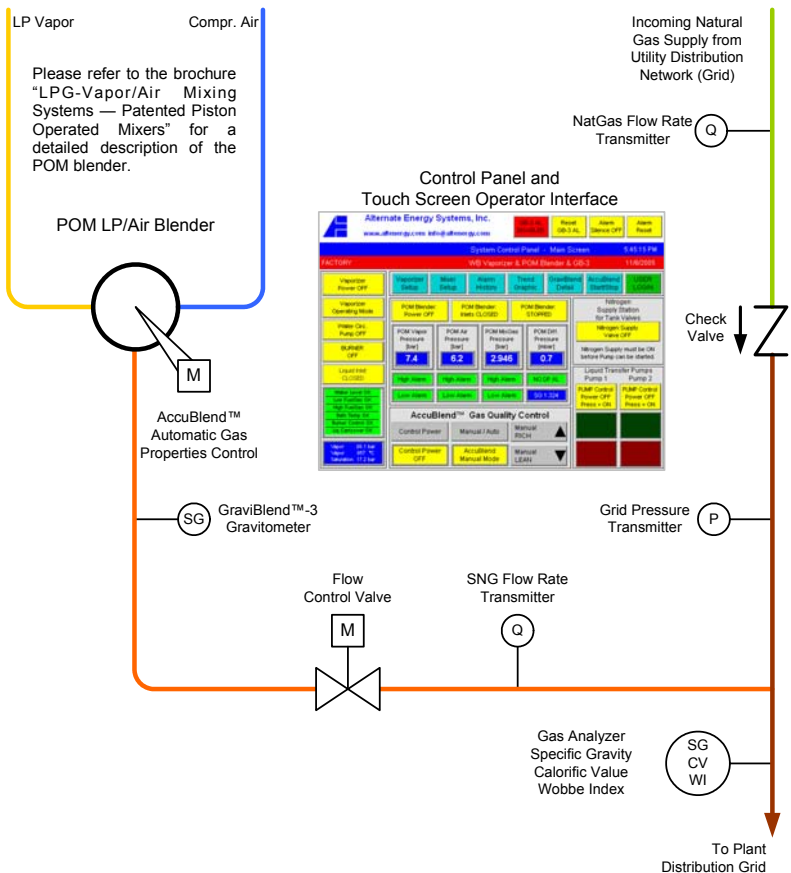
In the past, LP/Air blenders were often unreliable, required close attention from operating and maintenance personnel, and were typically stand-alone units with little or no integration into an overall plant monitoring and control system.

Some of this changed with the development of the POM blender by AES in the early 1990's. The real breakthrough came later when modern PLC controls and operator interfaces were added.

Today, the POM blenders are known as the easiest to operate, easiest to maintain, and most reliable gas/gas blenders on the market.

With a POM blender as the foundation, AES now manufactures a number of industry-specific gas/gas blenders.

One of these is the GlassGas™ Controller, which combines the reliability and ease of operation of the POM blender with a feature-package that is the result of feedback from customers in the glass industry.



Functions:

1. **Pressure Stabilization**
2. **Emergency Backup**
3. **PeakShaving**
4. **Natural Gas Conditioning**

Function 1: Pressure Stabilization

A pressure transmitter monitors the pressure of the incoming NatGas. If the gas pressure falls below an operator-adjustable setpoint, the GlassGas™ Controller brings the POM blender on-line and gradually opens the Flow Control Valve until the NatGas pressure is maintained at the lowest acceptable level.

When the NatGas supply pressure returns to normal, the GlassGas™ Controller gradually closes and eventually takes the POM blender off-line.

Function 2: Emergency Backup

The Pressure Stabilization function also serves as the automatic Emergency Backup function. If the NatGas supply is interrupted due to equipment failure in the NatGas pipeline or due to another catastrophic event, the NatGas pipeline pressure will fall below the lowest acceptable level, and the Pressure Stabilization function of the GlassGas™ Controller will take over.

Function 3: PeakShaving

If the maximum allowable NatGas consumption of a plant (per hour or per day) is limited by contractual agreements, the GlassGas™ Controller can be used to supply the gas that is in excess of the contract volume. All an operator has to do is to enter the NatGas flow rate that cannot be exceeded, and the GlassGas™ Controller opens the Flow Control Valve to supply "just enough" SNG to keep the NatGas flow rate below the allowable maximum.

(This function requires a NatGas flow rate signal from the NatGas supplier, or the installation of a flow rate transmitter in the NatGas line.)

How do AES GlassGas™ Controllers work?

(continued)

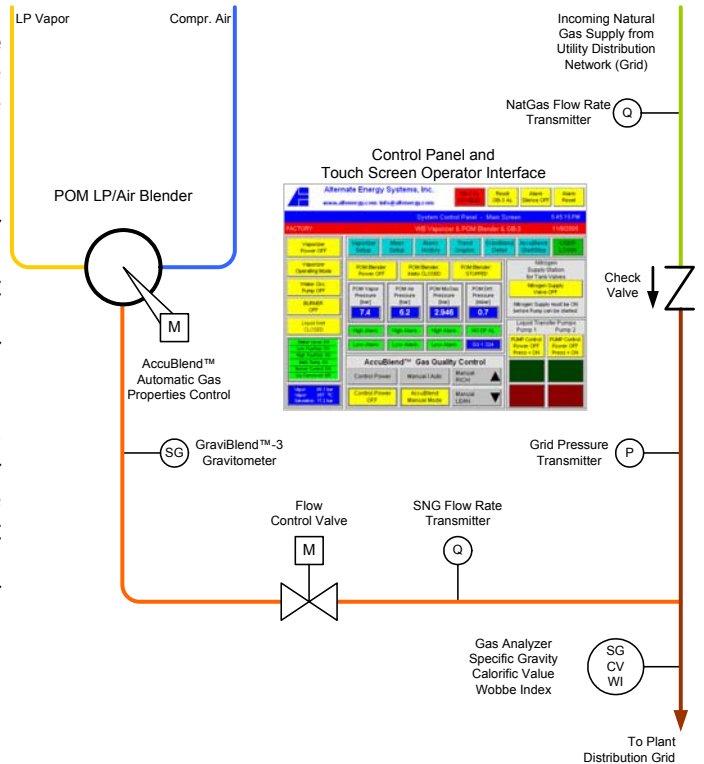
Function 4: NatGas Stabilization

If the properties (Calorific Value / Wobbe Index) of the NatGas fluctuate too much, or if they do not meet the requirements of the combustion equipment in the plant, the GlassGas™ Controller can correct that.

If the NatGas is “lean” (= low Calorific Value), the AccuBlend™ Automatic Gas Properties Controller positions the POM blender to produce “rich” SNG, and the GlassGas™ Controller opens the Flow Control Valve “just enough” so that the Gas Analyzer in the combined NatGas/SNG stream reads the desired Wobbe Index (or Calorific Value).

If the NatGas is “rich” (= high Calorific Value), the AccuBlend™ Automatic Gas Properties Controller positions the POM blender to produce “lean” SNG, and the GlassGas™ Controller opens the Flow Control Valve “just enough” so that the Gas Analyzer in the combined NatGas/SNG stream reads the desired Wobbe Index (or Calorific Value).

If the NatGas properties change while the system is active, the combination of AccuBlend™ and GlassGas™ Controller will automatically compensate for it.



Other Functions:

The standard GlassGas™ Controller has all labels on the operator interface in English. The engineering units can be switched between standard units (psi; inWC; °F; BTU/cuft; SCFM; SCFH; etc.) and SI units (bar; mbar; °C; kcal/m³; Nm³/min; Nm³/h; etc.).

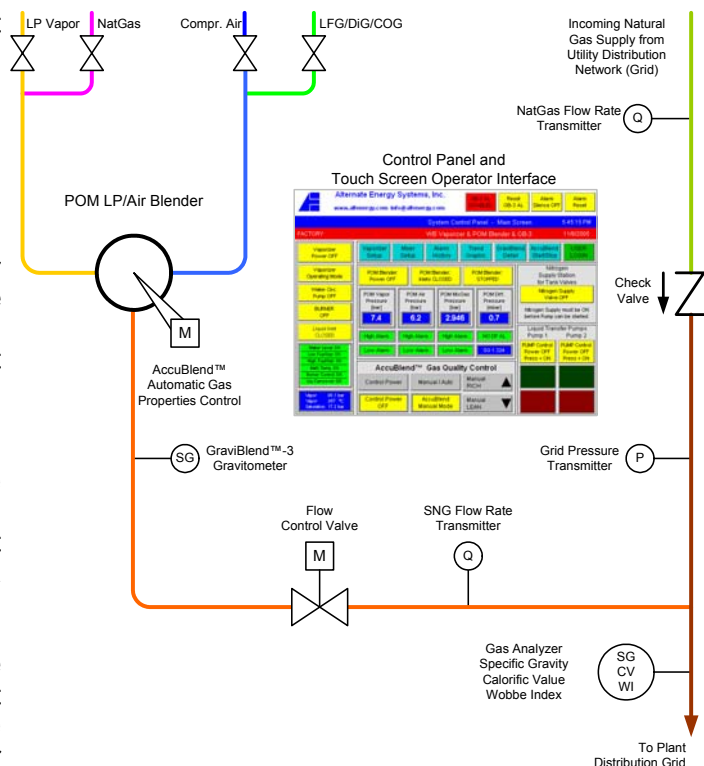
The operator interface can also be switched to different languages. Currently available languages include English; Spanish; French; German. Other languages can be added upon request.

Take Advantage of inexpensive Gas Sources:

If gas from landfill sites (LandFillGas; LFG), waste water treatment plants (Digester Gas; DiG), steel mills (Coke Gas; COG) or other sources is available, AES GlassGas™ Controllers can be used to condition these gasses so that they can be used as fuel gas for your combustion equipment.

Depending on the properties of the available gas, the conditioned fuel gas can be a blend of NatGas and LFG; NatGas and DiG; or NatGas and COG. If NatGas is not available, LPG vapor can be used instead to create a blend of LPG and LFG, DiG, or COG.

If the alternate gas source becomes unavailable, or if the alternate gas source cannot deliver all of the plant demand, AES GlassGas™ Controllers can supplement the available gas with NatGas, LP vapor, NatGas/Air, or LP/Air, while simultaneously maintaining constant fuel gas properties.



Control Systems

The “heart” of the GlassGas™ Controller is of course the POM Blender, the most reliable and the easiest to operate and maintain blender in the industry today. Detailed information about the POM blender is available on our web site www.altenergy.com, or directly from AES.

However, in order to take full advantage of the capabilities of the POM blender, AES has developed several versions of PLC-based control systems. Since these control systems are optimized for applications in the glass and ceramics industries, we call them GlassGas™ Controller.

PLC Hardware: GlassGas™ Controllers can be supplied with PLCs from worldwide leading manufacturers. These include Allen-Bradley (standard for US systems); and SIEMENS (standard for export systems). Other hardware configurations are available upon request.

Regardless of the hardware manufacturer, all control systems offer color LCD displays with touch screen operator interface (Electronic Operator Interface; EOI). The screens are crisp and clear, are easy-to-read and easy-to-follow, and provide intuitive operator guidance.



Allen-Bradley EOI

All relevant system data are available in real-time; changes to operating parameters (alarm setpoints; pressure settings; operating modes; etc.) can easily be selected through simple inputs at the touch screen; first-out history is standard; and high-resolution graphic trend lines are available for all pressure and flow data.

The standard EOI for smaller systems is 10-inch. Larger systems, and systems with additional design features, receive larger EOIs with 12-inch, 15-inch, 17-inch, 19-inch, or 21-inch displays.

Remote Monitoring and Control: All systems can be equipped with Ethernet or other networks for remote monitoring and control, or for integration into plant supervisory systems.

Security: All GlassGas™ Controllers are protected against unauthorized access with user names and passwords. Access to system functions is structured in several levels from “Operator (system operation only)” to “Supervisor (can change setpoints)” to “Maintenance (can change transmitter ranges)”. Additional levels can be added as needed.

Languages and Engineering Units: GlassGas™ Controllers can be supplied with several languages and with standard US units (psi; inWC; °F; BTU/cuft; etc.) or international SI units (bar; mbar; kPa; °C; kcal/m³; etc.). Currently available languages include English; Spanish; French; and German. Additional languages will be added as needed.

Gas Analyzer and Automatic Gas Properties Control (AccuBlend™): All GlassGas™ Controllers can be equipped with an Automatic Gas Properties Control. This option is not required if the quality of the backup fuel (LPG) is known and consistent from delivery-to-delivery, but it is highly recommended if the properties of new LPG deliveries change over time (summer/winter), or if alternate gas sources (Landfill Gas; Digester Gas; Coke Gas; etc.) are used. Automatic Gas Properties Control is also a “must” for systems that are being used for NatGas stabilization.

In LPG-only systems (standby and backup), AES uses our own, patented GraviBlend™-3 Gravitometer. The GraviBlend™-3 has been specifically designed for use with LP/Air systems and offers real-time display of Calorific Value (BTU/cuft or kcal/m³); Specific Gravity; and Wobbe Index. Detailed information about the GraviBlend™-3 Gravitometer is available on our web site www.altenergy.com/GB3, or directly from AES.



GB-3E; Ex-proof Version with Remote Sensor.

More complex systems use Gas Analyzers (Calorimeters; Wobbe Index Meters; Gas Chromatographs) from Union Apparatebau (Germany) or other leading manufacturers.

POM Blender Selection Chart

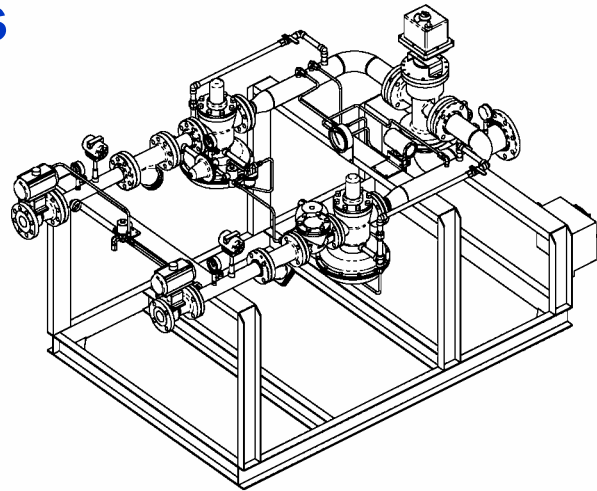
To find the right POM blender for your application, select the required nominal system capacity from the first column of the chart. Move to the right until you are below the system design pressure (delivered mixed gas pressure). The top row of the cell indicates the POM model number. The bottom row of the cell indicates the POM configuration (regulator type / orifice size / spring range).

Nominal Capacity in MMBTU per hour (top row) and MMkcal per hour (middle row) is given for Propane/air mixture with 1450 BTU/cuft at delivered mixed gas pressures of 10 psig to 100 psig. The m³/h-number in the bottom row represents the volume of Natural Gas that the system can replace. Capacity for other LPG/air mixtures and/or pressures may vary. Nominal Capacity is based on vapor and compressed air inlet pressures of 20 psi (1.4 bar) above sendout pressure, and a pressure drop of 5% across the mixing valve at maximum flow.

	10 psi 0.7 bar	20 psi 1.4 bar	30 psi 2.1 bar	40 psi 2.8 bar	50 psi 3.5 bar	60 psi 4.2 bar	70 psi 4.9 bar	80 psi 5.6 bar	90 psi 6.3 bar	100 psi 7 bar
20 MMBTU/h 5 MMkcal/h 560 m ³ /h	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978
40 MMBTU/h 10 MMkcal/h 1100 m ³ /h	POM-40 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978
60 MMBTU/h 15 MMkcal/h 1700 m ³ /h	POM-40 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978
80 MMBTU/h 20 MMkcal/h 2250 m ³ /h	POM-40 9978	POM-40 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 99118
100 MMBTU/h 25 MMkcal/h 2800 m ³ /h	POM-60 9978	POM-40 9978	POM-40 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 9978	POM-30 99118	POM-30 99118
120 MMBTU/h 30 MMkcal/h 3400 m ³ /h	POM-60 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-30 99118	POM-30 99118	POM-30 99118	POM-30 99118	POM-30 99118	POM-30 99118
140 MMBTU/h 35 MMkcal/h 3900 m ³ /h	POM-60 99118	POM-60 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-30 9835100	POM-30 9835100	POM-30 9835100	POM-30 9835100	POM-30 9835100
160 MMBTU/h 40 MMkcal/h 4500 m ³ /h	POM-80 98340	POM-60 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-30 9835100	POM-30 9835100	POM-30 9835100	POM-30 9835100
180 MMBTU/h 45 MMkcal/h 5050 m ³ /h	POM-80 98340	POM-60 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-30 9835100	POM-30 9835100	POM-30 9835100	POM-30 9835100
200 MMBTU/h 50 MMkcal/h 5600 m ³ /h	POM-80 98340	POM-60 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-40 99118	POM-30 9835100	POM-30 9835100	POM-30 9835100
220 MMBTU/h 55 MMkcal/h 6200 m ³ /h	POM-80 98340	POM-60 98340	POM-60 98340	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-30 9835100	POM-30 9835100
240 MMBTU/h 60 MMkcal/h 6750 m ³ /h	POM-80 98340	POM-60 98340	POM-60 98340	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-30 9835100
260 MMBTU/h 65 MMkcal/h 7300 m ³ /h	POM-80 98340	POM-80 98340	POM-60 98340	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
280 MMBTU/h 70 MMkcal/h 7900 m ³ /h		POM-80 98340	POM-60 98340	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
300 MMBTU/h 75 MMkcal/h 8400 m ³ /h		POM-80 98340	POM-60 98340	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
320 MMBTU/h 80 MMkcal/h 9000 m ³ /h		POM-80 98340	POM-60 98340	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
340 MMBTU/h 85 MMkcal/h 9550 m ³ /h		POM-80 98340	POM-80 98340	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
360 MMBTU/h 90 MMkcal/h 10000 m ³ /h		POM-80 98340	POM-80 98340	POM-60 9835100	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
380 MMBTU/h 95 MMkcal/h 10700 m ³ /h		POM-80 98340	POM-80 98340	POM-60 9835100	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100
400 MMBTU/h 100 MMkcal/h 11200 m ³ /h		POM-80 98340	POM-80 98340	POM-60 9835100	POM-60 9835100	POM-60 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100	POM-40 9835100

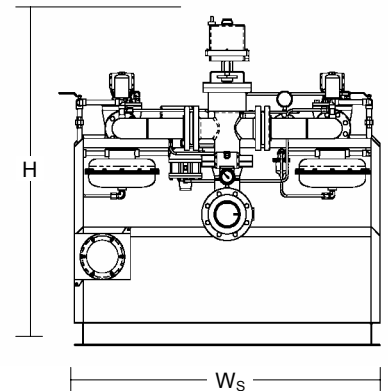
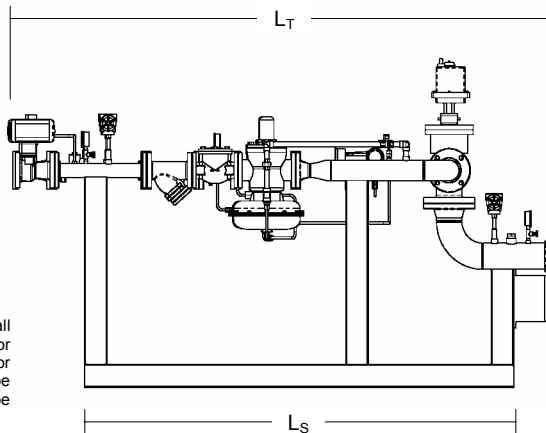
Drawings, Dimensions

Dimensions in inches				
Dimensions in m				
	W _S	L _S	L _T	H
POM-30	54	72	92	53
	1.37	1.83	2.34	1.35
POM-40	54	76	96	57
	1.37	1.93	2.44	1.45
POM-60	54	84	103	64
	1.37	2.13	2.62	1.63
POM-80	60	95	118	66
	1.52	2.41	3.00	1.68



Safety Valves in Vapor Inlet and Air Inlet are pneumatically actuated and "fail-safe" through spring-return to "Closed" position in case of power failure.

Standard regulator type on all POM models is Fisher 99 or similar. POM models for certain applications may be equipped with regulator type Fisher 1098-EGR or similar.



Typical System Installations



Standby System at a Float Glass Plant

- Water Bath Vaporizer 3000 gal/h (6000 kg/h)
- POM-40 Blender with 40 psi (2.8 bar) sendout pressure
- Automatic Gas Properties Control (Ratio Control)
- Automatic Grid Pressure Stabilization at 35 psi (2.4 bar)
- PeakShaving Controller with 3 operating modes
- Flow Totalizer for LP Liquid, LP Vapor, Compr. Air, SNG
- Compressed Air supply from existing Plant Compressors
- Vaporizer with enlarged Control Room (Maintenance House)
- GraviBlend™-3 Gravitometer with real-time display of Calorific Value, Specific Gravity, Wobbe Index



Standby System at a Fiber Glass Plant

- Water Bath Vaporizer 1000 gal/h (2000 kg/h)
- POM-40 Blender with 35 psi (2.4 bar) sendout pressure
- Automatic Gas Properties Control (Ratio Control)
- Automatic Grid Pressure Stabilization at 28 psi (1.9 bar)
- PeakShaving Controller with 3 operating modes
- Flow Totalizer for LP Liquid, LP Vapor, Compr. Air, SNG
- Compressed Air supply through dedicated Compressor
- Vaporizer with enlarged Control Room (Maintenance House)
- GraviBlend™-3 Gravitometer with real-time display of Calorific Value, Specific Gravity, Wobbe Index

Who is Alternate Energy Systems, Inc. ?

After working for other manufacturers of LPG vaporizers and LPG / air systems for several years, John E. Hallberg founded Alternate Energy Systems, Inc. in 1974 in Peachtree City, located just 20 minutes south-west of the Atlanta airport. He successfully set out to design and manufacture products which were superior to those of his competitors. As a result, AES became very quickly known as the innovative manufacturer of quality products. Soon, the customer list included a representative cross-section of the Fortune 500 companies in the U.S.



Through the years, AES has constantly added new products, and has further improved the design of existing products, keeping us ahead of the competition. Several designs, including those for LPG/Air mixing systems, were awarded national and international patents.

Today, AES is owned by Wolfgang Driftmeier. With his manufacturing background and his experience in sales and marketing, the company focus is clearly on "... offering the best product design, combined with quality workmanship, at a competitive price, to the full satisfaction of our customers, at all times ...".

AES is committed to serve customers in the U.S. through a network of sales specialists, technical support personnel, distributors and installers, and international customers in selected countries through qualified representatives.

Please visit our web site at www.altenergy.com for updated versions of all data sheets, price lists, application notes, a list of authorized distributors, and other documents that are only available online.

Other Products from Alternate Energy Systems, Inc.

Water Bath Vaporizers
Hot Water Vaporizers
Steam Vaporizers

Electric Vaporizers
Electric Water Bath Vaporizers

Venturi Type LPG / Air Mixers
Patented Piston Operated LPG / Air Mixers

Complete Vaporizer / Mixer Systems
Peak Shaving Plants
Gas Stabilization Systems

Accessories for LPG / Air Systems
LPG Pump Packages

Service
Maintenance
Trouble Shooting

Our Address

Alternate Energy Systems, Inc.
210 Prospect Park P.O. Box 2469
Peachtree City, GA 30269, USA

Phone 770-487-8596
Fax 770-631-4306
Toll Free 800-410-9161

E-Mail info@altenergy.com
WebSite www.altenergy.com

Your AES Distributor