Alternate Energy Systems, Inc.

A Corporation devoted to Energy-Oriented Needs

Water Bath LPG Vaporizers

with "Smart" Liquid Carryover Protection

- **Capacities from 200 gph to 7000 gph**
- **For Propane, Butane, and other LPG**
- **Atmospheric Burners or Forced Draft Power Burners**
- **Small Footprint, High Efficiency**
- **Conforms to ASME, NFPA**
- **FM / IRI approved**
- **Heavy-Gauge Steel Construction**
- **All-Welded Design**
- **Walk-in Control Room**
- **Standard: PLC Controls with First-Out Monitor**

WB-2500 with standard Extended Control Room (Maintenance House)

- **Option: Extended Control Room (Maintenance House)**
- **Option: Remote Monitoring and Operation (Modem or Ethernet)**
- **Option: Integration with LPG/Air Mixers for Standby Systems and Peak Shaving Systems**

What are LPG Vaporizers ?

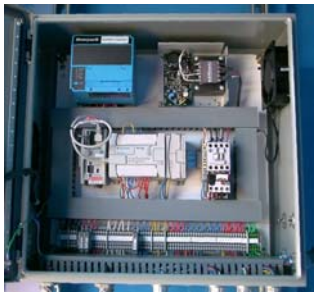
LPG vaporizers are actually boilers. Instead of boiling water, they boil propane, butane, or another LPG (Liquefied Petroleum Gas). It may sound strange that heat is required to vaporize LPG when Propane will boil at -44 °F and Butane at 32 °F, but, when LPG vaporizes by expansion alone, it causes a refrigeration action. In applications with high LPG flow, the uncontrolled vaporization would freeze valves and burner nozzles. Therefore, controlled heat is required to offset the refrigeration action.

Standard Features and Options

- Multi-Pass Steel Burner Tube.
- Multi-Pass High-Efficiency LPG Vapor Tube with welded heat transfer fins, rated at 250 psig @ 650 °F.
- Designed and manufactured per ASME Pressure Vessel Code, Section VIII, Division 1, and NFPA 58.
- Honeywell Electronic Flame Safeguard (WB-450 and higher).
- Water Circulation Pump with internal Diffuser.
- All models are FM approved.
- “Smart” Liquid Carryover Protection.
- UL listed Safety Pressure Relief Valve.
- UL listed Solenoid Valve (Liquid Inlet).
- Vaporizer Control Panel with Allen-Bradley PLC and First-Out Monitor.
- Factory Primed, Painted, and Tested.

Options:

- IRI Burner Configuration
- ASME “S” Stamp for Vaporization Tubes
- Custom Control Panels and System Integration
- Remote Control (Modem or Ethernet)
- Enlarged Control Room (Maintenance House)
- Control Panel with UL 508 A certification



Standard Control Panel with Allen-Bradley PLC and Honeywell Flame Safeguard.

Applications

AES Water Bath Vaporizers have been manufactured since 1974 and have seen continuous design improvement. This has lead to probably the most versatile and most reliable line of Water Bath Vaporizers on the market today.

Installations around the world include Peak Shaving Plants for Gas Utilities, Standby Plants for large industrial users, Backup Systems for government and defense installations, Primary Fuel Source for areas without natural gas supply or for areas preparing for connection to natural gas, Power Plants, Glass and Brick Manufacturing, Chemical Plants, Food Processing, etc.

AES Water Bath Vaporizers can be used “stand-alone”, or in combination with LPG/Air mixing systems, producing gas which is directly interchangeable with natural gas.

How do Alternate Energy Systems' Water Bath Vaporizers work ?

Water Bath Vaporizers are available in standard capacities from 200 gallons per hour (gph), to 7,000 gph. From the outside, they differ primarily in their size. Inside, the burner capacity, the amount of heat exchange medium, and the active heat exchange areas of the vapor tube and the burner tube also determine their vaporization capacity.

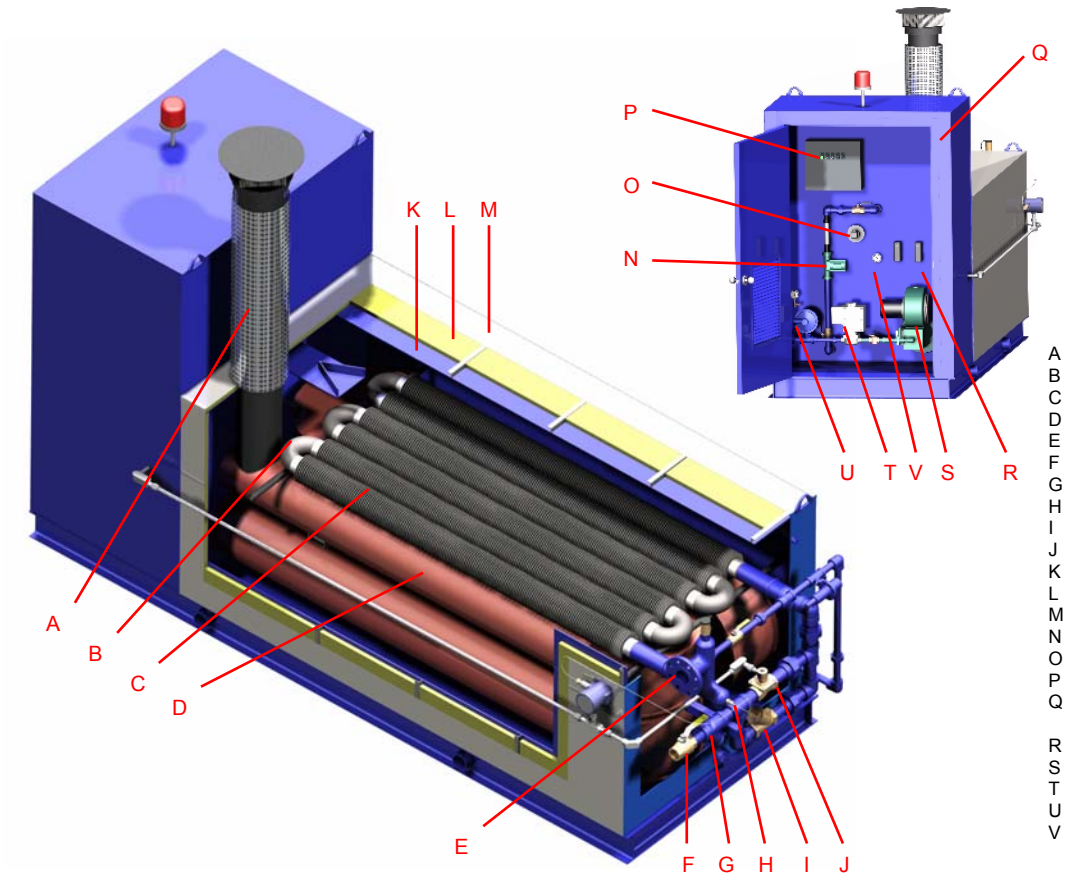
The drawing below shows a typical configuration of a 1,000 gph vaporizer. The main components of the vaporizer are the Burner Tube (D) with the Exhaust Stack (A), the Vapor Tube (B) with Welded Fins (C), the Steel Shell (K) with the integral Burner and Control Room Cabinet (Q), the Liquid Inlet Train (F, G, I, J), the Vapor Outlet Header (E) with Liquid Carryover Protection (H), and the Gas Train (U) for the Burner (S).

Also shown on the drawing are the Water Tank Insulation (L), the Outer Sheet Metal Shell (M), the Vaporizer Control Panel (P), the Main Gas Control Valve (T), the Water Circulation Pump (N), and the controls for Water Bath Temperature (R) and Water Level (O).

The Burner Tube and the Vapor Tube are fully immersed in a water/anti-freeze solution. LPG vapor from naturally occuring vaporization is taken from the Vapor Outlet Header (E) and fed through a Pressure Regulator (U) to the Burner (S). The Burner heats the water/anti-freeze solution through the Burner Tube (D). Temperature controls (R) maintain a constant water temperature of 180 °F. The heat from the water is transferred through the Vapor Tube (B) to the LPG, which then evaporates and exits the system through the Vapor Outlet Header (E). A Temperature Sensor (H), is inserted deep into the Vapor Outlet Header. In vaporizers without PLC controls, this Temperature Sensor would detect any temperature drop, associated with the presence of liquid LPG, and cause the the Solenoid Valve (J) in the liquid inlet train to close, preventing liquid from entering the vaporizer (Liquid Carryover Protection). Other components in the Liquid Inlet Train are the Liquid Shutoff Valve (F), the Strainer (G), and the Check Valve (I), allowing excess LPG pressure in the Vapor Tube to vent back to the liquid supply line and the tank.

The insulation of water bath tank and the thorough corrosion protection allow the vaporizer to be installed outside without any further weather protection.

"Smart" Liquid Carryover protection: Vaporizers with PLC controls (WB-450 and above) are equipped with "smart" liquid carryover protection. Vapor pressure and temperature are constantly monitored by a dedicated Rosemount pressure transmitter and a temperature transmitter. Their signals are processed in the PLC and are compared against the vapor pressure/temperature saturation curve of the LPG that is being vaporized. The properties of the LPG (Propane/Butane percentage), and the "safety margin" (how close the pressure/temperature are allowed to come to the saturation curve) can be entered through the operator interface. If the safety margin is "breached", the liquid inlet solenoid valve is closed after an adjustable alarm delay period has elapsed.



A Exhaust Stack
B Vapor Tube
C Welded Fins
D Burner Tube
E Vapor Outlet Header
F Liquid Inlet Train
G Strainer
H Temperature Sensor
I Check Valve
J Solenoid Valve
K Steel Shell
L Water Tank Insulation
M Outer Sheet Metal Shell
N Water Circulation Pump
O Controls for Water Level
P Vaporizer Control Panel
Q Burner and Control Room Cabinet
R Temperature controls
S Burner
T Main Gas Control Valve
U Pressure Regulator
V Thermometer

Specifications, WB-200 to WB-1500

SPECIFICATIONS		WB-200	WB-250	WB-350	WB-450	WB-550	WB-650	WB-750	WB-850	WB-1000	WB-1200	WB-1500
Nominal Vaporization Capacity (1)	gph	200	250	350	450	550	650	750	850	1000	1200	1500
Water Tank Capacity	gal	160	160	160	240	240	450	450	450	660	660	660
Burner Design		Venturi Type , Eclipse or similar			Forced Draft Power Burner with Electric Blower; Pyronics PITB or similar							
Burner Capacity	BTU/h	240,000	300,000	395,000	540,000	660,000	780,000	900,000	1,020,000	1,200,000	1,440,000	1,800,000
Design Temperature	°F	650	650	650	650	650	650	650	650	650	650	650
Design Pressure	psig	250	250	250	250	250	250	250	250	250	250	250
Standard Safety Features												
Pilot Failure		x	x	x	–	–	–	–	–	–	–	–
Ignition Failure Safety Shut Down		–	–	–	x	x	x	x	x	x	x	x
Electronic Flame Safeguard		–	–	–	x	x	x	x	x	x	x	x
Low Water Level Cutoff		x	x	x	x	x	x	x	x	x	x	x
High Water Bath Temperature Limit		x	x	x	x	x	x	x	x	x	x	x
Liquid Carryover Protection		Temperature Sensor			"Smart"		"Smart"			"Smart"		
Relief Valve on Vaporization Tubes		x	x	x	x	x	x	x	x	x	x	x
Relief Valve on Burner Gas Train		x	x	x	x	x	x	x	x	x	x	x
Low Burner Gas Pressure		–	–	–	x	x	x	x	x	x	x	x
High Burner Gas Pressure		–	–	–	x	x	x	x	x	x	x	x
Liquid Inlet Connection		1" 300# Raised Face Flange								2" 300# Raised Face Flange		
Vapor Outlet Connection		2" 300# Raised Face Flange								3" 300# Raised Face Flange		
Electrical Requirement (2)		AC 110 V 60 Hz, 15 A, 1-Ph			AC 220 V 60 Hz, 15 A, 1-Phase							
Standard Dimensions (3) Width	in.(mm)	39 (990)			72 (1829)		72 (1829)			72 (1829)		
Length	in.(mm)	99 (2520)			135 (3429)		135 (3429)			156 (3962)		
Height	in.(mm)	80 (2030)			112 (2845)		112 (2845)			112 (2845)		
Weight (3)	lbs.(kg)	3200 (1450)			4600 (2090)		5200 (2360)			6500 (2950)		

(1) Nominal Capacity for Vaporization of Propane @ 0°F Liquid Temperature (2) Export Models are AC 220 V 50 Hz, 15 A, 1-Phase, or AC 380 V 50 Hz, 15 A, 3-Phase
(3) Dimensions and weights are approximate Specifications subject to change without notice

PLC Control Panels and First-Outage Panels

All AES Water Bath Vaporizers are equipped with safety controls in accordance with NFPA 58, FM/CSA, and/or IRI (see table above). In models with atmospheric burners (WB-200 to WB-350), a single system control relay is used to monitor the status of these safety devices and to control the main gas valve to the burner. In models with power burners (WB-450 to WB-7000), the safety devices and the status of the Electronic Flame Safeguard are monitored by a Programmable Logic Controller (Allen-Bradley PLC), which then activates (or, in case of a system failure, turns off), the burner.

The PLC communicates with an operator interface, which can either be a 3-inch Allen-Bradley display (PanelView 300 Micro), or a 6-inch full-graphic color LCD display with touch-screen.

Either operator interface continuously displays the system status, and also functions as the first-outage annunciator panel, indicating any system malfunction in plain English. The 6-inch color LCD display with touch-screen also offers an alarm history function.

Size and complexity of the PLC depend largely on system requirements and owner-preferences, and can be adapted to virtually any application, including remote status indication and remote control.

Standard display


Color Graphic Display

Specifications, WB-1800 to WB-7000

SPECIFICATIONS		WB-1800	WB-2000	WB-2200	WB-2500	WB-3000	WB-3500	WB-4500	WB-5500	WB-7000
Nominal Vaporization Capacity (1)	gph	1800	2000	2200	2500	3000	3500	4500	5500	7000
Water Tank Capacity	gal	1200	1200	1200	1200	2625	2625	2625	3225	3600
Burner Design		(4)	Forced Draft Power Burner with Electric Blower; Eclipse IP or similar							
Burner Capacity	BTU/h	2,160,000	2,400,000	2,640,000	3,000,000	3,750,000	4,200,000	5,400,000	6,600,000	8,000,000
Design Temperature	°F	650	650	650	650	650	650	650	650	650
Design Pressure	psig	250	250	250	250	250	250	250	250	250
Standard Safety Features										
Pilot Failure		–	–	–	–	–	–	–	–	–
Ignition Failure Safety Shut Down		x	x	x	x	x	x	x	x	x
Electronic Flame Safeguard		x	x	x	x	x	x	x	x	x
Low Water Level Cutoff		x	x	x	x	x	x	x	x	x
High Water Bath Temperature Limit		x	x	x	x	x	x	x	x	x
Liquid Carryover Protection		“Smart”				“Smart”				“Smart”
Relief Valve on Vaporization Tubes		x	x	x	x	x	x	x	x	x
Relief Valve on Burner Train		x	x	x	x	x	x	x	x	x
Low Burner Gas Pressure		x	x	x	x	x	x	x	x	x
High Burner Gas Pressure		x	x	x	x	x	x	x	x	x
Liquid Inlet Connection										3” FNPT
Vapor Outlet Connection						4” 300# Raised Face Flange				6” 300#
Electrical Requirement (2)		(4)	AC 460 V 60 Hz, 15 A, 3-Phase							
Standard Dimensions (3) Width	in.(mm)	84 (2134)				89 (2260)				call AES
Length	in.(mm)	216 (5486)				252 (6400)				call AES
Height	in.(mm)	120 (3048)				124 (3150)				call AES
Weight (3)	lbs.(kg)	12000 (4650)				15000 (6800)				call AES

(1) Nominal Capacity for Vaporization of Propane @ 0°F Liquid Temperature
(2) Export Models are AC 220 V 50 Hz, 15 A, 1-Phase, or AC 380 V 50 Hz, 15 A, 3-Phase
(3) Dimensions and weights are approximate
(4) Same specification as model WB-1500
Specifications subject to change without notice

Control Room Sizes

All Water Bath Vaporizers have a compartment (vaporizer control room) in the front of the unit, holding burner, burner gas train, vaporizer control panel, temperature controls, water circulation pump, etc. The size of the vaporizer control room varies with the vaporizer size and the space required to accommodate the various sizes of burners and controls.

The following vaporizer control room configurations are available:

Full Size Control Room (84”x72”x36” HxWxD): standard on WB-450 to WB-1500; available as an option for WB-200 to WB-350.

Low Profile Control Cabinet (see table on next page for dimensions): standard on WB-200 to WB-350; available as an option for WB-450 to WB-850.

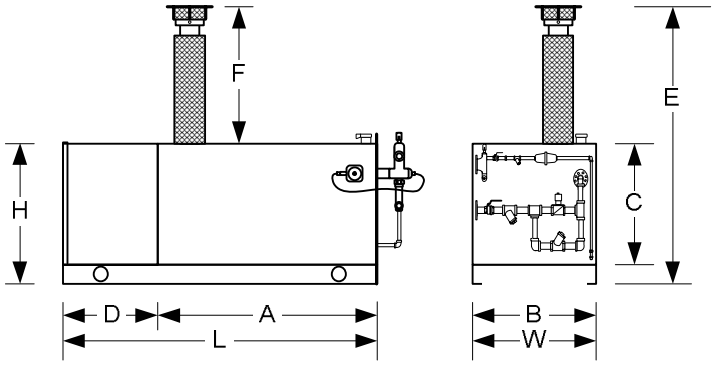
Extended Control Room (Maintenance House): standard for WB-1800 to WB-7000 (84”x84”x72” HxWxD); available as an option for WB-200 to WB-1500 (84”x72”x72” HxWxD).

Enlarged Control Room (Maintenance House) (84”x84”x92” HxWxD): available as an option for WB-200 to WB-7000, replacing the standard design with a separate structure with corrugated metal siding and roof, installed on common skid with vaporizer.

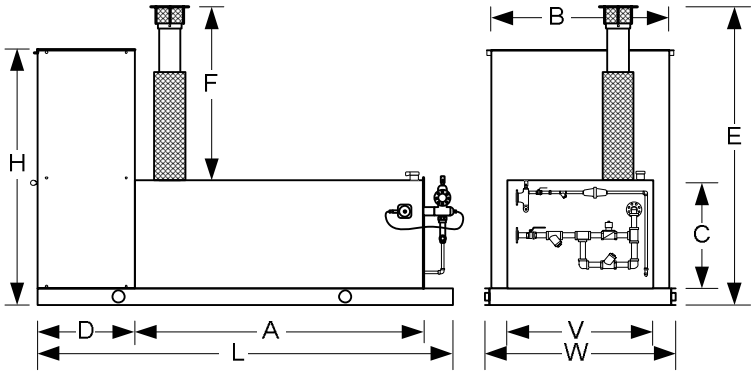
All control rooms are equipped with ventilation, light fixture, and AC outlet. Enlarged and Extended Control Rooms, which are sometimes referred to as the “Maintenance House”, can be equipped with electric heater, gas alarm, recording instruments, remote alarm telephone dialer, or any other customer-specific equipment.

Drawings

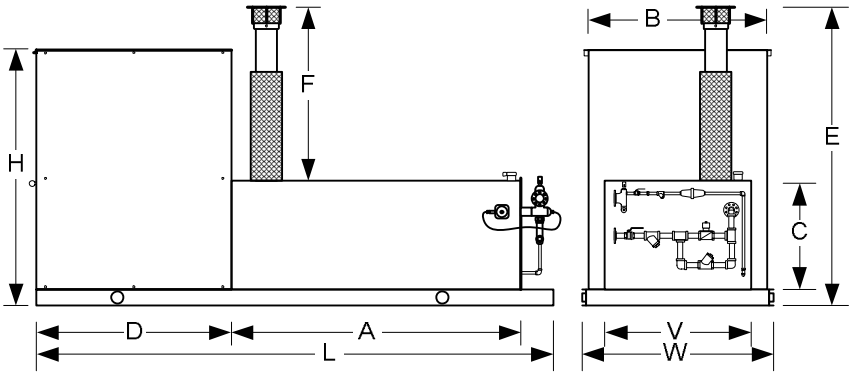
Low-Profile Design:
Standard on WB-200 to WB-350,
optional for WB-450 to WB-850.



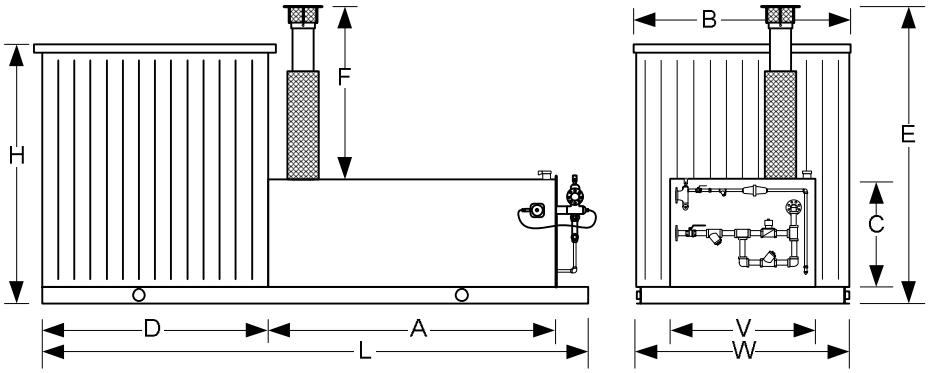
Full-Size Control Room:
Standard on WB-450 to WB-1500,
optional for WB-200 to WB-350.



Extended Control Room:
Standard on WB-1800 to WB-5500,
optional for WB-200 to WB-1500.



Enlarged Control Room:
Available as an option on
WB-200 to WB-5500.



Dimensions

Standard Dimensions

Dimension in inches (mm)	W	L	H	V	A	B	C	D	E	F	Concrete Slab
WB-200, WB-250, WB-350	39	99	37	39	69	39	31	30	80	43	5' x 12'
WB-450, WB-550	72	135	90	50	82	66	25	36	112	81	8' x 15'
WB-650, WB-750, WB-850	72	135	90	60	78	66	38	36	112	68	8' x 15'
WB-1000, WB-1200, WB-1500	72	156	90	55	107	66	46	36	112	60	8' x 17'
WB-1800, WB-2000, WB-2200, WB-2500	84	216	90	62	127	83	55	72	112	51	9' x 22'
WB-3000, WB-3500, WB-4500, WB-5500	90	252	90	83	171	89	64	72	112	42	9' x 25'
WB-7000	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES

Option: Full Size Control Room (Standard on WB-450 to WB-1500)

Dimension in inches (mm)	W	L	H	V	A	B	C	D	E	F	Concrete Slab
WB-200, WB-250, WB-350	72	108	90	39	69	66	31	36	112	75	8' x 13'

Option: Low-Profile Control Cabinet (Standard on WB-200 to WB-350)

Dimension in inches (mm)	W	L	H	V	A	B	C	D	E	F	Concrete Slab
WB-450, WB-550	50	114	54	50	82	50	26	30	85	53	6' x 13'
WB-650, WB-750, WB-850	62	110	66	60	78	62	39	31	92	47	7' x 13'

Option: Extended Control Room (Maintenance House) (Standard on WB-1800 to WB-5500)

Dimension in inches (mm)	W	L	H	V	A	B	C	D	E	F	Concrete Slab
WB-200, 250, 350	72	144	90	39	69	66	31	72	112	75	8' x 16'
WB-450, WB-550	72	156	90	50	82	66	25	72	112	81	8' x 17'
WB-650, WB-750, WB-850	72	168	90	60	78	66	38	72	112	68	8' x 18'
WB-1000, WB-1200, WB-1500	72	192	90	55	107	66	46	72	112	60	8' x 20'

Option: Enlarged Control Room (Maintenance House) (Separate structure on common skid)

Dimension in inches (mm)	W	L	H	V	A	B	C	D	E	F	Concrete Slab
WB-200, WB-250, WB-350	84	180	90	39	69	84	31	92	112	75	9' x 19'
WB-450, WB-550	84	192	90	50	82	84	25	92	112	81	9' x 20'
WB-650, WB-750, WB-850	84	192	90	60	78	84	38	92	112	68	9' x 20'
WB-1000, WB-1200, WB-1500	84	216	90	55	107	84	46	92	112	60	9' x 22'
WB-1800, WB-2000, WB-2200, WB-2500	84	240	90	62	126	84	55	92	112	51	9' x 24'
WB-3000, WB-3500, WB-4500, WB-5500	90	288	90	83	171	90	64	92	112	42	9' x 28'
WB-7000	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES	call AES

Note: All dimensions are approximate and are given for orientation purposes only. For actual dimensions contact Alternate Energy Systems, Inc.

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.

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

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