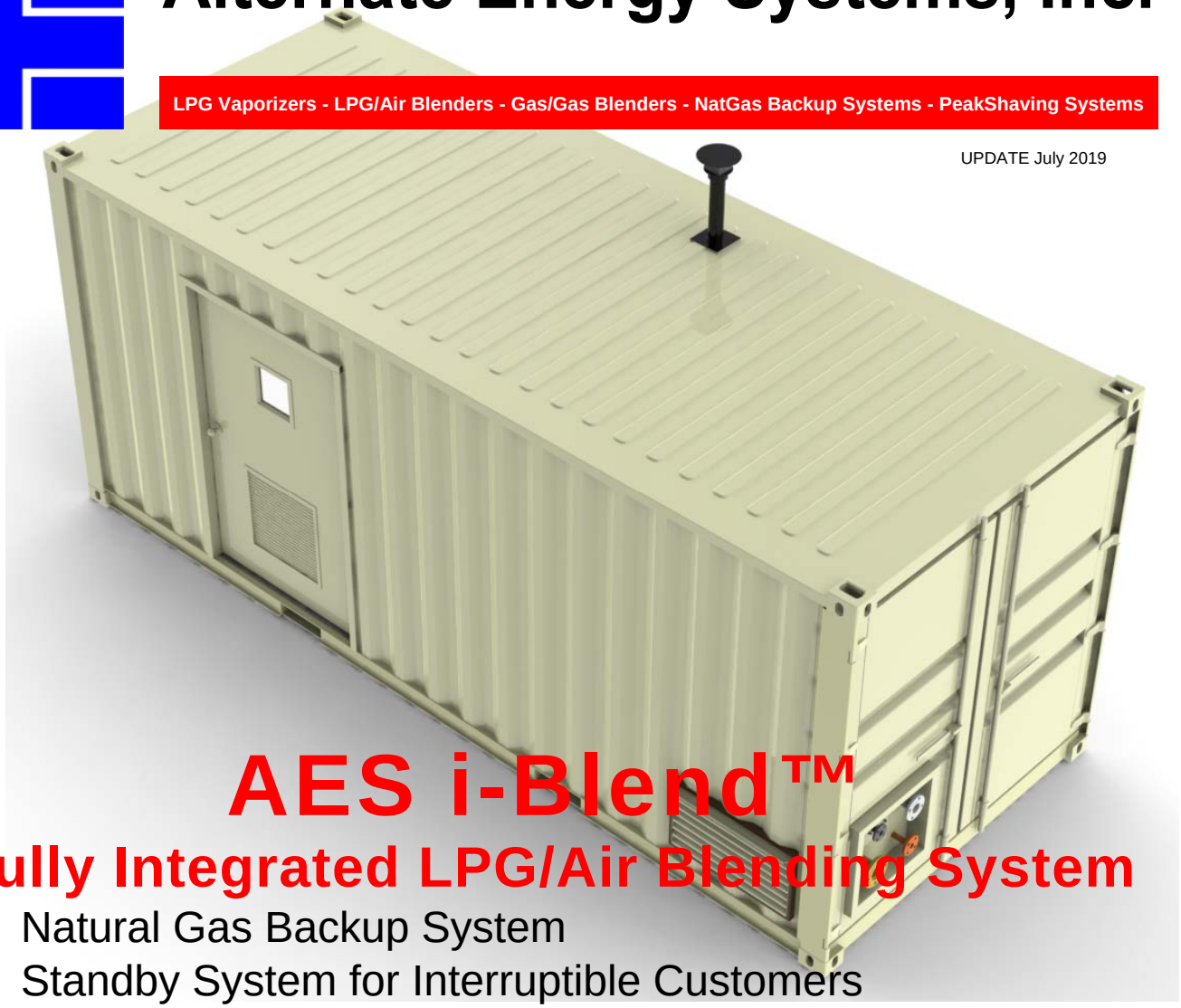
ISO9001:2015
REGISTERED

Alternate Energy Systems, Inc.

LPG Vaporizers - LPG/Air Blenders - Gas/Gas Blenders - NatGas Backup Systems - PeakShaving Systems

UPDATE July 2019



AES i-Blend™

Fully Integrated LPG/Air Blending System

- Natural Gas Backup System
- Standby System for Interruptible Customers
- Synthetic Natural Gas for New Developments
- PeakShaving for Industry and Utilities
- Vaporizer / Blender / Compressor combined in Weatherproof and Stormproof Enclosure
- Low-Pressure / High-Pressure (up to 250 psi / 16 bar)
- Propane, Butane, Propane/Butane Mixtures
- Automatic Gas Properties Controller (GraviBlend / AccuBlend)
- ASME, NFPA, FM, UL, CSA, PED, CE, …
- 110-230-277-380-400-440-460-480 VAC 50/60 Hz
- Choice of Controllers: Allen-Bradley (MicroLogix / CompactLogix) Siemens (S7-1200 / S7-1500), GE-Fanuc (Rx3i / VersaMax), …
- Multi-Language Operator Interface: English, Spanish, French, German, Polish, Portuguese, ...

AES i-Blend™

Fully Integrated LPG/Air Blending System

The AES i-Blend™ is the first fully integrated LPG/Air blending system on the market that is available as a "standard product", and not as a one-off special design. It combines a horizontal water bath vaporizer with a POM LPG/Air blender and a rotary air-compressor in a single weatherproof enclosure. Hundreds of each of these components have been supplied individually for a wide variety of applications to customers worldwide. For the first time they are now available as a fully integrated, pre-assembled, pre-tested, easy-to-ship, easy-to-install system that meets the requirements of customers worldwide.

Ordering an i-Blend™ system is as simple as selecting system capacity, sendout pressure, available LPG feedstock, supply voltage, and optional equipment and features from a list. Alternate Energy Systems will then manufacture the system to these specifications, and will ship it after it has been fully tested on our test stand. Systems for export customers will be tested with their country-specific voltage and frequency (i.e. AC 400V 50Hz 3-phase).

Upon arrival at the installation site, the i-Blend™ system should be placed on a level surface and will be fully functional within a few hours after making the piping connections at the integrated bulkhead, and making a single electrical connection.

All i-Blend™ systems are equipped with Electronic Operator Interface (EOI/HMI) with color LCD touchscreen and Programmable Logic Controller (PLC). The operator can select the EOI language (English, Spanish, French, German, Polish, Portuguese, …), and the Engineering Units (standard US units or metric SI units).

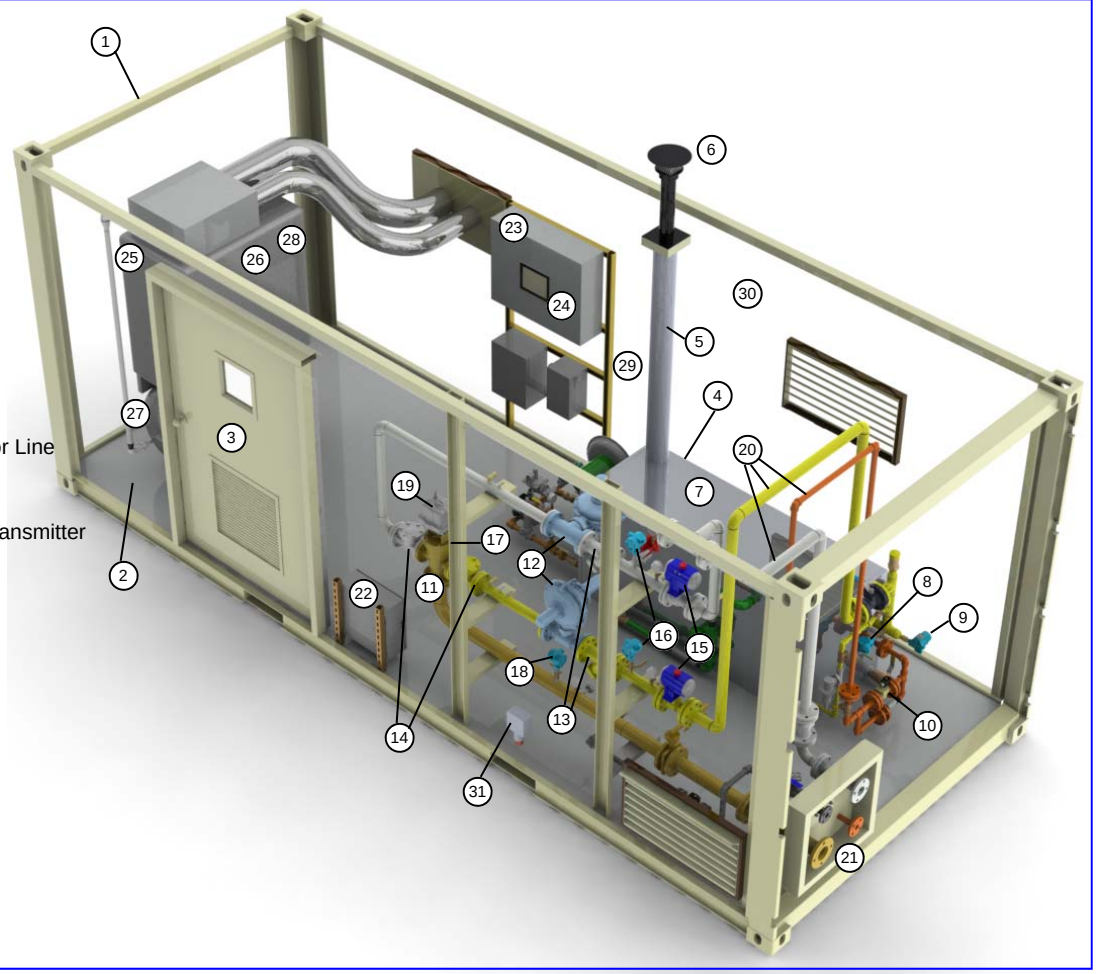
i-Blend™ systems up to 50 MMBTU/h (1130 m^3/h NatGas) can be installed in 20-ft enclosures. Larger systems have 40-ft enclosures (up to 100 MMBTU/h / 2800 m^3/h NatGas). Multiple i-Blend™ systems can be combined for even larger capacities. Each i-Blend™ system in multi-system installations has its own control system, and its own HMI.

i-Blend™ systems that will be installed in extreme climates can be equipped with hydronic heaters (warm water supplied by vaporizer), electric heaters, and/or with A/C units.

To make integration into existing plant monitoring systems easier, i-Blend™ systems can be equipped with PLC controls from Siemens (S7-1200 or S7-1500), Allen-Bradley (MicroLogix or CompactLogix), GE-Fanuc (VersaMax or Rx3i), and others.

Legend

1 Modified ISO Container
2 Steel Floor
3 Lockable Personnel Door
4 WB Vaporizer
5 Insulated Exhaust Stack
6 Removable Rain Cap
7 Bath Insulation
8 Vapor Pressure Transmitter
9 Vapor Temperature Transmitter
10 Flanged Liquid Inlet Valve
11 POM Blending Valve
12 On-Skid Regulators
13 On-Skid Strainers
14 Check Valve in Air Line and Vapor Line
15 Pneumatic Valves in Inlet Lines
16 Inlet Pressure Transmitters
17 Vapor/Air Differential Pressure Transmitter
18 Outlet Pressure Transmitter
19 AccuBlend™ Positioner
20 Color-Coded Piping
21 Bulkhead Connection
22 GraviBlend®-3 Gravitometer
23 Control Panel Enclosure
24 Electronic Operator Interface
25 Screw-Type Compressor
26 Integrated Dryer
27 Integrated Air Receiver Tank
28 Integrated Afterfilter
29 Wall Outlet
30 Overhead Lighting
31 Gas Leak Monitor (optional)



AES i-Blend™

Main System Components

Horizontal Water Bath Vaporizer, for Propane, Butane, and other LPG. All Models WB-168 to WB-1205 use Forced Draft Power Burners. Standard Safety Features in accordance with NFPA # 58. Vapor Tube Bundle in accordance with ASME Boiler & Pressure Vessel Code, Section VIII, Division I; or European PED. Approvals: Factory Mutual (FM) and Canadian Standards Association (CSA); suitable for Industrial Risk Insurers (IRI) installations; CE approval.

All models are equipped with Honeywell Flame Safeguard Controls, and with Temperature and Pressure Transmitters in Vapor Outlet for "smart" Liquid Carryover Protection, based on pressure/temperature correlation and LPG type (Propane/Butane/…). Detailed equipment description can be found in AES brochure "Water Bath Vaporizers".

POM LPG-Vapor/Air Blenders are designed in accordance with ASME and NFPA 58/59, and European Directives. They are FM listed and are available with CE approval. Pneumatically operated ball valves in vapor inlet and compressed air inlet are standard. Vapor inlet, air inlet, strainers, check valves, and regulators are flanged. Detailed equipment description can be found in AES brochure "LPG-Vapor / Air Blending Systems".

POM blenders are known for their reliability, immediate response to load changes, high turn-down, stable gas properties and sendout pressure, and their low maintenance requirements.

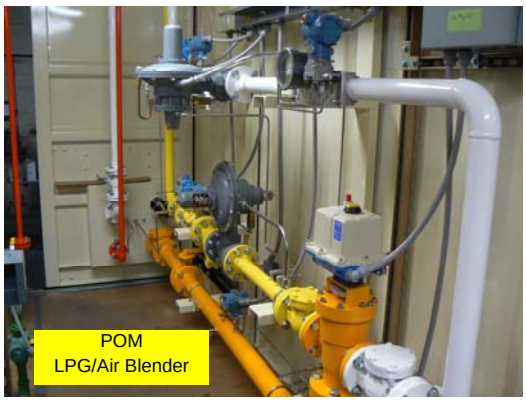
Compressed Air in all i-Blend™ systems is provided by a rotary (screw-type) compressor with integrated aftercooler, integrated air dryer, integrated oil/water separator, air receiver tank with ASME stamp, and 1-Micron afterfilter. All compressors comply with US regulations and are CE approved.

The PLC in the **System Control Panel** is used to monitor and control all vaporizer and blender functions. The PLC communicates with an Electronic Operator Interface (EOI/HMI) with color LCD and touchscreen, indicating system status, pressures, temperatures, and any trouble conditions that may occur. First-Out monitor (Alarm History) and graphic trend recording functions are standard. Plant Monitoring Systems can be connected via the standard Ethernet Interface (Siemens and Allen-Bradley), or other optional communications busses.

GraviBlend®-3E gravitometer and **AccuBlend**™ positioner are available as a standard option. Together, they form the **Automatic Gas Properties Controller**. This option is recommended for installations where the LPG properties could change from delivery to delivery, or where the LPG composition (Propane/Butane ratio) is different in summer and winter. The Gas Properties Controller compensates for these changes by automatically adjusting the LPG/Air blending ratio.

The **Weatherproof and Stormproof Enclosure** is based on a modified ISO shipping container. The original wooden floor is replaced with an all-welded steel floor, a lockable personnel door is installed, and framed openings are added for compressor cooling air discharge, ventilation, etc. The enclosures can be optionally equipped with long-life infrared gas leak monitor, ample lighting, power outlets with country-specific sockets, etc.

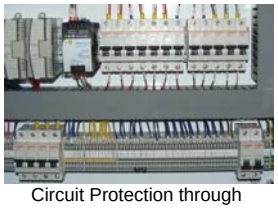
All **Piping** is color-coded (standard RAL colors). A bulkhead provides flanged connections for liquid LPG inlet, MixGas outlet, test flare connection, and flare pilot. Also available are flanged connections for compressed air (from a backup compressor or to other i-Blend™ modules), and vapor outlet (to-and-from other i-Blend™ modules).




Control Panel

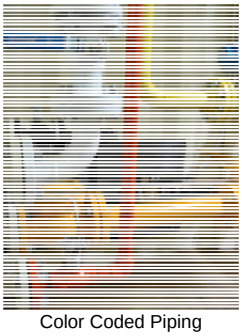

GraviBlend®-3 Gravitometer


Wall outlets with country-specific sockets


Circuit Protection through resettable breakers


Compressor


Gas Leak Monitor


Color Coded Piping


AccuBlend™ Positioner

Vaporizer Specifications

i-Blend™ Model		i-20	i-30	i-40	i-50	i-60	i-70	i-80	i-90	i-100
Based on Vaporizer Model		WB-258	WB-358	WB-458	WB-555	WB-755	WB-855	WB-1005	WB-1005	WB-1205
Nominal Vaporizer Capacity	gph kg/h	258 495	358 687	458 879	555 1065	755 1449	855 1641	1005 1929	1005 1929	1205 2312
Water Tank Capacity	gal m^3	165 0.625	165 0.625	165 0.625	220 0.83	220 0.83	385 1.46	495 1.87	495 1.87	495 1.87
Burner Design		European-style forced draft Power Burner with Combustion Air Blower.			Forced Draft Power Burner with Electric Combustion Air Blower Maxon TuboTherm or similar					
Burner Control		Honeywell Aquastat with ON/OFF Control			Electronic Thermostat (Temperature Transmitter) with 3-Point Modulation (OFF – Low-Fire – High-Fire)					
Burner Capacity (1)	MMBTU/h kW	0.3-0.4 88-123	0.4-0.6 123-172	0.5-0.8 158-222	0.7-0.9 193-270	0.9-1.3 260-370	1.0-1.4 300-420	1.2-1.7 350-490	1.2-1.7 350-490	1.4-2.0 420-590
Design Temperature	°F °C	650 343	650 343	650 343	650 343	650 343	650 343	650 343	650 343	650 343
Design Pressure	psi bar	250 17.2	250 17.2	250 17.2	250 17.2	250 17.2	250 17.2	250 17.2	250 17.2	250 17.2
Test Pressure	psi bar	375 25	375 25	375 25	375 25	375 25	375 25	375 25	375 25	375 25
Standard Safety Features										
Electronic Flame Safeguard Honeywell 7800-series or similar		x	x	x	x	x	x	x	x	x
Ignition Failure Shutdown		x	x	x	x	x	x	x	x	x
Low Burner Fuel Pressure		x	x	x	x	x	x	x	x	x
High Burner Fuel Pressure		x	x	x	x	x	x	x	x	x
Low Water Level Cutoff		x	x	x	x	x	x	x	x	x
High Bath Temperature Limit		x	x	x	x	x	x	x	x	x
Liquid Carryover Protection		“Smart” Liquid Carryover Protection with Pressure Transmitter and Temperature Transmitter in Vapor Outlet. Liquid Inlet Valve will be closed if Pressure/Temperature correlation indicates saturation is imminent.								
Relief Valve on Burner Train		x	x	x	x	x	x	x	x	x
Relief Valve on Vapor Tubes		x	x	x	x	x	x	x	x	x
External Alarm Input (ESD)		x	x	x	x	x	x	x	x	x
Liquid Inlet Connection (Flange at Bulkhead)		1-inch 300# Raised Face ANSI/ASME (standard) DN25 PN40 DIN (optional)						2-inch 300# Raised Face ANSI/ASME DN50 PN40		
Liquid Inlet Valve (controlled by PLC)		1-inch Solenoid, direct-acting, flanged						2-inch Solenoid, direct-acting, flanged		
Liquid Inlet Valve (manual)		1-inch Ball Valve, flanged						2-inch Ball Valve, flanged		
Vapor Outlet Connection (Flange at Bulkhead)		2-inch 300# Raised Face ANSI/ASME (standard) DN50 PN40 (optional)						3-inch 300# Raised Face ANSI/ASME DN80 PN40		
Vapor Outlet Valve (manual)		2-inch Ball Valve, flanged						3-inch Ball Valve, flanged		

(1) Burner Capacity (and heat transfer area of vapor heat exchanger) will be adjusted according to LPG type (Propane/Butane ratio) and sendout pressure.

Blender Specifications

i-Blend™ Model		i-20	i-30	i-40	i-50	i-60	i-70	i-80	i-90	i-100
Based on Blender Model	10 psi / 0.7 bar 20 psi / 1.4 bar 30 psi / 2.1 bar 40 psi / 2.8 bar above 40 psi	POM-30 POM-30 POM-30 POM-30 POM-30	POM-40 POM-30 POM-30 POM-30 POM-30	POM-40 POM-30 POM-30 POM-30 POM-30	POM-40 POM-30 POM-30 POM-30 POM-30	POM-40 POM-30 POM-30 POM-30 POM-30	POM-40 POM-40 POM-30 POM-30 POM-30	POM-40 POM-40 POM-30 POM-30 POM-30	POM-40 POM-40 POM-30 POM-30 POM-30	POM-60 POM-40 POM-40 POM-30 POM-30
System Capacity	MM BTU/h MM kcal/h MW NatGas m^3/h	20 5.0 5.86 570	30 8.80 32000 850	40 11.72 42000 1130	50 14.65 53000 1400	60 17.58 63000 1700	70 20.51 74000 2000	80 23.45 84000 2300	90 26.38 95000 2550	100 29.31 105000 2800
Design Temperature	°F °C	180 82	180 82	180 82	180 82	180 82	180 82	180 82	180 82	180 82
Design Standards		Conforms to ASME Boiler & Pressure Vessel Code; FM Listed European CE Approval including PED, ATEX, LVD, MD, etc.								
Standard Safety Features										
High / Low MixGas Pressure		Electronic Pressure Transmitter in MixGas Outlet. Setpoints adjustable through input at touchscreen EOI.								
High / Low LPG Vapor Pressure		Electronic Pressure Transmitter in Vapor Inlet. Setpoints adjustable through input at touchscreen EOI.								
High / Low Compressed Air Pressure		Electronic Pressure Transmitter in Compressed Air Inlet. Setpoints adjustable through input at touchscreen EOI.								
High Vapor/Air Differential Pressure		Electronic Pressure Transmitter downstream of Vapor and Air Regulators. Setpoint adjustable through input at touchscreen EOI.								
Safety Valves in Vapor and Air Inlets		Air-operated ball valves close on all high-pressure alarms. Fail-safe design with spring-return closes valves on loss of power.								
Vapor Supply Connection (inside container)		2-inch 300# Raised Face ANSI/ASME (standard) DN50 PN40 (optional)								
Air Supply Connection (inside container)		2-inch 150# Raised Face ANSI/ASME (standard) DN50 PN16 (optional)								
MixGas Outlet Connection (Flange at Bulkhead)		POM-30 3-inch 150# Raised Face ANSI/ASME DN80 PN16 (optional)			POM-40 4-inch 150# Raised Face ANSI/ASME DN100 PN16 (optional)			POM-60 6-inch 150# Raised Face ANSI/ASME DN150 PN16 (optional)		

i-Blend™ Model		i-20	i-30	i-40	i-50	i-60	i-70	i-80	i-90	i-100
Enclosure is based on		Modified 20-ft ISO Container				Modified 40-ft ISO Container				
Enclosure Dimensions (outside)	ft m	20 ft x 8 ft 6.1m x 2.4m				40 ft x 8 ft 12.20m x 2.4m				
Approximate Weight (standard configuration)	lbs kg	14,000 lbs 6,350 kg	15,000 lbs 6,800 kg	16,000 lbs 7,250 kg	18,000 lbs 8,160 kg	22,000 lbs 9,980 kg	23,000 lbs 10,430 kg	27,000 lbs 12,250 kg	28,000 lbs 12,700 kg	29,000 lbs 13,150 kg
Maintenance Access Panels		n/a	n/a	n/a	1	1	1	1	2	2
Overhead Lights		2	2	2	2	4	4	4	4	4
Wall Outlets		2	2	2	2	4	4	4	4	4
GasLeak Monitors (optional)		1	1	1	1	2	2	2	2	2
Enclosure Insulation		Available as an option for all i-Blend systems.								
Hydronic Heating System		Available as an option for all i-Blend systems; warm water supplied by vaporizer; requires option “Enclosure Insulation”.								
Electric Heating System		Available as an option for all i-Blend systems; wall-mount unit; requires option “Enclosure Insulation”.								

Compressor Specifications

i-Blend™ Model		i-20	i-30	i-40	i-50	i-60	i-70	i-80	i-90	i-100
For installations in 50/60Hz countries										
Compressor Model	Atlas Copco VSD+ Full-Feature	GA18	GA26	GA37	GA45	GA55	GA75	GA75L	GA75L	GA90
Compressor Motor	Atlas Copco hp	25	35	50	60	75	100	100	100	125
Compressor Capacity	Atlas Copco cfm	113	166	216	291	352	419	498	498	570
	Atlas Copco m^3/hr	193	282	368	494	598	712	847	847	969
All Compressors feature Variable Speed Drives (VSD), aftercooler, and refrigerated air dryers.										
Compressor selection based on HD-5 LPG and altitude of 1000' ASL. Changes in LPG composition and/or elevation may impact compressor sizing.										

Request Quotation

To Request a Quotation for an i-Blend™ system, use the tables above to provide us with basic information about your application. The choices shown in each category are only a small selection of all available options — you can substitute (almost) everything with your own preference.

If you are unclear how to specify the system, or if you have any additional questions, please contact us by email at i-blend@altenergy.com, or by phone at +1 770 487 8596.

Once we receive your RFQ, we will respond within one business day with a price and an available manufacturing slot, and within two business days with estimated shipping costs to your location.

EXAMPLE

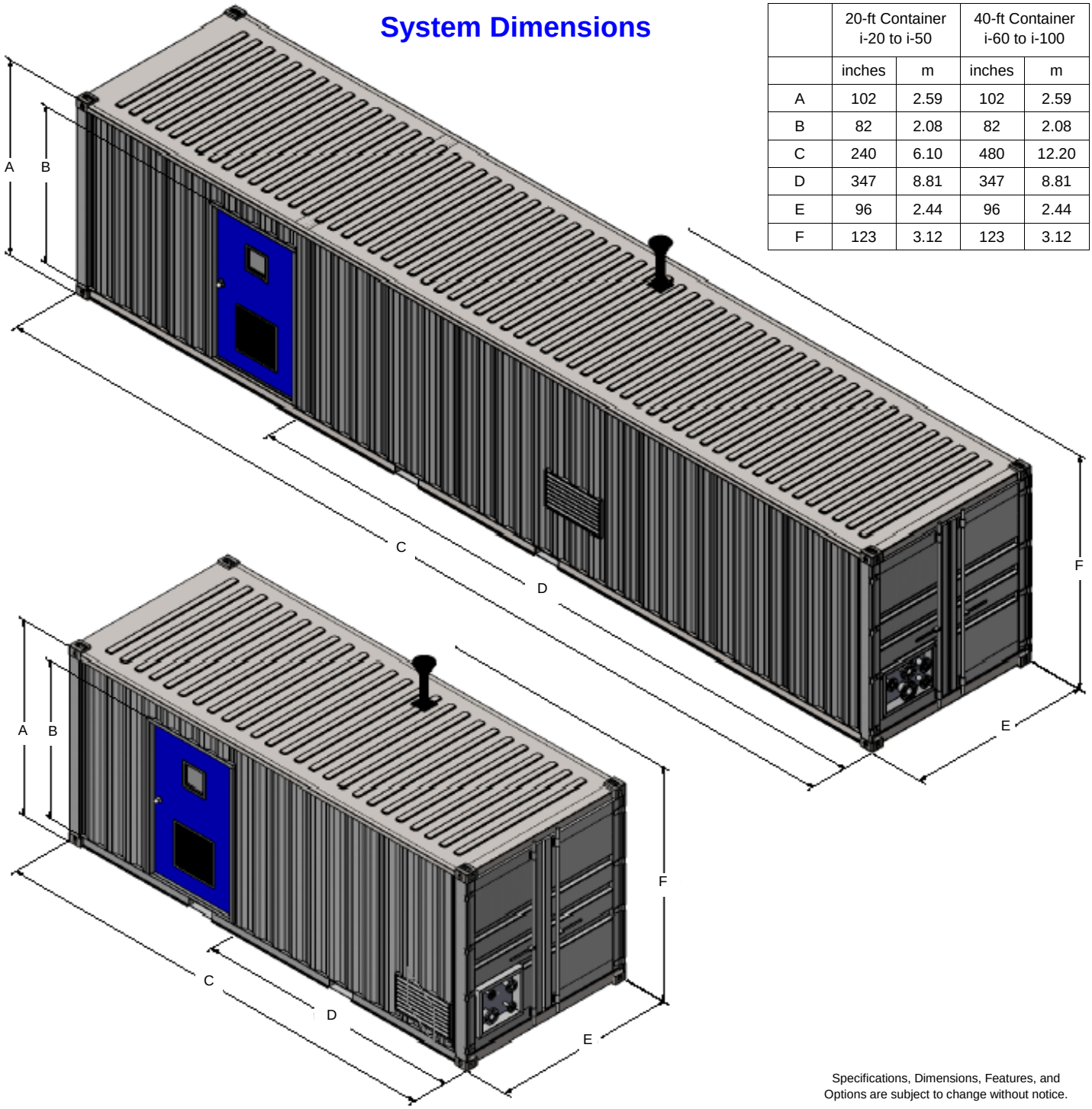
i-40	25 psi	70%P 30%B	AC415V3Ph	Atlas Copco	S7-1500	1

System Size	Sendout Pressure	LPG Feedstock	Electrical Supply	Compressor Manufacturer	PLC Manufacturer	Gas Analysis and Control
i-20 i-30 i-40 i-50 i-60 i-70 i-80 i-90 i-100 (see Page 5 for System Capacities)	10 psi 0.7 bar 15 psi 1.0 bar 20 psi 1.5 bar 25 psi 2.0 bar 30 psi 2.5 bar 35 psi 3.0 bar 40 psi 3.5 bar 45 psi 4.0 bar 50 psi 4.5 bar 60 psi 5.0 bar 65 psi 5.5 bar 70 psi 6.0 bar other	95% P 5% B 90% P 10% B 85% P 15% B 80% P 20% B 75% P 25% B 70% P 30% B 65% P 35% B 60% P 40% B 55% P 45% B 50% P 50% B 45% P 55% B 40% P 60% B 35% P 65% B 30% P 70% B 25% P 75% B 20% P 80% B 15% P 85% B 10% P 90% B other	AC 120V 1Ph AC 220V 1Ph AC 230V 1Ph AC 277V 1Ph AC 220V 3Ph AC 380V 3Ph AC 400V 3Ph AC 415V 3Ph AC 440V 3Ph AC 460V 3Ph AC 480V 3Ph other	NONE Atlas Copco Ingersoll Rand other	Siemens S7-200 S7-1500 Allen-Bradley MicroLogix CompactLogix GE-Fanuc VersaMax RX3i other	0 NONE 1 Gravitometer GraviBlend-3 only 2 Gravitometer GraviBlend-3 and AccuBlend Positioner 3 Other

Specifications, Dimensions, Features, and Options are subject to change without notice.

System Dimensions

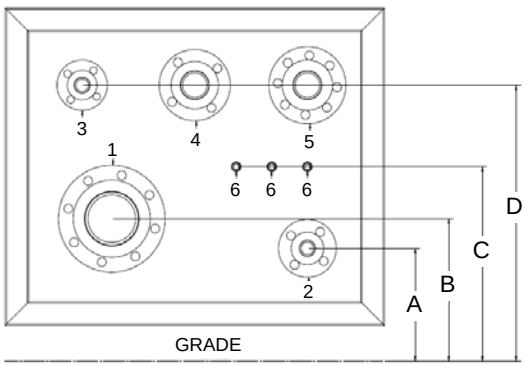
	20-ft Container i-20 to i-50		40-ft Container i-60 to i-100	
	inches	m	inches	m
A	102	2.59	102	2.59
B	82	2.08	82	2.08
C	240	6.10	480	12.20
D	347	8.81	347	8.81
E	96	2.44	96	2.44
F	123	3.12	123	3.12



Specifications, Dimensions, Features, and Options are subject to change without notice.

Connection Size		i-20 to i-70	i-80 to i-100
1	MixGas OUT	Outlet Size is determined by Blender Model POM-30: 3" 150# ANSI/ASME DN80 PN16 (DIN 86030) POM-40: 4" 150# ANSI/ASME DN100 PN16 (DIN 86030) POM-60: 6" 150# ANSI/ASME DN160 PN16 (DIN 86030)	
2	Liquid IN	1" 300# RF ANSI/ASME DN25 PN40 (DIN 2635)	2" 300# RF ANSI/ASME DN25 PN40 (DIN 2635)
3	Flare Line OUT	2" 150# RF ANSI/ASME DN25 PN16 (DIN 86030)	2" 150# RF ANSI/ASME DN25 PN16 (DIN 86030)
4	Air IN/OUT	2" 150# RF ANSI/ASME DN50 PN16 (DIN 86030)	2" 150# RF ANSI/ASME DN50 PN16 (DIN 86030)
5	Vapor IN/OUT	2" 300# RF ANSI/ASME DN50 PN40 (DIN 2635)	3" 300# RF ANSI/ASME DN80 PN40 (DIN 2635)
6	Vent Lines	Compression Fittings for 1/4-inch tubing	

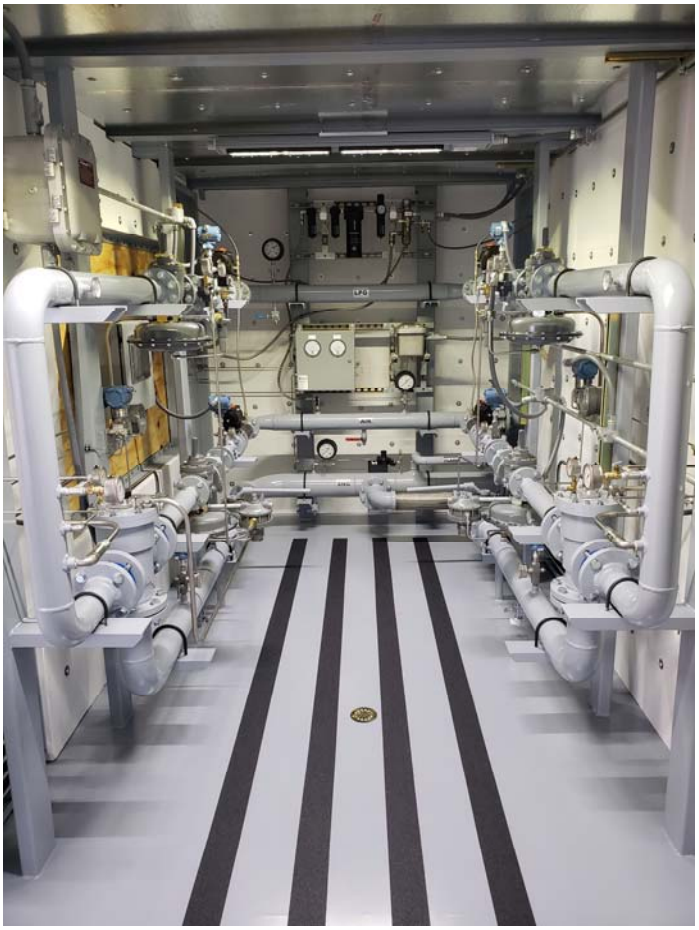
Bulkhead Dimensions		
	inches	mm
A	17.75	451
B	20.25	514
C	24.63	626
D	31.50	800

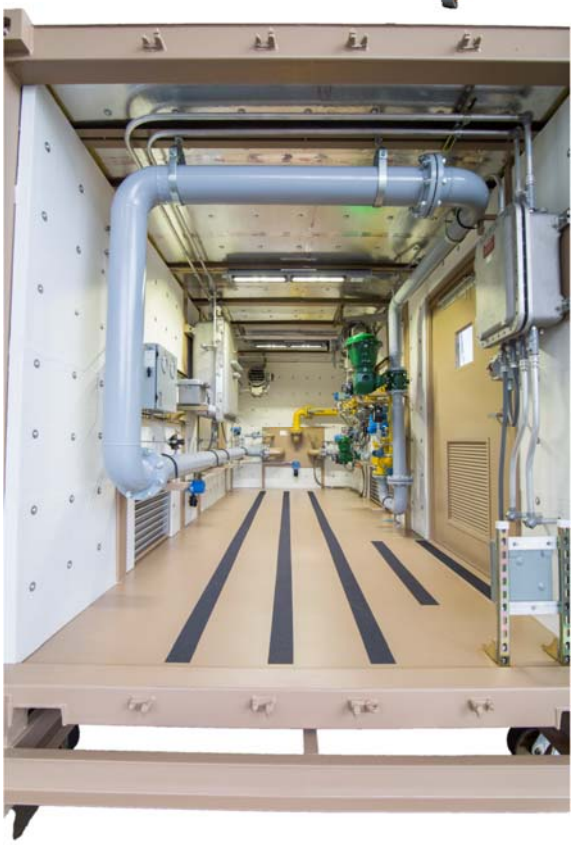


NOTE: Air IN/OUT and Vapor IN/OUT connections can be used to connect to other (redundant) i-blend modules.

Other Containerized Products

- Vaporizer Only Systems
- Blender Only Systems
- PeakShaving Systems
- Simplex or Duplex (Redundant)
- Custom Configurations





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