



## GEK GASIFIER KIT

Complete System for Converting Biomass to Syngas



**GEK Gasifier - Half Power Pallet**

The GEK Gasifier makes it easy for beginners and experts alike to run high-performance solutions in small-scale gasification. Whether you are a DIY enthusiast, university researcher or OEM manufacturer, the GEK will get you over the starting hurdles of gasification, and onto the more rewarding work of making clean gas for power generation or experimental studies.

The GEK Gasifier kit is a complete gas-making system: from biomass-fuel-feed input through syngas/air-mixer output, all controlled by the same full automation system as used on our Power Pallet. The GEK kit might also be thought of as the complete APL Power Pallet, minus the engine, genhead, and engine governor. We do the hard part of making a gasifier that actually works; you do the “easy” part of connecting it to an engine.

Unlike our historic kits, the new GEK kit comes largely assembled, skidded and commissioned. It arrives ready-to-run, with minimal assembly, not as parts for you to puzzle together, and it is compatible with our Continuous Feed Airlock option.

### PERFORMANCE

Maximum Gas Flow Rate:	60 m <sup>3</sup> /hr ~20kWe or 380,000 BTU
Minimum Gas Flow Rate:	10 m <sup>3</sup> /hr ~3kWe or 60,000 BTU
Gas Energy Density	6.5 MJ/m <sup>3</sup>
Gas Composition	CO: 22%, H <sub>2</sub> : 20%, CH <sub>4</sub> : 3% CO <sub>2</sub> : 10%, N <sub>2</sub> : 45%
Biomass Consumption:	1.2 kg biomass = 3 m <sup>3</sup> gas = 1 kWhe
Run Time per Hopper Fill:	5 kW: 15 m <sup>3</sup> /hr = 11 hrs approximate @ 200 kg/m <sup>3</sup> fuel density 10 kW: 31 m <sup>3</sup> /hr = 5.5 hrs 20 kW: 62 m <sup>3</sup> /hr = 2.8 hrs
Max. Continuous Operation:	~12 hours
Start Up Time:	5 -20 min.

### MAJOR COMPONENTS INCLUDED

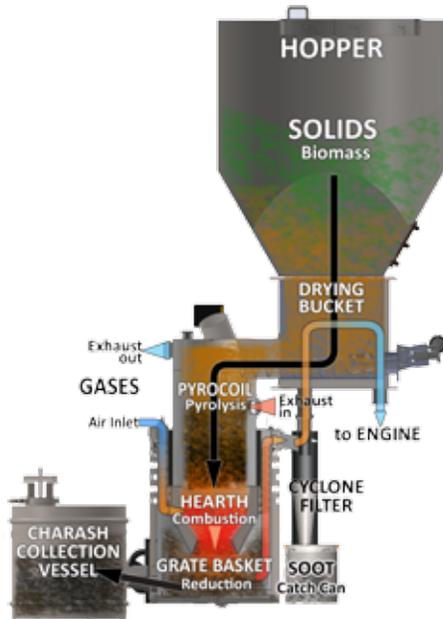
Gasifier	v5 GEK Gasifier with thermal recycling
Automation	Custom APL with open-source microcontroller
Feed System	Batch Hopper with feedstock auger
Filtration	Packed Bed
Gas Mixing	Active PID Controlled wide-band O <sub>2</sub> sensor
Mounting Skid	Powder-Coated Steel
Flare Stack	Premixed, Auto-Igniting
User Kit	Tools Consumables

### COMPONENTS NOT INCLUDED

Battery	12V DC marine recommended
Genset Control	Mechanical or Electronic
Exhaust Plumbing	Routing to Gasifier

**Note:** specifications provided are subject to change and assume connecting engine exhaust gas to the pyroreactor to support pyrolysis.

## GASIFICATION PROCESSES & FLOWS



## GASIFIER SPECIFICATIONS

Type:	Multistage Downdraft with thermal recycling
Materials:	304 SS/310 SS/ 321 SS/mild steel
Ash Removal:	Automated 12-hour batch vessel
Fuel Feed:	Automated
Hopper Capacity:	0.33 m <sup>3</sup> /88 gallons
Hopper Filling:	Batch - refill while operating
Maintenance Cycle:	~12 hours
Control System:	On-Board Automation

## FEEDSTOCK BIOMASS

Size:	12-40 mm/0.5-1.5 in.
Moisture Content:	10-30% dry basis
Approved and Tested w/ normal operating procedures	Large Nut Shells Softwood Chips (e.g. Fir, Pine) Hardwood Chips (e.g. Oak, Ash)
Approved and Tested w/ increased operating effort	Corn Cobs Coconut Shells Palm Kernel Shells
Not Approved dangerous & voids warranty	Coal Tires Plastic Municipal Solid Waste

## DIMENSIONS

Shipping	145 x 145 x 140 cm/57 x 57 x 54 in
Operating:	145 x 145 x 223 cm/57 x 57 x 88 in
Weight:	450 kg/990 lbs.

## ALL Power Labs



ALL Power Labs is the global leader in small-scale gasification. We make biomass-fueled power generators that are ready for everyday work, to serve real-world distributed energy needs.

Our project started in 2008 with the open-source Gasifier Experimenter's Kit (GEK), supporting research, education and DIY hacking in biomass thermal conversion. Seven years later the GEK has evolved into the Power Pallet, a full solution for personal scale biomass power generation. Today you can find our systems in dozens of countries around the world, and supporting research in over 50 universities.

The APL team is an unusual combination of hands-on fabricators and university-trained scientists and engineers. The result is a powerful combination of technical ability and physical know how for building real things that have impact in the real world.

We invite you to join us for the ongoing collaborative process of refining GEK systems, and proving gasification to be a uniquely powerful solution for individual-scale energy independence.



Our facility is in Berkeley, CA. Please contact us to arrange a visit next time you are in the Bay Area. We'd love to show you around.