



MULTI-FUEL FURNACES

The burning of used crankcase oils, lubricants and other nontraditional fuels for heating purposes is very different than standard heating systems and presents many unique challenges. INOV8 International was founded on the principles of providing solutions to these technical challenges to allow the reliable and safe burning of these fuels while extracting the maximum heat value in an environmentally friendly way.

Beginning in 1990, our founder, Harry Foust, began working on a completely new waste oil furnace design to address the many problems he saw with other inferior designs on the market. His efforts resulted in the creation of a revolutionary new burner design, the receipt of multiple patents and the founding of INOV8 International in La Crosse, WI. The innovation that began the company has continually been refined through the years and is present in every product we manufacture today. INOV8 furnaces continue to be the most advanced and reliable on the market - they are loaded with a combination of features and benefits you simply will not find on any other unit!

Key Features and Benefits

1. Clean Burning

In distinct contrast to other systems on the market, and in some cases public perception of waste oil fired furnaces, INOV8 furnaces burn cleanly and produce chimney emissions similar to, or better than, typical residential oil furnaces. Our unique combination of features allows for nearly complete combustion, as evidenced by low chimney temperatures, very low presence of carbon monoxide molecules and oxygen, and a light colored powdery residual ash. These technologies include:

- Oil pre-heat circuit – a thermostatically controlled electric heating element preheats the oil to a high temperature as it circulates. This heating process reduces and equalizes the viscosities of the oil, which will often vary widely. The result is a hotter flame and more complete combustion. To allow maximum flexibility in fuel choice, the pre-heater circuit can also be shut off for burning low flash point fuels like fuel oil.
- Continuous circulation – applying high heat to oil without keeping it flowing will cause the formation of small burnt particles that can clog the nozzle and result in frequent furnace shutdowns and inefficient combustion. INOV8 has solved this challenge with a unique system that circulates the oil continuously at high velocity, effectively preventing the formation of these particles and the problems they cause.
- Vapor Eliminator system – waste oils contain varying amounts of moisture, impurities, and gases that will vaporize as the oil is heated. This will cause the flame to be interrupted and result in unstable, incomplete combustion, frequent re-starts and higher chimney emissions. The patented INOV8 vapor eliminator system extracts these gases to insure a stable flame and clean combustion.
- Double filtration – two separate filtering systems provide a cleaner stream of oil to the burner and virtually eliminate fuel related shutdowns. Our unique two-stage system filters the oil both before and after its heated.
 - In line – filters the oil initially as it comes from the tank. 50 micron spin-on filter, filter housing and floating pickup assembly are included.
 - Vapor eliminator – in addition to removing the entrapped air from the oil, this patented system also provides the critical second filtering stage, just prior to the oil entering the burner. Filter housing and 10 micron rayon filter are included.
- Needle valve – another patented and exclusive feature, this system performs two key functions:
 - Precisely controls oil delivery to the burn chamber and prevents the build up of any oil droplets that cause higher emissions upon restart.
 - At each ignition cycle, clears out any obstructions that may have become lodged in the nozzle, insuring proper spray pattern and efficient combustion.
- Optimized spray pattern – INOV8 furnaces utilize a perfected combination of oil pressure, air pressure and nozzle design to provide a finely atomized spray pattern that helps ensure complete combustion. Other models on the market use a larger orifice, lower pressure and less precise nozzle to compensate for less effective filtering. This yields larger oil droplets and less efficient combustion.
- Innovative heat exchanger:
 - Three pass design means maximum efficiency and less wasted heat.
 - 14 gauge aluminized steel construction provides corrosion resistance far superior to the mild steel others use.
 - Unique design separates the heat exchanger from the combustion chamber to prevent stress cracks.

- o Configured to retain the residual ash inside the furnace instead of sending it up the chimney and into the environment. Ash generated from our furnaces can be easily cleaned out and disposed of properly instead of ending up on your roof, parking lot, or surroundings as occurs with other brands.

2. Flexibility of Fuels

One of the most practical and money saving benefits of INOV8's unique technology is the ability to burn fuels with an extremely wide range of viscosities and flash points without the need for adjustments. This gives you tremendous flexibility to utilize fuels that are in plentiful supply in your industry or region, yet also operate on more traditional fuels like home heating oil or diesel fuel if needed. Options include:

Used lubricants

Crankcase oils - all weights, petroleum based and synthetic
 Transmission fluid
 Hydraulic oil
 Gear oils - up to 140 wt.
 Heat transfer oil - up to 175 wt.
 Machine shop cutting oil

Other options

Home heating oil
 Vegetable oil
 Diesel fuel
 Extracted aircraft and jet fuel
 Mineral spirit solvents
 Crude petroleum

3. Low Operating Costs

Superior design and advanced technology combined with old-fashioned craftsmanship, insure that INOV8 furnaces are inexpensive to maintain, simple to service and built to last for years. We keep your operating costs down by providing:

- Industrial grade components and materials.
- No requirement for annual repairs or annual replacement of expensive parts as with other brands.
- Convenient access to burner assembly and all serviceable components.
- Individually replaceable parts – no need to replace complete subassemblies or modules due to single component problem.
- Low electricity usage – advanced technology means our igniters only need to activate for a short period of time instead of continuously like other brands. In addition, the oil pre-heater operates only as needed.
- Comprehensive Owners Manual – includes detailed information required for a successful installation, normal operation, routine maintenance, and step-by-step troubleshooting.
- Free unlimited factory technical support – our responsive and knowledgeable Technical Support team is just a phone call away on our toll free line. The INOV8 Technical Support team is the best in the business – We guarantee it!
- Most parts are in stock and ready for immediate shipment (overnight if needed) to keep any downtime to a minimum.

4. Safety

While we are passionate about all aspects of our products, safety has been a primary focus since our inception and guides many of the choices we make. We don't just adhere to the bare minimum regulations as other manufacturers do, we strive to build the safest furnaces possible using the best components available even when they cost more.

Combustion controller

A key example of our commitment in the area of safety is our Fireye combustion controller. It is the "brains" of the INOV8 burner and monitors the flame as well as multiple safety functions. Fireye utilizes an industrial rated ultra-violet (UV) sensor costing up to ten times more than commonly used cadmium based controls. It does however, offer tremendous benefits compared to the cheaper units. The Fireye control:

- Monitors the flame in the combustion chamber and will recognize an improper flame (caused by after-burn) and shut off the oil supply within 3 seconds. In contrast, cadmium sensors can't differentiate between a normal flame and improper flame and will continue to deliver oil, in some cases for up to 45 seconds. A re-fire in this circumstance can cause dirty combustion, smoky after burn and unsafe accumulation of fumes.
- Will shut the furnace down if there is a poor chimney draft. The Fireye will not be able to "see" through the fumes caused by the back-draft and will shut down the burner preventing flue gases from being carried back into the building. You don't have to put up with smelly fumes to have free heat!
- Is not sensitive to daylight or artificial light and won't be "fooled" by a nearby ceiling light or skylight. Cadmium sensors can create a hazard by "reading" these kinds of lights as a flame and continuing to supply oil even after the flame may have expired.

Other safety features controlled by the Fireye include:

- Oil temperature interlock – will not allow ignition until the oil reaches the proper temperature.
- Air pressure interlock – prevents the delivery of oil to the burn chamber unless there is proof of required atomizing air.

- Blocked filter interlock – turns on an amber warning light if the filter is restricted and will eventually shut down the furnace if the filter becomes blocked.
- Purge cycle – a 90 second purge to insure proper venting of any combustible vapors prior to each start sequence.
- Trial for ignition – if a flame is not established and recognized by the Fireye within 10 seconds of startup, the igniter is turned off and the system automatically reverts to a safety lockout.
- Termination of spark ignition – once a flame has been established and sensed by the Fireye, it shuts down the igniter to lengthen the life of the ignition system and electrodes.
- In the event of a loss of flame, the control terminates oil delivery in 3 seconds and attempts to restart after a 90 second purge.

Testing and standards

- Tested & listed by Intertek ETL-Semko to UL296A
- Tested & listed to CSA standard B140.0-03, B140.4-04 and B140.2.1-M90.
- Listed with European Economic Community with a CE registration number 3884/97.

Additional Standard Features & Benefits

- Oil preheat system – normally activated for burning used oils, but can be switched off when burning fuel oil and other low flash point fuels.
- Self priming pump – requires no hand priming and also reduces the need for a boost pump.
- Powder coated cabinet – extremely tough and long lasting industrial finish applied to all exterior cabinet surfaces.
- Swing out burner assembly and removable access doors – ease of cleaning and maintenance.
- Ceramic burner target – protects the burn chamber from the flame and prolongs cabinet life.
- Viewing port – allows observation of the inside of the burn chamber and monitoring for correct flame configuration.
- Integrated hour meter – makes it easy to keep track of run time for scheduled maintenance and service.
- Heavy-duty mounting brackets – make ceiling mount installations easy.
- Integrated air pressure regulator – all you need to supply is the compressed air.
- Our furnaces and tanks are proudly “Made in the USA”!

Optional Components

Workbench storage tank - Offers the most convenient way to install an INOV8 furnace. It includes all mounting brackets, lines, fittings and hardware to mount and hookup the furnace. All you need to supply is the chimney, compressed air and electrical hookups. See our tank brochure for additional details.

Boost pump - For applications where the furnace must be mounted high, or a longer distance from the storage tank, a boost pump may be needed. Electric gear drive and pneumatic diaphragm models are available.

Draft Inducer - May be required for certain applications to provide additional draft in the chimney when the natural draw is not sufficient.

Sealed combustion kit - This option is required for applications where outside air needs to be used for combustion due to negative building pressures from exhaust fans/systems.

Additional Specifications

Chimney requirements:	
Minimum height above furnace outlet	12 feet
Inside diameter	8 inch
Compressed air requirements:	
CFM	2.0
PSI	30
Fittings	¼” NPT
Electrical requirements:	
Voltage	120
Dedicated circuit breaker (amps)	20
Wiring (gauge)	12