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Used Oil Furnace Regulations and Emissions

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EnergyLogic manufactures space heaters and small boilers that are designed to burn used crankcase oil and transmission fluid, as well as #2 fuel oil (diesel). For the United States, EnergyLogic builds and certifies their furnaces, boilers, and tanks to the Underwriters Laboratories standards and testing methods. EnergyLogic furnaces are certified to Standard UL 296A: "Waste Oil Burning Air-Heating Appliances", boilers are certified to UL 296A and UL 726: "Oil Fired Boiler Assemblies", and tanks are certified to UL 142: "Steel Aboveground Tanks for Flammable and Combustible Liquids".

The U.S. Federal requirements for handling used oil are given in the Code of Federal Regulations, Title 40, Part 279 – Standards for the Management of Used Oil, which can be found at the link below:

http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=b7930fd683e39bd2afbdf23ea27ad329&mc=true&r=PART&n=pt40.27.279

Burning is specifically covered in Subpart C, Paragraph 279.23 "On-site burning in space heaters", which has only a few requirements:

> **§ 279.23 On-site burning in space heaters.**
>
> Generators may burn used oil in used oil-fired space heaters provided that:
>
> (a) The heater burns only used oil that the owner or operator generates or used oil received from household do-it-yourself used oil generators;
>
> (b) The heater is designed to have a maximum capacity of not more than 0.5 million Btu per hour; and
>
> (c) The combustion gases from the heater are vented to the ambient air.
>
> [57 FR 41612, Sept. 10, 1992, as amended at 58 FR 26425, May 3, 1993]

Basically, the EPA has determined through previous testing and analysis that for small (<500,000 BTU/hour) waste oil furnaces, the potential risks associated with burning the oil onsite are less than the risks of having the oil dumped illegally or accidentally spilled while transporting the oil offsite. (Note that 1 gallon of spilled oil can contaminate 1,000,000 gallons of water.) The EPA reviewed this rule as recently as 2011 and maintained this section allowing onsite burning in space heaters.

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The safety of used oil when used in space heaters and small boilers is supported by a March 1996 study by the Vermont Agency of Natural Resources: "Vermont Used Oil Analysis and Waste Oil Furnace Emissions Study."

www.epa.gov/ttn/catc/dir1/w_**oil**acr.pdf

This study concluded that the combustion of used oil in air atomizing space heaters complies with Vermont Air Pollution Control Regulations. Any risks posed by using used oil in space heaters and small boilers will be even less today given the fact that the used oil being generated today is much cleaner than oils generated in the past, in large part due to the elimination of leaded gasoline and the reduction of sulfur in diesel fuel, requiring less ash in the crankcase oil.

Today's used oil burners incorporate several features to allow them to burn cleanly and efficiently. The oil is filtered to remove large particles. Then it is preheated to reduce its viscosity. The heated oil then flows into an air-blast atomizing nozzle, which uses compressed air to spray the oil out as tiny droplets. The droplets are ignited electronically by a large continuous spark, and the flame is stabilized by a flame retention head. The units are equipped with multiple safety features, such as flame-out sensors, fuel shutoff valves, and temperature limit controls.

In 2007, an air emissions test of an EnergyLogic EL-340H furnace burning waste crankcase oil was conducted by an independent third party test company. The results are summarized below and compared with estimates for heavy duty trucks based on the U.S. EPA allowable levels for several model years. The results show that the oil burns completely in the furnace, as the unburned hydrocarbons and the carbon monoxide (CO) are very low. The higher level of SO2 is due to the sulfated ash used as an additive in motor oil.

Pollutant	EL-340H Used Oil Furnace Emissions (lb/hr)	1998 US EPA Truck Emissions (lb/hr)	2007 US EPA Truck Emissions (lb/hr)	2010 US EPA Truck Emissions (lb/hr)
Total Particulates	0.097	0.14	0.014	0.014
Total Hydrocarbons	0.004	1.86	0.20	0.20
SO2	0.101	0.0008	0.0008	0.0008
NOX	0.052	5.73	1.72	0.29
CO	0.010	22.21	22.21	22.21
CO2	54	78	78	78