



TECHNICAL UPDATE

Air Emissions from Home Oil Burners and Other Sources

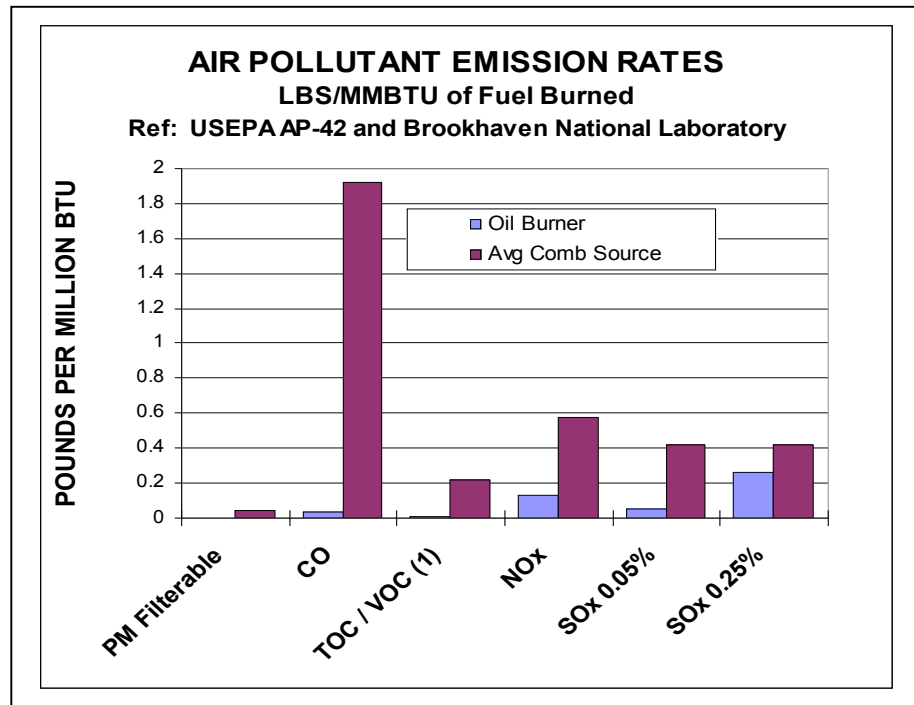
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OMA published the Oilheat Advantages Engineering Analysis and Documentation Report in 1995 which summarized many favorable attributes of oil heating equipment including their low level of air pollutant emissions. This note is the first in a series of Technical Updates that revisits the topic of air emissions and presents up-to-date calculations. It compares both the rate of air pollutant emissions and the total quantity of pollutants emitted each year. As in the previous reports, oil heating equipment produces very low air emissions and is a most favorable fuel from an air emissions perspective.

Air Emissions from Oil Burners and Other Sources

Air pollution emissions from residential oil burners are much lower than emissions from most other combustion sources in the U.S. and do not produce a significant negative impact on the environment. Both the rate of air emissions and total emissions released by oil burners are low. Brookhaven National Laboratory Report 52249 concluded: **"Residential oil burners generally, and modern equipment specifically, are not significant national emission sources"**. The environmental impact caused by oil burners is much less than other combustion sources including electric heat, heat pumps, and residential wood stoves. *Modern oil burners now produce air emissions at rates that are similar to natural gas burning equipment.*



The main air pollutants produced by combustion equipment in the U.S. that are evaluated by the USEPA include: Particulate Matter (PM), Nitrogen Oxides (NOx), Carbon Monoxide (CO), Hydrocarbons (HC, TOC, VOC), and Sulfur Oxides (SOx). A brief comparison of oil burner emissions to other combustion sources follows. The **RATE** of production of these air pollutants from residential **oil burners** and from the **average combustion source in the U.S.** are compared

in the bar chart above. The emission factors for oil heating equipment are from U.S. Environmental Protection Agency publications (ref: AP-42 - Compilation of Air Pollutant Emission Factors), Brookhaven National Laboratory reports, including recently revised USEPA particulate emissions factors for oil burners. Emission rates for the average US combustion source are determined by dividing the total pounds of each pollutant (ref EPA-454/R-01-004) from all combustion sources by the total heating value in BTUs of these sources (ref DOE/EIA-0214).

Particulate (filterable) emission rates from home oil burners are **14 times lower** than the average combustion source; **Nitrogen Oxide** emissions are **4 times lower** than the average; **Carbon Monoxide** rates are **53 times lower**; and **Hydrocarbon** emissions (Total Organic Compounds) from oil burners are **43 times lower** than the average U.S. combustion source.

Sulfur Oxide emissions vary from **1/8 to 1/2** of the average US combustion source depending on the sulfur content of the fuel oil. Lower sulfur fuel oil is now available with only 0.05 percent sulfur content as required for on-highway use. The current trend is toward this lower Sulfur oil for home heating which drastically lowers sulfur oxide emissions. It is clear that the rate of air pollutants released by residential oil burners is very low when compared to other sources in the U.S.

TOTAL air pollutant emissions by oil burners each year are also very low when compared to the average U.S. source. The table that follows shows historically that oil burners account for only **0.018 percent** (0.00018) to **0.58 percent** (0.0058) of each of the air emissions shown. This is based on data from the U.S. Department of Energy and the US Environmental Protection Agency.

TOTAL EMISSIONS (Million Tons per Year)

Air pollutant	Residential Oil Burners	All Combustion Sources in U.S.(2)(3)	% from Residential Oil Burners
Particulates	0.0012	1.78	0.068
Nitrogen Oxides	0.053	24.1	0.21
Carbon Monoxide	0.015	80.5	0.018
Hydrocarbons(TOC)	0.0021	9.43	0.022
Sulfur Oxides (3)	0.02 to 0.10	17.4	0.11 to 0.58

- References: (1) U.S. Environmental Protection Agency, AP-42, 9/98, Jan 2004
 (2) U.S. Environmental Protection Agency, EPA-454/R-01-004, National Air Quality and Emissions Trends Report – 1999, Mar 2001.
 (3) U.S. Department of Energy, DOE/EIA-0214(88), State Energy Data Report- 1999 May 2001.

Oil burners have RATES of air emissions of only **1/2 to 1/53rd** of the average combustion source in the U.S., and **much less than one percent of the TOTAL annual emissions** for each of the air pollutants above. Residential oil burners are one of the cleanest combustion sources in the U.S. and produce only negligible quantities of air pollution each year.

These emissions data clearly demonstrate that residential oil burners are not a significant source of air pollution in the U.S.