

PTE Evaluation

Equipment:

One waste oil furnace rated at 1.5 gallons/hr with an atomizing burner

One 200 gallon storage tank

Assumptions:

AP-42 Emission Factors: (Table 1.11-1 through Table 1.11-4)

Source Category	Pollutant	Emission Factor (lb/10 ³ gal)	Emission Factor Rating
Atomizing Burner	NO _x	16	D
Atomizing Burner	CO	2.1	D
Atomizing Burner	TOC	1.0	D
Atomizing Burner	Chromium	1.8x10 ⁻¹	D
Atomizing Burner	Nickel	1.6x10 ⁻¹	D
Atomizing Burner	Arsenic	6.0x10 ⁻²	D
Atomizing Burner	SO ₂	107S	D
Atomizing Burner	PM	66A	D
Atomizing Burner	PM ₁₀	57A	D
Atomizing Burner	Lead	50L	D
Atomizing Burner	Phenol	2.8x10 ⁻⁵	D
Atomizing Burner	Naphtalene	9.2x10 ⁻⁵	D
Atomizing Burner	Antimony	4.5x10 ⁻³	D
Atomizing Burner	Beryllium	1.8x10 ⁻³	D
Atomizing Burner	Codmium	1.2x10 ⁻²	D
Atomizing Burner	Cobalt	5.2x10 ⁻³	D
Atomizing Burner	Manganese	5.0x10 ⁻²	D
Atomizing Burner	Naphthalene	9.2x10 ⁻⁵	D
Atomizing Burner	Phenanthrene/ anthracene	1.0x10 ⁻⁴	D
Atomizing Burner	Dibutylphalate	3.4x10 ⁻⁵	D
Atomizing Burner	Pyrene	8.3x10 ⁻⁶	D

S = weight % sulfur in fuel = 0.46%

A = weight % ash in fuel = 0.87%

L = weight % lead in fuel = (146 parts/million) = 0.0146% = 0.0146

Waste oil furnaces are only permitted to operate September 1st - May 15th.

Operating hours = 6168 hr/yr

TANKs Program for Storage Tanks

The Tanks program accounts for working (loading) and breathing (changes in daytime/nighttime temperature) losses from the storage tanks.

Storage Tank: 200 gal = 26.74 ft

(1 tank/200 gal)(1.5 gal/hr)(8760 hr/yr) = 65.70 turnover/yr per tank

Calculations:

PTE for NO_x

Waste Oil Furnace:(1.5 gal/hr)

(1.5 gal/hr)(16 lb/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.074 tpy NO_x

Total = 0.074

PTE for CO:

Waste Oil Furnace:(1.5 gal/hr)

(1.5 gal/hr)(2.1 lb/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.0097 tpy CO

Total = 0.0097

PTE for Chromium:

Waste Oil Furnace:(1.5 gal/hr)

(1.5 gal/hr)(1.8x10⁻¹ lb/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.0008 tpy Chromium

Total = 0.0008

PTE for Nickel:

Waste Oil Furnace:(1.5 gal/hr)

(1.5 gal/hr)(1.6x10⁻¹ lb/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.0007 tpy Nickel

Total = 0.0007

PTE for Arsenic:

Waste Oil Furnace:(1.5 gal/hr)

(1.5 gal/hr)(6.0x10⁻² lb/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.0003 tpy Arsenic

Total = 0.0003

PTE for SO₂:

Waste Oil Furnace:(1.5 gal/hr)

S = 0.46

(1.5 gal/hr)(107(0.46)/10³ gal)(6168 hr/yr)/(2000 lb/ton) = 0.2277 tpy SO₂

Total = 0.2277

PTE for PM:

Waste Oil Furnace:(1.5 gal/hr)

A = 0.87

$(1.5 \text{ gal/hr})(66(0.87)/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.2656 \text{ tpy PM}$

Total = 0.2656

PTE for PM₁₀:

Waste Oil Furnace:(1.5 gal/hr)

A = 0.87

$(1.5 \text{ gal/hr})(57(0.87)/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.2294 \text{ tpy PM}_{10}$

Total = 0.2294

PTE for Lead:

Waste Oil Furnace:(1.5 gal/hr)

L = 0.0146

$(1.5 \text{ gal/hr})(50(0.0146)/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.0034 \text{ tpy Lead}$

Total = 0.0034 (Highest HAP)

PTE for Phenol:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(2.8 \times 10^{-5}/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 1.30 \times 10^{-7} \text{ tpy Phenol}$

Total = 1.30 x 10⁻⁷

PTE for Naphthalene:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(9.2 \times 10^{-5}/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 4.26 \times 10^{-7} \text{ tpy Naphthalene}$

Total = 4.26 x 10⁻⁷

PTE for Antimony:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(4.5 \times 10^{-3}/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.00002 \text{ tpy Antimony}$

Total = 0.00002

PTE for Beryllium:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(1.8 \times 10^{-3}/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.000008 \text{ tpy Beryllium}$

Total = 0.000008

PTE for Cadmium:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(1.2 \times 10^{-2}/10^3 \text{ gal})(6168 \text{ hr/yr})/(2000 \text{ lb/ton}) = 0.000056 \text{ tpy Codmium}$

Total = 0.000056

PTE for Cobalt:

Waste Oil Furnace:(1.5 gal/hr)

$(1.5 \text{ gal/hr})(5.2 \times 10^{-3} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 0.000024 \text{ tpy Cobalt}$
Total = 0.000024

PTE for Manganese:

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(5.0 \times 10^{-2} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 0.000231 \text{ tpy Manganese}$
Total = 0.000231

PTE for Phenanthrene/anthracene:

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(1.0 \times 10^{-4} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 4.63 \times 10^{-7} \text{ tpy Phenanthrene/anthracene}$
Total = 4.63 x 10⁻⁷

PTE for Dibutylphthalate:

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(3.4 \times 10^{-5} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 1.57 \times 10^{-7} \text{ tpy Dibutylphthalate}$
Total = 1.57 x 10⁻⁷

PTE for Pyrene:

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(8.3 \times 10^{-6} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 3.84 \times 10^{-8} \text{ tpy Pyrene}$
Total = 3.84 x 10⁻⁸

PTE for Total HAP:

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(1.22 \text{ lb total HAP} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 0.0056 \text{ tpy total HAP}$
Total = 0.0056

PTE for VOC:

Storage Tank: (Working and Breathing Losses)
 $(0.18 \text{ lb})(2000 \text{ lb/ton}) = .00009 \text{ tpy}$

Waste Oil Furnace:(1.5 gal/hr)
 $(1.5 \text{ gal/hr})(1.0 \text{ lb} / 10^3 \text{ gal})(6168 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 0.0046 \text{ tpy}$
Total = 0.0009 tpy + 0.0046 = 0.0055 tpy VOC