

VAPOR ABATEMENT

S.A.V.E™ SYSTEMS



- No Open Flame**
- Small Footprint & Portable**
- Minimal Supplemental Fuel Usage**
- Built-in Automatic Fire Suppression System**
- Removal Rate Efficiency Greater Than 99.9%**
- No Electrical Connection or Generator Required**
- Totally Automated for unattended Applications**
- Wide Range of Automatic Safety Shutdown Alarms**
- Uses 100% Process Vapors as Primary Fuel Source**
- Control up to 2,400 lb/day of VOC per Dual Engine Unit**
- Telemetry/Remote Control via Land Line or Wireless Internet**





REMEDATION SERVICE, INT'L
Technology in Support of the Environment

Oxidizer / Internal Combustion Engine (ICE) Comparison at average 50,000 PPMv VOC Concentration In Process Flow During Typical Tank Degassing Event

Equipment Type	Max PPMv (as Toluene) after dilution air	Btu/hr to operate system at zero PPMv	Process Flow (SCFM)	Dilution Air (SCFM)	Lbs/hour (as Toluene) Oxidized	Gallons/hr "make up fuel" (Propane)
Thermal Oxidizer-Furnace						
1000 SCFM Thermal without safety control ¹	2,656	1,805,080	53	947	38.73	12.9
Thermal Oxidizer-Furnace						
1000 SCFM Thermal with safety control ¹	5,313	1,805,080	106	894	77.46	5.5
Internal Combustion Engine (ICE)						
300 SCFM (model V4 dual engine w/load)	22,810	1,784,979	137	163	99.77	0.3

Assumptions:

- Mass removed = (ug/L * Flow (SCF/M) * 28.3L/SCF * 60 Minutes/Hour * 2.2 Pounds/Kg)* 1/10⁹
- Toluene at 92.1 mole weight; 17601 Btu/lb, LEL 1.25% (12,500 PPMv)
- 20.9% Oxygen in process stream
- Dilution Air = Process Capacity - Process Flow
- One gallon of propane (vaporized) is equal to 91,500 Btu)
- 594,993 BTU/hr per 100 SCFM throughput for stoichiometric burn for ICE oxidation (105 Btu/cubic foot)
- 180,508 BTU/hr per 100 SCFM throughput for thermal oxidation (30 Btu/cubic foot)
- Thermal Oxidizers shown operating at 85% of NFPA LEL recommendations (see footnote 1)
- Oxidizers' burner have a 30 to 1 turn down ratio with no heat exchanger installed
- Engine uses slightly less than 1 to 1 ratio of Btu contaminants for reduction of alternate fuel

¹Furnace type oxidizers normally operate safely below the LEL so that an explosion does not occur within or outside of the oxidizing chamber. The National Fire Protection Association (NFPA) recommends that oxidizers operate at a maximum of 25%, or up to 50% of the LEL depending on the safety control features of the system. Oxidizers are limited to this safe operating range in order to have adequate time to respond to fluctuations in the input flow rates and/or VOC concentrations. Common practice for refinery or tank farm use is to operate at less than NFPA recommendations. Above chart assumes 85% of NFPA recommendations.

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