

VOC Emission Control

Off-Gas Treatment: Air Abatement

Organic vapors extracted from contaminated soil during Soil Venting or from contaminated groundwater treated in the S.A.V.E.™ system's Spray Aeration process typically requires treatment to meet Volatile Organic Compound (VOC) emissions standards. Depending on the concentration and composition of the organic vapors, RSI offers several treatment technologies.

Compressive Thermal Oxidation using RSI's specially designed Internal Combustion Engine For high concentrations of total petroleum hydrocarbons (TPH) from fuel spills, at or above the Lower Explosion Limit (LEL), compressive thermal oxidation via our computer controlled modified internal combustion engine (ICE) is the most cost-effective process on the market today. The ICE is also effective on TPH below the LEL by simply adding supplementary fuel from another source, for example, natural gas, propane or gasoline.

Chlorinated Organic Vapor Air Abatement Module

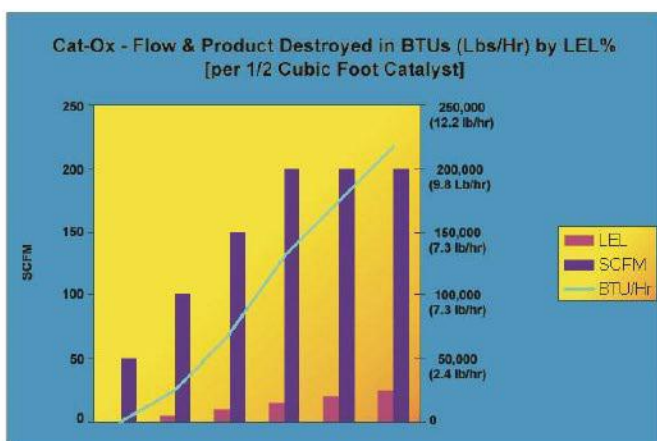
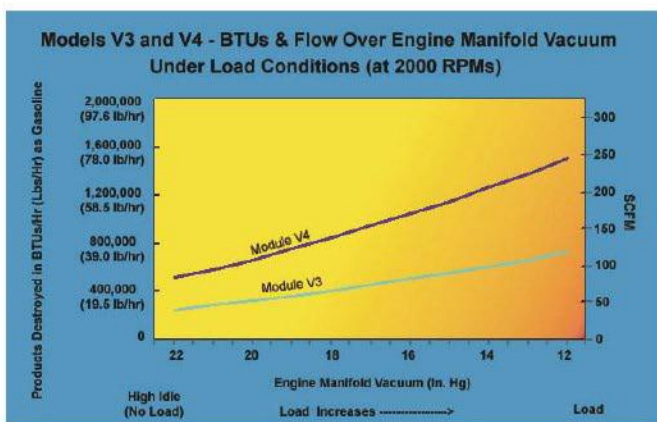
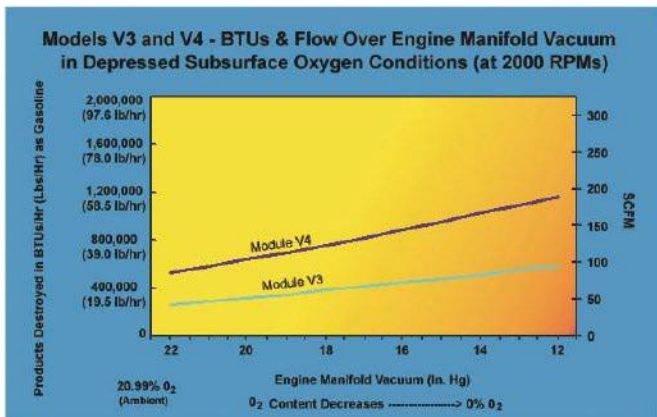
Chlorinated organic vapors can be treated via activated carbon adsorption units or in a catalytic unit specifically developed for chlorinated organics. The destruction of chlorinated organics results in the production of hydrochloric acid (HCl); the acid may be removed from the emissions using a scrubber system provided with this module. For low levels of chlorinated vapors in a petroleum hydrocarbon spill, the vapors may be treated in the ICE, following RSI's modified operating instructions with prior RSI approval.

RSI's Catalytic Oxidation Module

Our catalytic oxidation module destroys additional TPH vapors, adding overall performance not seen in the industry. It is also useful when the total combined gas flow rate from Soil Venting and Spray Aeration exceeds the destruction capacity of the ICE. The key to our success is that the catalytic module increases the total S.A.V.E.™ system capacity, with two off-gas treatment units (ICE and catalytic oxidation) operating simultaneously, in parallel. Our catalytic module requires no outside energy source as all required power is derived from the waste energy of the ICE. No one offers a better treatment cost per cubic foot treated than RSI's patented remediation systems.



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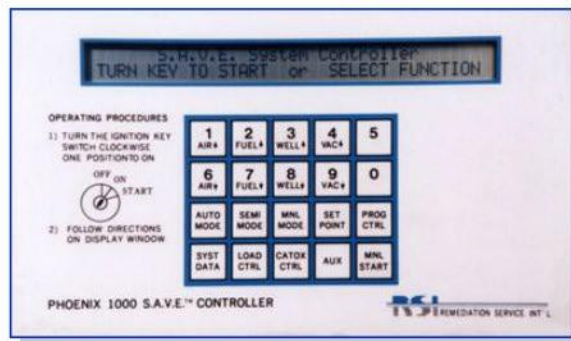
Note: Total air throughput remains constant at set RPM and manifold vacuum. Engine manifold vacuum is a function of rpm, load, timing, & air-fuel ratio. Typically, systems are operated at high RPM, minimal load, advanced timing, and at or near stoichiometric air-fuel ratio, which results in high engine manifold vacuum.

The Phoenix S.A.V.E.™ Controller

Maintaining optimal A/F ratio is challenging with variations in site conditions, such as fluctuating hydro-carbon, oxygen or carbon dioxide concentrations. Competing systems require constant operator input to adjust to changing conditions.

RSI developed the Phoenix engine controller to handle virtually any change in site conditions, from a slug of free product to a temporary loss of supplemental fuel. It maximizes vapor flow from the extraction wells and minimizes alternate fuel consumption simultaneously.

The electronic controller senses any deviation from the stoichiometric air-to-fuel (A/F) ratio to optimize contaminant destruction and meet stringent air emissions standards. With the ability to optimize system operation to meet Air Quality Control standards, the patented computerized control system is cutting edge technology.



The Project Manager

The optional "Project Manager" software module allows for control of the "Smart Valve Manifold System". This unique system optimizes BTUs extracted from the contamination source by purposely rotating from well to well and determining the most efficient combination of wells to extract from. This will reduce energy cost from alternate fuel and increase Contaminant removal rates. The system can be manually overridden for operator control, both on and off site.

Patents Pending

