Formulas for VOC Abatement

Temperature Rise Across Catalyst From Exothermic Oxidation of VOCs

$$\text{Temperature Rise } ^\circ\text{F} = \frac{(\text{VOC in lbs / hr}) \times (\text{heat of combustion for VOC / lb})}{(1.2) \times (\text{airflow in scf / min})}$$

Maximum VOC Load for an Oxidizer

$$\text{VOC in lbs / hr} = \frac{(\text{allowable temp rise, } ^\circ\text{F}) \times (1.2) \times (\text{airflow in scf / min})}{(\text{heat of combustion for VOC / lb})}$$

Concentration of VOCs in Air Stream (given lbs / hr flow of VOCs)

$$\text{ppmv} = \frac{(\text{VOC in lbs / hr}) \times (387 \text{ scf / mole}) \times 1{,}000{,}000}{(\text{airflow in scf / min}) \times (\text{molecular wt. VOC in lbs / mole}) \times (60 \text{ min / hour})}$$

Contact Information

Intellishare Environmental, Inc.
E4803 395th Avenue
Menomonie, WI 54751
www.intellishare-env.com

Phone: 715-233-6115
Fax: 715-232-0669

E-mail Us

Request Product Information

Request Service Information

Pounds Per Hour of VOCs in an Air Stream (given concentration in ppmv)

$$\text{Lbs / hr} = \frac{\text{(concentration in ppmv)}}{\text{(1,000,000)}} \times \text{airflow in scf / min} \times \frac{\text{(molecular wt in lbs / mole)}}{\text{(387 scf / mole)}} \times 60 \text{ min / hr}$$

Calculate % of LEL (given concentration in ppmv)

$$\%\ \text{LEL} = \frac{\text{(concentration in ppmv)}}{\text{(VOC LEL \%)} \times 100}$$

Note: LEL must be entered into the formula as a whole percentage. For example, if LEL = 2.3%, enter the value of 2.3.

Energy Released by Oxidation (assumes 100% reaction)

Btu = (VOC in lbs) X (heat of combustion for VOC / hr)

Energy Required to Heat an Air Stream

Btu / hr = (airflow in scf / min) X (1.2) X (temp rise required in °F)