

Calculation of Hydrocarbon Loading Rate

Formula:

$$\dot{m} = Q \times C \times CF$$

Where:

\dot{m} = Contaminant Loading Rate (lbs/hr)

Q = Air Flow Rate (CFM)

C = Contaminant Concentration (mg/m³)

$$CF = \text{Conversion Factor} = 0.000003743 = \frac{1 \text{ m}^3}{35.31 \text{ ft}^3} \times \frac{1 \text{ lb}}{454 \times 10^3 \text{ mg}} \times \frac{60 \text{ min}}{1 \text{ hr}}$$

Since all field measurements are in PPM_v, the following formula is used to convert to mg/m³.

$$C = \frac{\text{PPM}_v}{R} \times \frac{1,000 \text{ L}}{1 \text{ m}^3}$$

Where:

R = TVA Response Ratio*

*According to the manufacture's documentation, *The Foxboro Monitor, Volume 3, Issue 1A, Page 5, Response Ratio of Fuel Samples*, the Foxboro TVA-1000 has a response ratio of approximately $\frac{600 \text{ PPM}_v}{1 \text{ mg/L}}$ for Gasoline, $\frac{200 \text{ PPM}_v}{1 \text{ mg/L}}$ for Diesel Fuel.

Example:

Q = Air Flow Rate = 200 CFM

C = TVA-1000 Reading = 20,400 PPM_v

R = Response Ratio for Gasoline = 600

Results:

$$25.45 \text{ lbs/hr} = 200 \times \left(\frac{20,400}{600} \times 1,000 \right) \times 0.000003743$$

\dot{m} Q C R CF

Note:

To convert *lbs* to equivalent gallons, the following formula is used:
 Specific Gravity (Gasoline = 0.74, Diesel = 0.84) x Conversion Factor (8.333) = *lbs/gal*.
 (Gasoline = 6.16 *lbs/gal*. Diesel = 6.99 *lbs/gal*.)

Fruits & Associates, Inc. 500 North Point Pkwy, Suite A Acworth, GA 30102	High-Vac Remediation (HVR) Concentration Calculations
<i>Scale:</i> Not to scale	
<i>Date:</i> February 25th, 2003	<i>Title:</i> Concentration Calculations
<i>Drawing By:</i> John M. Fruits	<i>Checked By:</i> John M. Fruits
	<i>Figure #:</i> 3