

Form X

DATA FORM FOR THE CALCULATION OF THE HENRY'S LAW CONSTANT FOR A COMPOUND IN A SEALED BATCH TEST

NAME OF THE FACILITY for site specific biorate determination		example
COMPOUND for site specific biorate determination		<i>methanol</i>
REACTOR HEADSPACE VOLUME, (L)	1	1
REACTOR LIQUID VOLUME (L)	2	10
TEMPERATURE of the liquid in the unit (deg.C)	3	25

Wastewater compounds are biodegraded by biomass in a sealed batch test. For the compound listed above, a data set of liquid and gas concentrations is measured at four different times during the sealed batch test. The data are entered below, and the ratio of the concentrations for each data set is entered in column E.

A	B	C	D	E	
Data set	Time (hr)	Liquid Conc. (mg/L)	Gas Conc. (mg/L)	K_{eq} D/C	.0002108
1					
2					
3					
4					

Temperature in degrees Kelvin. Add 273.16 to the number on line 3. Enter the results here	4	298.16
Molar ratio. Multiply the number on line 4 by 4.555. Enter the results on line 5.	5	1,358.12
Henry's law value (mg/L gas per mg/L liquid). Enter the average value in column E above on line 6.	6	0.000211
Henry's law value (mole fraction gas per mole fraction liquid) Multiply the number on line 6 by the number on line 5. Enter the results on line 7.	7	0.286563
Expected Henry's law value. Enter the number from Form IX line 3.	8	0.288500

Precision: Discuss any variability of the numbers in column E.

Accuracy: Discuss any difference between the numbers on line 7 and line 8. Identify which value will be used for evaluating the biodegradation rate data. Divide the Henry's law value by the number on line 5 and enter the results on line 9.

K _{eq} value (mg/L gas per mg/L liquid)	9	0.000211
HEADSPACE CORRECTION FACTOR. Divide the number on line 2 by the sum of the number on line 2 and the product of the numbers on line 9 and line 1. Enter the result on line 10.	10	0.999979

The headspace correction factor should equal approximately 1 if the headspace is relatively small. Reducing the headspace volume may improve the test data quality if the headspace correction factor is substantially less than one.