

## Introduction

Senovol Corporation's PIDs are designed for the detection of a wide variety of volatile organic compounds (VOCs). Generally, when measuring VOCs, a substitute gas is used as the calibration gas. In our PID, the standard surrogate gas is isobutylene (IBE). This document will list the correction factors for a wide variety of VOCs using IBE as the single calibration gas.

## Correction Factor Calculation

The correction factor to measure another compound when using IBE as the standard calibration gas is:

$$\text{True Concentration} = \text{Reading} \times \text{CF}$$

## Mixture Correction Factor

For unknown VOC mixtures, the correction factor is calculated as:

$$\text{CF}_{\text{mix}} = 1 / (\text{X}_1/\text{CF}_1 + \text{X}_2/\text{CF}_2 + \text{X}_3/\text{CF}_3 + \dots \text{X}_i/\text{CF}_i)$$

Where  $\text{X}_n$  and  $\text{CF}_n$  are the mole fraction and correction factor for component  $n$ , respectively (In the case of a paint solvent the mole fractions can be obtained from the MSDS). However, if the mixture is variable over time, then it is again not possible to calculate an accurate CF or concentration.

## Correction Factors for Measuring Various Compounds by PID

| Compound Name             | Formula                                      | CAS Number | CF at 10.6 eV | CF at 9.8 eV | IE, eV |
|---------------------------|----------------------------------------------|------------|---------------|--------------|--------|
| Acetaldehyde              | C <sub>2</sub> H <sub>4</sub> O              | 75-07-0    | 6.0           |              | 10.23  |
| Acetic acid Ethanoic Acid | C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> | 64-19-7    | 22            |              | 10.00  |
| Acetic anhydride          | C <sub>4</sub> H <sub>6</sub> O <sub>3</sub> | 108-24-7   | 6.00          |              | 10.14  |
| Acetone                   | C <sub>3</sub> H <sub>6</sub> O              | 67-64-1    | 1.10          | 1.30         | 9.71   |
| Acrolein                  | C <sub>3</sub> H <sub>4</sub> O              | 107-02-8   | 3.90          |              | 10.10  |
| Acrylic acid              | C <sub>3</sub> H <sub>4</sub> O <sub>2</sub> | 79-10-7    | 12.00         |              | 10.60  |
| Allyl alcohol             | C <sub>3</sub> H <sub>6</sub> O              | 107-18-6   | 2.40          | 4.50         | 9.67   |
| Allyl chloride            | C <sub>3</sub> H <sub>5</sub> Cl             | 107-05-1   | 4.30          |              | 9.90   |
| Aniline                   | C <sub>6</sub> H <sub>7</sub> N              | 62-53-3    | 0.48          | 0.50         | 7.72   |
| Anisole                   | C <sub>7</sub> H <sub>8</sub> O              | 100-66-3   | 0.58          | 0.70         | 8.21   |
| Arsine                    | AsH <sub>3</sub>                             | 7784-42-1  | 2.00          |              | 9.89   |

|                             |         |           |       |      |       |
|-----------------------------|---------|-----------|-------|------|-------|
| Ammonia                     |         | 7664-41-7 | 5.8   |      | 10.16 |
| Benzaldehyde                | C7H6O   | 100-52-7  | 0.70  | 0.90 | 9.49  |
| Benzene                     | C6H6    | 71-43-2   | 0.50  | 0.55 | 9.25  |
| Benzonitrile                | C7H5N   | 100-47-0  | 1.60  | 1.80 | 9.62  |
| Benzyl alcohol              | C7H8O   | 100-51-6  | 1.10  | 1.40 | 8.26  |
| Benzyl chloride             | C7H7Cl  | 100-44-7  | 0.60  | 0.75 | 9.14  |
| Bromine                     | Br2     | 7726-95-6 | 1.30  |      | 10.51 |
| Bromobenzene                | C6H5Br  | 108-86-1  | 0.60  | 0.70 | 8.98  |
| Bromine                     | CH3Br   | 75-25-2   | 2.60  |      | 10.48 |
| Bromopropane, 1-            | C3H7Br  | 106-94-5  | 1.50  |      | 10.18 |
| Butadiene                   | C4H6    | 106-99-0  | 0.60  | 0.80 | 9.07  |
| Butane                      | C4H10   | 106-97-8  | 60.00 |      | 10.53 |
| Butanol, 1-                 | C4H10O  | 71-36-3   | 4.70  |      | 9.99  |
| Butanol, t-                 | C4H10O  | 75-65-0   | 2.90  |      | 9.90  |
| Butoxyethanol, 2-           | C6H14O2 | 111-76-2  | 1.20  |      | 10.00 |
| Butoxyethyl Acetate, 2-     | C8H16O3 | 112-07-2  | 1.30  | 4.00 | 9.80  |
| Butyl acetate, n-           | C6H12O2 | 123-86-4  | 2.60  |      | 10.00 |
| Butyl acrylate, n-          | C7H12O2 | 141-32-2  | 1.60  | 8.00 | 9.60  |
| Butylamine, n-              | C4H11N  | 109-73-9  | 1.10  | 1.20 | 8.71  |
| Butyl mercaptan             | C4H10S  | 109-79-5  | 0.50  | 0.55 | 9.14  |
| Butyraldehyde               | C4H8O   | 123-72-8  | 1.80  |      | 9.82  |
| Carbon disulfide            | CS2     | 75-15-0   | 1.20  |      | 10.07 |
| Chlorobenzene               | C6H5Cl  | 108-90-7  | 0.50  | 0.40 | 9.06  |
| Chloro-1,3-butadiene, 2-    | C4H5Cl  | 126-99-8  | 2.00  | 1.50 | 8.79  |
| Chloroethyl methyl ether 2- | C3H7ClO | 627-42-9  | 3.00  |      | 10.25 |
| Chlorotoluene, o-           | C7H7Cl  | 95-49-8   | 0.50  | 0.60 | 8.83  |
| Cresol, m-                  | C7H8O   | 108-39-4  | 0.50  | 0.55 | 8.29  |
| Cresol, o                   | C7H8O   | 95-48-7   | 1.10  | 1.25 | 8.14  |
| Cresol, p                   | C7H8O   | 106-44-5  | 1.20  | 1.40 | 8.34  |
| Cumene                      | C9H12   | 98-82-8   | 0.55  | 0.60 | 8.73  |
| Cyclohexane                 | C6H12   | 110-82-7  | 1.40  |      | 9.86  |
| Cyclohexanol                | C6H12O  | 108-93-0  | 0.92  | 1.40 | 9.75  |
| Cyclohexanone               | C6H10O  | 108-94-1  | 0.90  | 1.00 | 9.14  |

|                              |           |            |       |      |       |
|------------------------------|-----------|------------|-------|------|-------|
| Cyclohexene                  | C6H10     | 110-83-8   | 0.80  | 0.95 | 8.95  |
| Cyclohexylamine              | C6H13N    | 108-91-8   | 1.20  | 1.40 | 8.62  |
| Decane                       | C10H22    | 124-18-5   | 1.40  | 3.50 | 9.65  |
| Diacetone alcohol            | C6H12O2   | 123-42-2   | 0.80  | 0.95 | 9.60  |
| Dibromo-3- chloropropane 1-2 | C3H5Br2Cl | 96-12-8    | 1.70  |      |       |
| Dibromoethane, 1,2-          | C2H4Br2   | 106-93-4   | 1.70  |      | 10.37 |
| Dichlorobenzene, o-          | C6H4Cl2   | 95-50-1    | 0.60  | 0.50 | 9.08  |
| Dichloroethene, 1,1-         | C2H2Cl2   | 75-35-4    | 0.90  | 1.20 | 9.79  |
| Dichloroethene, c-1,2-       | C2H2Cl2   | 156-59-2   | 0.80  | 0.95 | 9.66  |
| Dichloroethene, t-1,2-       | C2H2Cl2   | 156-60-5   | 0.45  | 0.55 | 9.65  |
| Dichloro-1-propene, 2,3-     | C3H4Cl2   | 78-88-6    | 1.30  |      | 10.00 |
| Dicyclopentadiene            | C10H12    | 77-73-6    | 0.48  | 0.56 | 8.80  |
| Diesel Fuel                  | m.w. 226  | 68334-30-5 | 0.80  |      |       |
| Diesel Fuel #2               | m.w. 216  | 68334-30-5 | 0.70  | 1.30 |       |
| Diethylamine                 | C4H11N    | 109-89-7   | 1.00  | 1.10 | 8.01  |
| Diethylaminopropylamine, 3-  | C7H18N2   | 104-78-9   | 2.50  | 3.00 | 9.00  |
| Diethyl ether                | C4H10O    | 60-29-7    | 1.20  | 1.50 | 9.51  |
| Diketene                     | C4H4O2    | 674-82-8   | 2.00  | 2.00 | 9.60  |
| Dimethylamine                | C2H7N     | 124-40-3   | 1.50  | 1.80 | 8.23  |
| Dimethyl disulfide           | C2H6S2    | 624-92-0   | 0.20  | 0.20 | 7.40  |
| Dimethylformamide, N,N       | C3H7NO    | 68-12-2    | 0.80  | 0.80 | 9.13  |
| Dimethylhydrazine, 1,1-      | C2H8N2    | 57-14-7    | 0.80  | 0.82 | 7.28  |
| Dioxane, 1,4-                | C4H8O2    | 123-91-1   | 1.30  | 1.40 | 9.19  |
| Epichlorohydrin              | C2H5ClO   | 106-89-8   | 8.50  |      | 10.20 |
| Ethanol                      | C2H6O     | 64-17-5    | 10.00 |      | 10.47 |
| Ethene                       | C2H4      | 74-85-1    | 9.00  |      | 11.52 |
| Ethyl acetate                | C4H8O2    | 141-78-6   | 4.50  |      | 10.01 |
| Ethylbenzene                 | C8H10     | 100-41-4   | 0.60  | 0.50 | 8.77  |
| Ethylene glycol              | C2H6O2    | 107-21-1   | 16.00 |      | 10.16 |
| Ethylene oxide               | C2H4O     | 75-21-8    | 13.00 |      | 10.57 |
| Ethyl ether                  | C4H10O    | 60-29-7    | 1.10  | 1.25 | 9.51  |
| Ethyl mercaptan              | C2H6S     | 75-08-1    | 0.56  | 0.60 | 9.25  |
| Gasoline #1                  | m.w. 72   | 8006-61-9  | 0.90  |      | 9.90  |
| Glutaraldehyde               | C5H8O2    | 111-30-8   | 0.80  | 1.10 | 9.60  |

|                          |          |                           |        |      |       |
|--------------------------|----------|---------------------------|--------|------|-------|
| Heptane, n-              | C7H16    | 142-82-5                  | 2.60   |      | 9.92  |
| Hexane, n-               | C6H14    | 110-54-3                  | 4.30   |      | 10.13 |
| Hexanol, 1-              | C6H14O   | 111-27-3                  | 2.50   |      | 9.89  |
| Hydrazine                | H4N2     | 302-01-2                  | 2.60   | 3.50 | 8.10  |
| Hydrogen iodide          | HI       | 10034-85-2                | 0.60   |      | 10.39 |
| Hydrogen sulfide         | H2S      | 7783-06-4                 | 3.30   |      | 10.45 |
| Iodine                   | I2       | 7553-56-2                 | 0.10   | 0.10 | 9.40  |
| Iodomethane              | CH3I     | 74-88-4                   | 0.22   | 0.20 | 9.54  |
| Isobutane                | C4H10    | 75-28-5                   | 100.00 |      | 10.57 |
| Isobutanol               | C4H10O   | 78-83-1                   | 3.80   |      | 10.02 |
| Isobutane                | C4H8     | 115-11-7                  | 1.00   | 1.00 | 9.24  |
| Isobutyl acrylate        | C7H12O2  | 106-63-8                  | 1.50   | 4.00 | 9.50  |
| Isoprene                 | C5H8     | 78-79-5                   | 0.65   | 0.70 | 8.85  |
| Isopropanol              | C3H8O    | 67-63-0                   | 5.00   |      | 10.12 |
| Isopropyl acetate        | C5H10O2  | 108-21-4                  | 2.50   |      | 9.99  |
| Isopropyl ether          | C6H14O   | 108-20-3                  | 0.80   | 0.95 | 9.20  |
| Jet fuel JP-4            | m.w. 115 | 8008-20-6 +<br>64741-42-0 | 1.00   | 0.90 | 9.00  |
| Jet fuel JP-5            | m.w. 167 | 8008-20-6 +<br>64747-77-1 | 0.60   | 0.60 | 9.00  |
| Jet fuel JP-8            | m.w. 165 | 8008-20-6 +<br>64741-77-1 | 0.70   | 0.70 | 9.00  |
| Limonene, D-             | C10H16   | 5989-27-5                 | 0.33   | 0.35 | 8.20  |
| Mesitylene               | C9H12    | 108-67-8                  | 0.35   | 0.35 | 8.41  |
| Methoxyethanol, 2-       | C3H8O2   | 109-86-4                  | 2.40   |      | 10.10 |
| Methoxyethoxyethanol, 2- | C5H12O3  | 111-77-3                  | 1.20   |      | 10.00 |
| Methyl acetate           | C3H6O2   | 79-20-9                   | 6.60   |      | 10.27 |
| Methyl acrylate          | C4H6O2   | 96-33-3                   | 3.70   |      | 9.90  |
| Methylamine              | CH5N     | 74-89-5                   | 1.20   | 1.40 | 8.97  |
| Methyl bromide           | CH3Br    | 74-83-9                   | 1.70   |      | 10.54 |
| Methyl t-butyl ether     | C5H12O   | 1634-04-4                 | 0.90   | 1.00 | 9.24  |
| Methylcyclohexane        | C7H14    | 107-87-2                  | 0.98   | 1.40 | 9.64  |
| Methyl ether             | C2H6O    | 115-10-6                  | 3.10   |      | 10.03 |
| Methyl ethyl ketone      | C4H8O    | 78-93-3                   | 0.95   | 0.85 | 9.51  |

|                           |           |                                       |       |       |       |
|---------------------------|-----------|---------------------------------------|-------|-------|-------|
| Methylhydrazine           | C2H6N2    | 60-34-4                               | 1.20  | 1.40  | 7.70  |
| Methyl isobutyl ketone    | C6H12O    | 108-10-1                              | 0.90  | 1.00  | 9.30  |
| Methyl isocyanate         | C2H3NO    | 624-83-9                              | 4.60  |       | 10.67 |
| Methyl isothiocyanate     | C2H3NS    | 551-61-6                              | 0.45  | 0.50  | 9.25  |
| Methyl mercaptan          | CH4 S     | 74-93-1                               | 0.60  | 0.70  | 9.44  |
| Methyl methacrylate       | C5H8O2    | 80-62-6                               | 1.40  | 2.50  | 9.70  |
| Methyl sulfide            | C2H6S     | 75-18-3                               | 0.44  | 0.50  | 8.69  |
| Mineral spirits           | m.w. 144  | 8020-83-5,<br>8052-41-3<br>68551-17-7 | 0.70  | 1.00  |       |
| Naphthalene               | C10H8     | 91-20-3                               | 0.42  | 0.45  | 8.13  |
| Nitric oxide              | NO        | 10102-43-9                            | 5.20  | 6.00  | 9.26  |
| Nitrogen dioxide          | NO2       | 10102-44-0                            | 15.00 | 22.00 | 9.75  |
| Octane, n-                | C8H18     | 111-65-9                              | 1.80  |       | 9.82  |
| Pentane                   | C5H12     | 109-66-0                              | 8.40  |       | 10.35 |
| Perchloroethene           | C2Cl4     | 127-18-4                              | 0.55  | 0.70  | 9.32  |
| PGME                      | C6H12O3   | 107-98-2                              | 1.50  | 2.50  |       |
| PGMEA                     | C6H12O3   | 108-65-6                              | 1.00  | 1.65  |       |
| Phenol                    | C6H6O     | 108-95-2                              | 1.00  | 1.00  | 8.51  |
| Phosphine                 | PH3       | 7803-51-2                             | 3.90  |       | 9.87  |
| Picoline                  | C6H7N     | 108-99-6                              | 0.85  |       | 9.04  |
| Pinene, α-                | C10H16    | 2437-95-8                             | 0.32  | 0.35  | 8.07  |
| Pinene, β-                | C10H16    | 18172-67-3                            | 0.40  | 0.42  | 8.00  |
| Piperylene, isomer mix    | C5H8      | 504-60-9                              | 0.70  | 0.75  | 8.60  |
| Propanol, n-              | C3H8O     | 71-23-8                               | 5.50  |       | 10.22 |
| Propene                   | C3H6      | 115-07-1                              | 1.40  | 1.50  | 9.73  |
| Propylene oxide           | C3H6O     | 75-56-9                               | 6.50  |       | 10.22 |
| Pyridine                  | C5H5N     | 110-86-1                              | 0.70  | 0.80  | 9.25  |
| Styrene                   | C8H8      | 100-42-5                              | 0.42  | 0.45  | 8.43  |
| Tetrahydrofuran           | C4H8O     | 109-99-9                              | 1.70  | 1.90  | 9.41  |
| Tetramethyl orthosilicate | C4H12O4Si | 681-84-5                              | 2.00  |       | 10.00 |
| Toluene                   | C7H8      | 108-88-3                              | 0.50  | 0.55  | 8.82  |
| Tolylene-2,4-diisocyanate | C9H6N2O2  | 584-84-9                              | 1.40  | 1.40  | 8.82  |
| Trichloroethene           | C2HCl3    | 79-01-6                               | 0.55  | 0.60  | 9.47  |
| Triethylamine             | C6H15N    | 121-44-8                              | 1.00  | 1.10  | 7.30  |

|            |                                 |           |      |      |      |
|------------|---------------------------------|-----------|------|------|------|
| Turpentine | C <sub>10</sub> H <sub>16</sub> | 8006-64-2 | 0.40 | 0.35 | 8.00 |
| Xylene,m-  | C <sub>8</sub> H <sub>10</sub>  | 108-38-3  | 0.45 | 0.52 | 8.56 |
| Xylene,o-  | C <sub>8</sub> H <sub>10</sub>  | 95-47-6   | 0.52 | 0.59 | 8.56 |
| Xylene,p-  | C <sub>8</sub> H <sub>10</sub>  | 106-42-3  | 0.45 | 0.55 | 8.44 |