# VOC Correction Factor gas Listing (10.6eV)

Application Note: G645 14/A

The WATCHGAS PID Low/High range sensors are calibrated using isobutylene, but the PID is a broadband VOC detector, with a sensitivity that differs for each VOC. If you know what VOC you are measuring, then the table below will allow you to calculate the concentration for your specific VOC. Remember, these are approximate values, so for best accuracy you should calibrate with the relevant VOC.

The table includes six columns:

1. **Gas/VOC** The most common name for the VOC
2. **CAS No.** You can find the VOC using the CAS No.: ask your supplier.
3. **Formula** To assist in identifying the VOC
4. **Relative Response/ Correction Factor (CF)** also called the Response Factor (RF). Multiply the displayed concentration by the Relative Response/ CF/ RF to calculate the actual concentration of the VOC.
5. **Relative Sensitivity (%)** This is the inverse of the correction factor, specifying the percent response of the VOC, relative to isobutylene. If less than 100%, then the VOC is less responsive than isobutylene; if the relative sensitivity is greater than 100%, then the VOC is more responsive than isobutylene. Relative sensitivity (%) is specified the same way as cross-sensitivity for toxic gas sensors.
6. **Minimum Detection Level (MDL)** Also called Minimum Detectable Quantity (MDQ). Typical lowest concentration than can be detected. The PID-AH (low range) has greater sensitivity than the PID-$A_1$ (high range), so the MDL for the PID-AH will be much less than the MDL for the PID-$A_1$.

The Relative response/ CF/ RF is measured in dry air; high humidity will reduce this factor by 30% to 50%. So the CF/ RF should be increased in high humidity.

## VOC RESPONSE

The PID cannot measure all VOCs or gases. Two types of VOCs are not measured:

**ZR:** No response. The 10.6 eV lamp does not ionise the VOC and the VOC cannot be measured.

**NV:** The Vapour pressure of the VOC at 20°C is less than a few ppm, so this Semi-Volatile Organic Compound (SVOC) cannot be measured.

Occasionally, you will be measuring a mixture of VOCs. If the total concentration is within the linear range of your PID, then it is reasonable to assume that the concentrations are additive without interference between the different VOCs. Remember that if you are measuring a combination of VOCs, then accurate measurement of one of these VOCs will be difficult; without careful data analysis, you will get only a CF averaged measurement. Be cautious when reporting actual VOC concentration if you know that there may be several VOCs present.

## BALANCE GAS

The relative response is measured in laboratory air, with 20.9% oxygen, balance nitrogen. Some gases absorb UV light without causing any PID response (e.g. methane, ethane). In ambient atmospheres where these gases are present, the measured concentration of target gas will be less than is actually present. Methane absorbs UV strongly, so for accurate measurements in methane containing atmospheres, calibrate with a calibration gas containing the expected methane concentration. 50% LEL methane reduces the reading by up to 50%. Gases such as nitrogen and helium do not absorb UV and do not affect the relative response.

The correction factor for a gas mix containing PID detectable gases A, B, C... with response factors RF(A), RF(B), RF(C), in relative proportions a: b: c... is given by:

$$CF(mix) = 1/[a/CF(A)+b/CF(B)+c/CF(C)...]$$

## ACCURACY OF THE TABLE

*This table is for indication only. Table accuracy is 1 to 2 digits only, so when calculating concentration for a specific VOC, specify to 1 or 2 digits only.*





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| Gas/VOC | Formula | Relative response | Relative sensitivity (%) | Typical MDL PID- AH (ppb) (Low Range) | Typical MDL PID-A1 (ppb) (High Range) |
|---|---|---|---|---|---|
| Acetaldehyde | $C_2H_4O$ | 4.9 | 21 | 25 | 480 |
| Acetic acid | $C_2H_4O_2$ | 36.2 | 3 | 180 | 3615 |
| Acetic anhydride | $C_4H_6O_3$ | 4.0 | 25 | 20 | 400 |
| Acetone | $C_3H_6O$ | 0.7 | 140 | 5 | 70 |
| Acetonitrile | $CH_3CN$ | | | | |
| Acetylene | $C_2H_2$ | | | | |
| Acrolein | $C_3H_4O$ | 4.0 | 25 | 20 | 400 |
| Acrylic acid | $C_3H_4O_2$ | 2.7 | 36 | 15 | 275 |
| Acrylonitrile | $C_3H_3N$ | | | | |
| Allyl alcohol | $C_3H_6O$ | 2.1 | 48 | 10 | 200 |
| Allyl chloride | $C_3H_5Cl$ | 4.5 | 22 | 20 | 450 |
| Ammonia | $H_3N$ | 8.5 | 12 | 40 | 850 |
| Amyl Acetate, n- | $C_7H_{14}O_2$ | 1.8 | 56 | 10 | 180 |
| Amyl alcohol | $C_5H_{12}O$ | 3.2 | 31 | 15 | 320 |
| Aniline | $C_6H_7N$ | 0.5 | 200 | 3 | 50 |
| Anisole | $C_7H_8O$ | 0.5 | 211 | 2 | 50 |
| Arsine | $AsH_3$ | 2.5 | 40 | 15 | 250 |
| Asphalt, petroleum fumes | | 1.0 | 100 | 5 | 100 |
| Benzaldehyde | $C_7H_6O$ | 0.9 | 117 | 5 | 85 |
| Benzene | $C_6H_6$ | 0.5 | 200 | 3 | 50 |
| Benzenethiol | $C_6H_5SH$ | 0.7 | 143 | 4 | 70 |
| Benzonitrile | $C_7H_5N$ | 0.7 | 141 | 4 | 70 |
| Benzyl alcohol | $C_7H_8O$ | 1.3 | 80 | 6 | 125 |
| Benzyl chloride | $C_7H_7Cl$ | 0.6 | 182 | 3 | 55 |
| Benzyl formate | $C_8H_8O_2$ | 0.8 | 130 | 5 | 77 |
| Biphenyl | $C_{12}H_{10}$ | 0.4 | 250 | 2 | 40 |
| Bis (2,3-epoxypropyl) ether | $C_6H_{10}O_3$ | 3.0 | 33 | 15 | 300 |
| Boron trifluoride | $BF_3$ | | | | |
| Bromine | $Br_2$ | 20.0 | 5 | 100 | 2000 |
| Bromine pentafluoride | $BrF_5$ | | | | |
| Bromobenzene | $C_6H_5Br$ | 0.7 | 143 | 4 | 70 |




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| Gas/VOC | Formula | Relative response | Relative sensitivity (%) | Typical MDL PID- AH (ppb) (Low Range) | Typical MDL PID-A1 (ppb) (High Range) |
|---|---|---|---|---|---|
| Bromoethane | $C_2H_5Br$ | 5.0 | 20 | 25 | 500 |
| Bromoethyl methyl ether, 2- | $C_3H_7OBr$ | 2.5 | 40 | 15 | 250 |
| Bromoform | $CHBr_3$ | 2.8 | 36 | 15 | 280 |
| Bromopropane, 1- | $C_3H_7Br$ | 1.3 | 77 | 7 | 130 |
| Bromotrifluoromethane | $CF_3Br$ | | | | |
| Butadiene | $C_4H_6$ | 0.8 | 120 | 4 | 80 |
| Butadiene diepoxide, 1, 3- | $C_4H_6O_2$ | 4.0 | 25 | 20 | 400 |
| Butane, n- | $CFH_{10}$ | 46.3 | 2 | 230 | 4600 |
| Butanol, 1- | $C_4H_{10}O$ | 4.0 | 25 | 20 | 400 |
| Buten-3-ol, 1- | $C_4H_8O$ | 1.2 | 87 | 6 | 115 |
| Butene, 1- | $C_4H_8$ | 1.3 | 77 | 7 | 130 |
| Butoxyethanol, 2- | $C_6H_{14}O_2$ | 1.1 | 91 | 6 | 110 |
| Butyl Acetate, n- | $C_6H_{12}O_2$ | 2.4 | 41 | 10 | 240 |
| Butyl Acrylate, n- | $C_7H_{12}O_2$ | 1.5 | 67 | 8 | 150 |
| Butyl lactate | $C_7H_{14}O_3$ | 2.5 | 40 | 15 | 250 |
| Butyl mercaptan | $C_4H_{10}S$ | 0.5 | 185 | 3 | 50 |
| Butylamine, 2- | $C_4H_{11}N$ | 0.9 | 111 | 5 | 90 |
| Butylamine, n- | $C_4H_{11}N$ | 1.0 | 100 | 5 | 100 |
| Camphene | $C_{10}H_{16}$ | 0.5 | 222 | 2 | 45 |
| Carbon dioxide | $CO_2$ | | | | |
| Carbon disulphide | $CS_2$ | 1.4 | 71 | 7 | 140 |
| Carbon monoxide | CO | | | | |
| Carbon tetrabromide | $CBr_4$ | 3.0 | 33 | 15 | 300 |
| Carbon tetrachloride | $CC_{l}4$ | | | | |
| Carbonyl sulphide | COS | | | | |
| Carvone, R- | $C_{10}H_{14}O$ | 1.0 | 100 | 5 | 100 |
| Chlorine | $Cl_2$ | | | | |
| Chlorine dioxide | $ClO_2$ | 1.0 | 100 | 5 | 100 |
| Chlorine trifluoride | $ClF_3$ | | | | |
| Chloro-1, 1, 1, 2,- tetrafluo-roethane | $C_2HClF_4$ | | | | |
| Chloro-1, 1, 1- | | | | | |
| trifluoroethane, 2- | $C_2H_2ClF_3$ | | | | |





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|---|---|---|---|---|---|
| Chloro-1, 1, 2, 2- tetrafluoroethane | $C_2HClF_4$ | | | | |
| Chloro-1, 1, 2- | | | | | |
| trifluoroethane, 1- | $C_2H_2ClF_3$ | | | | |
| Chloro-1, 1-difluoroethane, 1- | $C_2H_3ClF_2$ | | | | |
| Chloro-1, 1-difluoroethane, 1- | $C_2H_3ClF_2$ | | | | |
| Chloro1, 1-difluoroethane, 2- | $C_2H_3ClF_2$ | | | | |
| Chloro-1, 2, 2- trifluoroethane | $C_2H_2ClF_3$ | | | | |
| Chloro-1, 3-butadiene, 2- | $C_4H_5Cl$ | 3.2 | 30 | 16 | 320 |
| Chloro-1-fluroethane, 1- | $C_2H_4ClF$ | | | | |
| Chloro-2-fluroethane, 1- | $C_2H_4ClF$ | | | | |
| Chloroacetaldehyde | $C_2H_3OCl$ | | | | |
| Chlorobenzene | $C_6H_5Cl$ | 0.5 | 220 | 2 | 50 |
| Chlorodifluoromethane | $CHClF_2$ | | | | |
| Chloroethane | $C_2H_5Cl$ | | | | |
| Chloroethanol 2- | $C_2H_5ClO$ | 10.0 | 10 | 50 | 1000 |
| Chloroethyl methyl ether, 2- | $C_3H_7ClO$ | 2.6 | 40 | 13 | 250 |
| Chlorofluoromethane | $CH_2ClF$ | | | | |
| Chloroform | $CHCl_3$ | | | | |
| Chloromethane | $CH_3Cl$ | | | | |
| Chloropentafluoroethane | $C_2ClF_5$ | | | | |
| Chlorotoluene, o- | $C_7H_7Cl$ | 0.5 | 220 | 2 | 50 |
| Chlorotoluene, p- | $C_7H_7Cl$ | 0.5 | 200 | 3 | 50 |
| Chlorotrifluoroethylene | $C_2ClF_3$ | 1.0 | 100 | 5 | 100 |
| Chlorotrifluoromethane | $CClF_3$ | | | | |
| Citral | $C_{10}H_{16}O$ | 1.0 | 100 | 5 | 100 |
| Citronellol | $C_{10}H_{20}O$ | 1.0 | 100 | 5 | 100 |
| Cresol, m- | $C_7H_8O$ | 1.1 | 95 | 5 | 105 |
| Cresol, o- | $C_7H_8O$ | 1.1 | 95 | 5 | 105 |
| Cresol, p- | $C_7H_8O$ | 1.1 | 95 | 5 | 105 |
| Crotonaldehyde | $C_4H_6O$ | 1.0 | 100 | 5 | 100 |
| Cumene | $C_9H_{12}$ | 0.6 | 170 | 3 | 60 |
| Cyanamide | $CH_2N_2$ | | | | |





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|---|---|---|---|---|---|
| Cyanogen bromide | CNBr | | | | |
| Cyanogen chloride | CNCl | | | | |
| Cyclohexane | $C_6H_{12}$ | 1.3 | 77 | 7 | 130 |
| Cyclohexanol | $C_6H_{12}O$ | 2.9 | 34 | 15 | 300 |
| Cyclohexanone | $C_6H_{10}O$ | 1.1 | 91 | 6 | 110 |
| Cyclohexene | $C_6H_{10}$ | 0.8 | 133 | 5 | 75 |
| Cyclohexylamine | $C_6H_{13}N$ | 1.0 | 102 | 5 | 100 |
| Cyclopentane | $C_5H_{10}$ | 4.0 | 25 | 20 | 400 |
| Decane, n- | $C_{10}H_{22}$ | 1.0 | 96 | 5 | 100 |
| Diacetone alcohol | $C_6H_{12}O_2$ | 0.8 | 125 | 5 | 80 |
| Dibenzoyl peroxide | $C_{14}H_{10}O_4$ | 0.8 | 125 | 5 | 80 |
| Diborane | $B_2H_6$ | | | | |
| Dibromochloromethane | $CHBr_2Cl$ | 10.0 | 10 | 50 | 1000 |
| Dibromodifluoromethane | $CF_2Br_2$ | | | | |
| Dibromoethane 1,2- | $C_2H_4Br_2$ | 2.0 | 50 | 10 | 200 |
| Dibromotetrafluoroethane, 1, 2- | $C_2F_4Br_2$ | | | | |
| Dibutyl hydrogen phosphate | $HC_8H_{18}PO_4$ | 4.0 | 25 | 20 | 400 |
| Dichloro-1,1,1- trifluoroethane, 2,2- | $C_2HCl_2F_3$ | | | | |
| Dichloro-1,1-difluoroethane, 1,2- | $C_2H_2Cl_2F_2$ | | | | |
| Dichloro-1,2,2- trifluoroethane, 1,2- | $C_2HCl_2F_3$ | | | | |
| Dichloro-1,2-difluoroethane, 1,2- | $C_2H_2Cl_2F_2$ | | | | |
| Dichloro-1-fluoroethane, 1,1- | $C_2H_3Cl_2F$ | | | | |
| Dichloro-1-fluoroethane, 1,1- | $C_2H_3Cl_2F$ | | | | |
| Dichloro-1-fluoroethane, 1,2- | $C_2H_3Cl_2F$ | | | | |
| Dichloro-1-propene, 2,3- | $C_3H_4Cl_2$ | 1.4 | 70 | 7 | 140 |
| Dichloro-2,2,-difluoroethane, 1,1- | $C_2H_2Cl_2F_2$ | | | | |
| Dichloroacetylene | $C_2Cl_2$ | 5.0 | 20 | 25 | 500 |
| Dichlorobenzene o- | $C_6H_4Cl_2$ | 0.5 | 200 | 3 | 50 |
| Dichlorodifluoromethane | $CCl_2F_2$ | | | | |
| Dichloroethane 1,2- | $C_2H_4Cl_2$ | | | | |
| Dichloroethane 1,1- | $C_2H_4Cl_2$ | | | | |




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| Gas/VOC | Formula | Relative response | Relative sensitivity (%) | Typical MDL PID- AH (ppb) (Low Range) | Typical MDL PID-A1 (ppb) (High Range) |
|---|---|---|---|---|---|
| Dichloroethane 1,1- | $C_2H_2Cl_2$ | 1.0 | 105 | 5 | 100 |
| Dichloroethane, cis-1,2- | $C_2H_2Cl_2$ | 0.8 | 125 | 4 | 80 |
| Dichloroethane, trans-1,2- | $C_2H_2Cl_2$ | 0.7 | 143 | 4 | 70 |
| Dichloroethylene 1,2- | $C_2H_2Cl_2$ | 0.8 | 133 | 4 | 75 |
| Dichlorofluoromethane | $CHFCl_2$ | | | | |
| Dichloromethane | $CH_2Cl_2$ | 39.0 | 3 | 200 | 3900 |
| Dichloropropane, 1,2- | $C_3H_6Cl_2$ | | | | |
| Dichlorotetrafluorethane, 1,1- | $C_2Cl_2F_4$ | | | | |
| Dichlorotetrafluoroethane, 1,2- | $C_2Cl_2F_4$ | | | | |
| Dicyclopentadiene | $C_{10}H_{12}$ | 0.9 | 110 | 5 | 90 |
| Diesel fuel | | 0.8 | 130 | 4 | 75 |
| Diethyl ether | $C_4H_{10}O$ | 0.9 | 110 | 4 | 90 |
| Diethyl maleate | $C_8H_{12}O_4$ | 2.0 | 50 | 10 | 200 |
| Diethyl phthalate | $C_{12}H_{14}O_4$ | 1.0 | 100 | 5 | 100 |
| Diethyl sulphate | $C_4H_{10}SO_4$ | 3.0 | 33 | 15 | 300 |
| Diethyl sulphide | $C_4H_{10}S$ | 0.6 | 180 | 3 | 50 |
| Diethylamine | $C_4H_{11}N$ | 1.0 | 100 | 5 | 100 |
| Diethylaminoethanol, 2- | $C_6H_{15}ON$ | 2.7 | 40 | 15 | 270 |
| Diethylaminopropylamine, 3- | $C_7H_{18}N_2$ | 1.0 | 100 | 5 | 100 |
| Difluoroethane, 1,1- | $C_2H_4F_2$ | | | | |
| Difluoroethane, 1,2- | $C_2H_4F_2$ | | | | |
| Difluoromethane | $CH_2F_2$ | | | | |
| Dihydrogen selenide | $H_2Se$ | 1.0 | 100 | 5 | 100 |
| Dihydroxybenzene, 1,2 | $C_6H_6O_2$ | 1.0 | 100 | 5 | 100 |
| Dihydroxybenzene, 1,3 | $C_6H_6O_2$ | 1.0 | 100 | 5 | 100 |
| Diisobutylene | $C_8H_{16}$ | 0.6 | 156 | 3 | 60 |
| Diisopropyl ether | $C_6H_{14}O$ | 0.7 | 150 | 3 | 70 |
| Diisopropylamine | $C_6H_{15}N$ | 0.7 | 140 | 4 | 70 |
| Diketene | $C_4H_4O_2$ | 2.2 | 45 | 11 | 220 |
| Dimethoxymethane | $C_3H_8O_2$ | 1.4 | 71 | 7 | 140 |
| Dimethyl cyclohexane, 1,2- | $C_8H_{16}$ | 1.1 | 95 | 5 | 105 |
| Dimethly disulphide | $C_2H_6S_2$ | 0.2 | 435 | 1 | 23 |





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|---|---|---|---|---|---|
| Dimethyl ether | $C_2H_6O$ | 1.3 | 80 | 7 | 130 |
| Dimethyl phthalate | $C_{10}H_{10}O_4$ | 1.0 | 100 | 5 | 100 |
| Dimethyl sulphate | $C_2H_6O_4S$ | | | | |
| Dimethyl sulphide | $C_2H_6S$ | 0.5 | 200 | 3 | 50 |
| Dimethylacetamide N,N- | $C_4H_9NO$ | 1.3 | 75 | 7 | 130 |
| Dimethylamine | $C_2H_7N$ | 1.4 | 70 | 7 | 140 |
| Dimethylaminoethanol | $C_4H_{11}NO$ | 1.5 | 70 | 8 | 150 |
| Dimethylaniline, NN- | $C_8H_{11}N$ | 0.6 | 167 | 3 | 60 |
| Dimethylbutyl acetate | $C_8H_{16}O_2$ | 1.6 | 60 | 8 | 160 |
| Dimethylathylamine, NN- | $C_4H_{11}N$ | 0.8 | 125 | 4 | 80 |
| Dimethylformamide | $C_3H_7NO$ | 0.9 | 110 | 5 | 90 |
| Dimethylheptan-$_4$-onem, $_{2,6}$- | $C_9H_{18}O$ | 0.8 | 125 | 4 | 80 |
| Dimethylhydrazine, 1,1- | $C_2H_{82}N$ | 1.0 | $10_0$ | 5 | 100 |
| Dinitrobenzene, m- | $C_6H_4N_2O_4$ | 3.0 | 33 | 15 | 300 |
| Dinitrobenzene, o- | $C_6H_4N_2O_4$ | | | | |
| Dinitrobenzene, p- | $C_6H_4N_2O_4$ | 5.0 | 20 | 25 | 500 |
| Dinonyl phthalate | $C_{26}H_{42}O_4$ | 1.0 | 100 | 5 | 100 |
| Dioxane 1,2- | $C_4H_8O_2$ | 1.5 | 67 | 8 | 150 |
| Dioxane 1,4- | $C_4H_8O_2$ | 1.5 | 67 | 8 | 150 |
| Dipentene | $C_{10}H_{16}$ | 0.9 | 110 | 5 | 90 |
| Diphenyl ether | $C_{12}H_{10}O$ | 0.8 | 125 | 4 | 80 |
| Disulphur decafluoride | $S_2F_{10}$ | | | | |
| Disulphur dichloride | $S_2Cl_2$ | 3.0 | 33 | 15 | 300 |
| Di-tert-butyl-p-cresol | $C_{11}H_{16}O$ | 1.0 | 100 | 5 | 100 |
| Divinylbenzene | $C_{10}H_{10}$ | 0.4 | 250 | 2 | 40 |
| Dodecanol | $C_{12}H_{26}O$ | 0.9 | 110 | 5 | 90 |
| Enflurane | $C_4H_2F_5ClO$ | | | | |
| Epichlorohydrin | $C_3H_5ClO$ | 0.8 | 15 | 40 | 800 |
| Epoxypropyl isopropyl ether, $_{2,3}$- | $C_6H_{12}O_2$ | 1.1 | 90 | 5 | 110 |
| Ethane | $C_2H_6$ | | | | |
| Ethanol | $C_2H_6O$ | 8.7 | 10 | 45 | 870 |
| Ethanolamine | $C_2H_7NO$ | 3.0 | 33 | 15 | 300 |




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|---|---|---|---|---|---|
| Ethoxy-2-propanol, 1- | $C_5H_{10}O_2$ | 2.0 | 50 | 10 | 200 |
| Ethoxyethanol, 2- | $C_4H_{10}O_2$ | 29.8 | 3 | 150 | 3000 |
| Ethoxyethyl acetate, 2- | $C_6H_{12}O_3$ | 3.0 | 33 | 15 | 300 |
| Ethyl (s)-(-)-lactate | $C_5H_{10}O_3$ | 3.0 | 33 | 15 | 300 |
| Ethyl acetate | $C_4H_8O_2$ | 3.6 | 28 | 20 | 360 |
| Ethyl acrylate | $C_5H_8O_2$ | 2.0 | 50 | 10 | 200 |
| Ethyl amine | $C_2H_{72}$ | 1.0 | 100 | 5 | 100 |
| Ethyl benzene | $C_8H_{10}$ | 0.5 | 185 | 3 | 50 |
| Ethyl butyrate | $C_6H_{12}O_2$ | 1.0 | 105 | 5 | 100 |
| Ethyl chloroformate | $C_3H_5O_2Cl$ | 80 | 1 | 400 | 8300 |
| Ethyl cyanoacrylate | $C_6H_7O_2N$ | 1.5 | 67 | 8 | 150 |
| Ethyl decanoate | $C_{12}H_{24}O_2$ | 1.8 | 56 | 10 | 180 |
| Ethyl formate | $C_3H_6O_2$ | 30 | 3 | 150 | 3000 |
| Ethyl hexanoate | $C_8H_{16}O_2$ | 2.6 | 38 | 15 | 260 |
| Ethyl hexanol, 2- | $C_8H_{18}O$ | 1.5 | 67 | 8 | 150 |
| Ethyl hexyl acrylate, 2- | $C_{11}H_{20}O_2$ | 1.0 | 100 | 5 | 100 |
| Ethyl mercaptan | $C_2H_6S$ | 0.7 | 145 | 3 | 70 |
| Ethyl octanoate | $C_{10}H_{20}O_2$ | 2.3 | 40 | 12 | 230 |
| Ethylene | $C_2H_4$ | 8.0 | 13 | 40 | 800 |
| Ethylene dinitrate | $C_2H_4O_6N_2$ | | | | |
| Ethylene glycol | $C_2H_6O_2$ | 20.0 | 5 | 100 | 2000 |
| Ethylene oxide | $C_2H_4O$ | 15.0 | 7 | 75 | 1500 |
| Ferrocene | $C_{10}H_{10}Fe$ | 0.8 | 125 | 4 | 80 |
| Fluorine | $F_2$ | | | | |
| Fluoroethane | $C_2H_5F$ | | | | |
| Fluoromethane | $CH_3F$ | | | | |
| Formaldehyde | $CH_2O$ | | | | |
| Formamide | $CH_3ON$ | 2.0 | 50 | 10 | 200 |
| Formic acid | $CH_2O_2$ | | | | |
| Furfural | $C_5H_4O_2$ | 1.4 | 70 | 7 | 140 |
| Furfuryl alcohol | $C_5H_6O_2$ | 2.0 | 50 | 10 | 200 |
| Gasoline vapors | | 1.1 | 95 | 5 | 105 |





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| Gas/VOC | Formula | Relative response | Relative sensitivity (%) | Typical MDL PID- AH (ppb) (Low Range) | Typical MDL PID-A1 (ppb) (High Range) |
|---|---|---|---|---|---|
| Gasoline vapors | | 0.8 | 125 | 4 | 80 |
| Gasoline vapors 92 octane | | 0.8 | 125 | 4 | 80 |
| Germane | $GeH_4$ | 10.0 | 10 | 50 | 1000 |
| Glutaraldehyde | $C_5H_8O_2$ | 0.9 | 111 | 5 | 90 |
| Halothane | $CF_3CHBrCl$ | | | | |
| Helium | He | | | | |
| Heptan-2-one | $C_7H_{14}O$ | 0.7 | 140 | 4 | 70 |
| Heptan-3-one | $C_7H_{14}O$ | 0.8 | 125 | 4 | 75 |
| Heptane n- | $C_7H_{16}$ | 2.1 | 50 | 10 | 200 |
| Hexachloroethane | $C_2Cl_6$ | | | | |
| Hexafluoroethane | $C_2F_6$ | | | | |
| Hexamethyldisilazane, 1,1,1,3,3,3-. | $C_6H_{19}NSi_2$ | 1.0 | 100 | 5 | 100 |
| Hexamethyldisiloxane. | $C_6H_{18}OSi_2$ | 0.3 | 350 | 1 | 30 |
| Hexan-2-one | $C_6H_{12}O$ | 0.8 | 125 | 4 | 80 |
| Hexane n- | $C_6H_{14}$ | 4.2 | 25 | 20 | 420 |
| Hexene, 1- | $C_6H_{12}$ | 0.9 | 110 | 5 | 90 |
| Hydrazine | $H_4N_2$ | 3.0 | 33 | 15 | 300 |
| Hydrazoic acid | $HN_3$ | | | | |
| Hydrogen | $H_2$ | | | | |
| Hydrogen bromide | HBr | | | | |
| Hydrogen chloride | HCl | | | | |
| Hydrogen cyanide | HCN | | | | |
| Hydrogen fluoride | HF | | | | |
| Hydrogen peroxide | $H_2O_2$ | 4.0 | 25 | 20 | 400 |
| Hydrogen sulfide | $H_2S$ | 4.0 | 25 | 20 | 400 |
| Hydroquinone | $C_6H_6O_2$ | 0.8 | 125 | 4 | 80 |
| Hydroxypropyl acrylate 2- | $C_6H_{10}O_3$ | 1.5 | 67 | 8 | 150 |
| Iminodi (ethylamine) 2,2'- | $C_4H_{13}N_3$ | 0.9 | 110 | 5 | 90 |
| Iminodiethanol 2,2'- | $C_4H_{11}NO_2$ | 1.6 | 60 | 8 | 160 |
| Indene | $C_9H_8$ | 0.5 | 220 | 2 | 50 |
| Iodine | $I_2$ | 0.2 | 667 | 1 | 15 |
| Iodoform | $CHI_3$ | 1.5 | 67 | 8 | 150 |




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|---|---|---|---|---|---|
| Iodomethane | $CH_3I$ | 0.4 | 250 | 2 | 40 |
| Isoamyl acetate | $C_7H_{14}O_2$ | 1.6 | 60 | 8 | 160 |
| Isobutane | $C_4H_{10}$ | 8.0 | 15 | 40 | 800 |
| Isobutanol | $C_4H_{10}O$ | 3.5 | 30 | 20 | 350 |
| Isobutyl acetate | $C_6H_{12}O_2$ | 2.3 | 45 | 10 | 230 |
| Isobutyl acrylate | $C_7H_{12}O_2$ | 1.3 | 80 | 7 | 130 |
| Isobutylene | $C_4H_8$ | 1.0 | 100 | 5 | 100 |
| Isobutyraldehyde | $C_4H_8O$ | 1.2 | 80 | 6 | 120 |
| Isocyanates, all | | | | | |
| Isodecanol | $C_{19}H_{22}O$ | 0.9 | 110 | 5 | 90 |
| Isoflurane | $C_3H_2ClF_5O$ | | | | |
| Isononanol | $C_9H_{20}O$ | 1.5 | 67 | 8 | 150 |
| Isooctane | $C_8H_{18}$ | 1.1 | 90 | 5 | 100 |
| Isooctanol | $C_8H_{18}O$ | 1.7 | 60 | 9 | 170 |
| Isopentane | $C_5H_{12}$ | 6.0 | 20 | 30 | 600 |
| Isophorone | $C_9H_{14}O$ | 0.8 | 133 | 4 | 75 |
| Isoprene | $C_5H_8$ | 0.7 | 140 | 3 | 70 |
| Isopropanol | $C_3H_8O$ | 4.4 | 20 | 22 | 440 |
| Isopropyl acetate | $C_5H_{10}O_2$ | 2.2 | 50 | 10 | 220 |
| Isopropyl chloroformate | $C_4H_7O_2Cl$ | 1.6 | 60 | 8 | 160 |
| Jet fuel jp-4 | | 0.8 | 133 | 4 | 75 |
| Jet fuel jp-5 | | 0.7 | 150 | 3 | 60 |
| Jet fuel jp-8 | | 0.7 | 150 | 3 | 60 |
| Kerosene | | 0.8 | 120 | 4 | 90 |
| Ketene | $C_2H_2O$ | 3.0 | 33 | 15 | 300 |
| Liquefied petroleum gas | | | | | |
| Maleic anhydride | $C_4H_2O_3$ | 2.0 | 50 | 10 | 200 |
| Mercaptoacetic acid | $C_2H_4O_2S$ | 1.0 | 100 | 5 | 100 |
| Mercury | Hg | | | | |
| Mercury alkyls | | | | | |
| Mesitylene | $C_9H_{12}$ | 0.3 | 300 | 2 | 30 |
| Methacrylic acid | $C_4H_6O_2$ | 2.3 | 40 | 12 | 230 |




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|---|---|---|---|---|---|
| Methacrylonitrile | $C_4H_5N$ | 5.0 | 20 | 25 | 500 |
| Methane | $CH_4$ | | | | |
| Methanol | $CH_4O$ | 200 | 1 | 1000 | 20000 |
| Methoxyethanol, 2- | $C_3H_8O_2$ | 2.7 | 40 | 15 | 270 |
| Methoxyethanol, 2- | $C_5H_{12}O_3$ | 1.4 | 70 | 7 | 140 |
| Methoxymethylethoxy-2-propanol | $C_7H_{16}O_3$ | 1.3 | 80 | 7 | 130 |
| Methoxypropan-2-ol | $C_4H_{10}O_2$ | 3.0 | 33 | 15 | 300 |
| Methoxypropyl acetate | $C_6H_{12}O_3$ | 1.2 | 80 | 6 | 120 |
| Methyl acetate | $C_3H_6O_2$ | 5.2 | 20 | 25 | 500 |
| Methyl acrylate | $C_4H_6O_2$ | 3.4 | 30 | 17 | 340 |
| Methyl bromide | $CH_3Br$ | 1.9 | 50 | 10 | 190 |
| Methyl cyanoacrylate | $C_5H_5O_2N$ | 5.0 | 20 | 25 | 500 |
| Methyl ethyl ketone | $C_4H_8O$ | 0.8 | 130 | 4 | 80 |
| Methyl ethyl ketone peroxides | $C_8H_{18}O_2$ | 0.8 | 125 | 4 | 80 |
| Methyl formate | $C_2H_4O_2$ | | | | |
| Methyl isobutyl ketone | $C_6H_{12}O$ | 0.8 | 125 | 4 | 80 |
| Methyl isocyanate | $C_2H_3NO$ | | | | |
| Methyl isothiocyanate | $C_2H_3NS$ | 0.6 | 167 | 3 | 60 |
| Methyl mercaptan | $CH_4S$ | 0.7 | 140 | 4 | 70 |
| Methyl methacrylate | $C_5H_8O_2$ | 1.6 | 60 | 8 | 160 |
| Methyl propyl ketone | $C_5H_{10}O$ | 0.8 | 130 | 4 | 80 |
| Methyl salicylate | $C_8H_8O_3$ | 1.2 | 80 | 6 | 120 |
| Methyl sulphide | $C_2H_6S$ | 0.5 | 200 | 3 | 50 |
| Methyl t-butyl ether | $C_5H_{12}O$ | 0.8 | 125 | 4 | 80 |
| Methyl-2-propen-1-ol, 2- | $C_4H_8O$ | 1.1 | 90 | 5 | 100 |
| Methyl-2-pyrrolidinone, N- | $C_5H_9NO$ | 0.9 | 110 | 5 | 90 |
| Methyl-4,6-dinitrophenol, 2- | $C_7H_6N_2O_5$ | 3.0 | 33 | 15 | 300 |
| Methyl-5-hepten-2-one, 6- | $C_8H_{14}O$ | 0.8 | 125 | 4 | 80 |
| Methylamine | $CH_5N$ | 1.4 | 70 | 7 | 140 |
| Methylbutan-1-ol, 3- | $C_5H_{12}O$ | 3.4 | 30 | 17 | 340 |
| Methylcyclohexane | $C_7H_{14}$ | 1.1 | 90 | 6 | 110 |
| Methylcyclonehexanol, 4- | $C_7H_{14}O$ | 2.4 | 40 | 12 | 240 |




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|---|---|---|---|---|---|
| Methylcyclonehexanone 2- | $C_7H_{12}O$ | 1.0 | 100 | 5 | 100 |
| Methylheptan-3-one, 5- | $C_8H_{16}O$ | 0.8 | 133 | 4 | 75 |
| Methylhexan-2-one, 5- | $C_7H_{14}O$ | 0.8 | 133 | 4 | 75 |
| Methylhydrazine | $CH_6N_2$ | 1.3 | 80 | 7 | 130 |
| Methyl-N-2,4, 6- tetranitroaniline, N- | $C_7H_5N_5O_8$ | 3.0 | 33 | 15 | 300 |
| Methylpent-3-en-2-one, 4- | $C_6H_{10}O$ | 0.7 | 140 | 4 | 70 |
| Methylpentan-2-ol, 4- | $C_6H_{14}O$ | 2.8 | 40 | 14 | 280 |
| Methypentane-2,4-diol, 2- | $C_6H_{14}O_2$ | 4.0 | 25 | 20 | 400 |
| Methylpropan-2-ol, 2- | $C_4H_{10}O$ | 3.5 | 30 | 18 | 350 |
| Methylstyrene | $C_9H_{10}$ | 0.5 | 200 | 3 | 50 |
| Mineral oil | | 0.8 | 125 | 4 | 80 |
| Mineral Spirits | | 0.8 | 125 | 4 | 80 |
| Naphthalene | $C_{10}H_8$ | 0.4 | 230 | 2 | 45 |
| Nitric Oxide | NO | 8.0 | 15 | 40 | 800 |
| Nitroaniline 4- | $C_6H_6N_2O_2$ | 0.8 | 125 | 4 | 80 |
| Nitrobenzene | $C_6H_5NO_2$ | 1.7 | 60 | 10 | 170 |
| Nitroethane | $C_2H_5NO_2$ | | | | |
| Nitrogen dioxide | $NO_2$ | 10.0 | 10 | 50 | 1000 |
| Nitrogen trichloride | $NCl_3$ | 1.0 | 100 | 5 | 100 |
| Nitrogen trifluoride | $NF_3$ | | | | |
| Nitromethane | $CH_3NO_2$ | | | | |
| Nitropropane, 1- | $C_3H_7NO_2$ | | | | |
| Nitropropane, 2- | $C_3H_7NO_2$ | | | | |
| Nitrous Oxide | $N_2O$ | | | | |
| Nonane, n- | $C_9H_{20}$ | 1.3 | 80 | 6 | 130 |
| Norbornandiene, 2,5- | $C_7H_8$ | 0.6 | 167 | 3 | 60 |
| Octachloronaphthalene | $C_{10}C_{18}$ | 1.0 | 100 | 5 | 100 |
| Octane, n- | $C_8H_{18}$ | 1.6 | 60 | 8 | 160 |
| Octene, 1- | $C_8H_{16}$ | 0.7 | 140 | 3 | 70 |
| Oxalic acid | $C_2H_2O_4$ | | | | |
| Oxalonitrile | $C_2N_2$ | | | | |
| Oxydiethanol 2,2- | $C_4H_{10}O_3$ | 4.0 | 25 | 20 | 400 |





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|---|---|---|---|---|---|
| Oxygen | $O_2$ | | | | |
| Ozone | $O_3$ | | | | |
| Paraffin wax, fume | | 1.0 | 100 | 5 | 100 |
| Paraffins, normal | | 1.0 | 105 | 5 | 100 |
| Pentacarbonyl iron | $FeC_5O_5$ | 1.0 | 100 | 5 | 100 |
| Pentachloroethane | $C_2HCl_5$ | | | | |
| Pentachlorofluoroethane | $C_2Cl_5F$ | | | | |
| Pentafluoroethane | $C_2HF_5$ | | | | |
| Pentan-2-one | $C_5H_{10}O$ | 0.8 | 125 | 4 | 80 |
| Pentan-3-one | $C_5H_{10}O$ | 0.8 | 125 | 4 | 80 |
| Pentandione, 2,4- | $C_5H_8O_2$ | 0.8 | 133 | 4 | 75 |
| Pentane, n- | $C_5H_{12}$ | 7.9 | 15 | 40 | 800 |
| Peracetic acid | $C_2H_4O_3$ | 2.0 | 50 | 10 | 200 |
| Perchloryl fluoride | $C_{103}F$ | | | | |
| Perfluoropropane | $C_3F_8$ | | | | |
| Petroleum ether | | 0.9 | 110 | 5 | 90 |
| Phenol | $C_6H_6O$ | 1.2 | 85 | 6 | 120 |
| Phenyl propene, 2- | $C_9H_{10}$ | 0.4 | 230 | 2 | 45 |
| Phenyl-2,3-epoxypropyl ether | $C_9H_{10}O_2$ | 0.8 | 125 | 4 | 80 |
| Phenylenediamine, p- | $C_6H_8N_2$ | 0.6 | 167 | 3 | 60 |
| Phosgene | $COCl_2$ | | | | |
| Phosphine | $PH_3$ | 2.0 | 50 | 10 | 200 |
| Picoline, 3- | $C_6H_7N$ | 0.9 | 110 | 5 | 90 |
| Pinene, alpha | $C_{10}H_{16}$ | 0.3 | 315 | 2 | 30 |
| Pinene, beta | $C_{10}H_{16}$ | 0.3 | 315 | 2 | 30 |
| Piperidine | $C_5H_{11}N$ | 0.9 | 110 | 5 | 90 |
| Piperylene | $C_5H_8$ | 0.7 | 150 | 3 | 67 |
| Prop-$_2$-yn-$_1$-ol | $C_3H_4O$ | 1.3 | 80 | 7 | 130 |
| Propan-$_1$-ol | $C_3H_8O$ | 4.8 | 20 | 25 | 480 |
| Propane | $C_3H_8$ | | | | |
| Propane-$_{1,2}$-diol, total | $C_3H_8O_2$ | 10.0 | 10 | 50 | 1000 |
| Propene | $C_3H_6$ | 1.4 | 70 | 7 | 140 |




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|---|---|---|---|---|---|
| Propionaldehyde | $C_3H_6O$ | 1.7 | 60 | 8 | 169 |
| Propionic acid | $C_3H_6O_2$ | 8.0 | 15 | 40 | 800 |
| Propyl acetate, n- | $C_5H_{10}O_2$ | 2.5 | 40 | 13 | 250 |
| Propylene dinitrate | $C_3H_6N_2O_6$ | | | | |
| Propylene oxide | $C_3H_6O$ | 7.0 | 15 | 35 | 700 |
| Propyleneimine | $C_3H_7N$ | 1.3 | 80 | 7 | 130 |
| Pyridine | $C_5H_5N$ | 0.8 | 133 | 4 | 75 |
| Pyridylamine 2- | $C_5H_6N_2$ | 0.8 | 125 | 4 | 80 |
| Silane | $SiH_4$ | | | | |
| Sodium fluoroacetate | $C_2H_2O_2FNa$ | | | | |
| Styrene | $C_8H_8$ | 0.4 | 230 | 2 | 50 |
| Sulphur dioxide | $SO_2$ | | | | |
| Sulphur hexafluoride | $SF_6$ | | | | |
| Sulphur tetrafluoride | $SF_4$ | | | | |
| Sulphuric acid | $H_2SO_4$ | | | | |
| Sulphuryl fluoride | $SO_2F_2$ | | | | |
| Terphenyls | $C_{18}H_{14}$ | 0.6 | 167 | 3 | 60 |
| Terpinolene | $C_{10}H_{16}$ | 0.5 | 210 | 2 | 50 |
| Tert-butanol | $C_4H_{10}O$ | 2.6 | 40 | 15 | 260 |
| Tetrabromoethane, 1,1,2,2- | $C_2H_2Br_4$ | 2.0 | 50 | 10 | 200 |
| Tetracarbonylnickel | $NiC_4O_4$ | 1.0 | 100 | 5 | 100 |
| Tetrachloro-1,2- difluoroethane, 1,1,1,2- | $C_2Cl_4F_2$ | | | | |
| Tetrachloro-1- fluoroethane,1,1,2,2- | $C_2HCl_4F$ | | | | |
| Tetrachloro-2,2- difluoroethane, 1,1,1,2- | $C_2Cl_4F_2$ | | | | |
| Tetrachloro-2-fluoroethane, 1,1,1,2- | $C_2HCl_4F$ | | | | |
| Tetrachloroethane, 1,1,1,2- | $C_2H_2Cl_4$ | | | | |
| Tetrachloroethane, 1,1,2,2- | $C_2H_2Cl_4$ | | | | |
| Tetrachloroethylene | $C_2Cl_4$ | 0.7 | 140 | 4 | 70 |
| Tetrachloronapthalenes, all isomers | $C_{10}H_4Cl_4$ | 1.0 | 100 | 5 | 100 |
| Tetraethyl orthosilicate | $C_8H_{20}O_4Si$ | 2.0 | 50 | 10 | 200 |




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|---|---|---|---|---|---|
| Tetraethyllead | $C_8H_{20}Pb$ | | | | |
| Tetrafluoroethane, 1,1,1,2- | $C_2H_2F_4$ | | | | |
| Tetrafluoroethane, 1,1,2,2- | $C_2H_2F_4$ | | | | |
| Tetrafluoroethylene | $C_2F_4$ | 1.0 | 100 | 5 | 100 |
| Tetrafluoromethane | $CF_4$ | | | | |
| Tetrahydrofuran | $C_4H_8O$ | 1.6 | 65 | 8 | 150 |
| Tetramethyl orthosilicate | $C_4H_{12}O_4Si$ | | | | |
| Tetramethyl succinonitrile | $C_8H_{12}N_2$ | 1.0 | 100 | 5 | 100 |
| Therminol | | 1.0 | 100 | 5 | 100 |
| Thionyl chloride | $SOCl_2$ | | | | |
| Toluene | $C_7H_8$ | 0.5 | 200 | 3 | 50 |
| Toluene-2,4-diisocyanate | $C_9H_6N_2O_2$ | 1.6 | 60 | 8 | 160 |
| Toluenesulphonyl chloride, p- | $C_7H_7SO_2Cl$ | 3.0 | 33 | 15 | 300 |
| Toluidine, o- | $C_7H_9N$ | 0.5 | 200 | 3 | 50 |
| Tributyl phosphate | $C_{12}H_{27}O_4P$ | 5.0 | 20 | 25 | 500 |
| Tributylamine | $C_{12}H_{27}N$ | 1.0 | 100 | 5 | 100 |
| Trichloro-1,1-difluoroethane, 1,1,2- | $C_2HCl_3F_2$ | | | | |
| Trichloro-1,2-difluoroethane, 1,1,2- | $C_2HCl_3F_2$ | | | | |
| Trichloro-2,2-difluoroethane, 1,1,1- | $C_2HCl_3F_2$ | | | | |
| Trichloro-2-fluoroethane, 1,1,2- | $C_2H_2Cl_3F$ | | | | |
| Trichlorobenzene 1,2,4- | $C_6H_3Cl_3$ | 0.6 | 180 | 3 | 50 |
| Trichloroethane, 1,1,1- | $C_2H_3Cl_3$ | | | | |
| Trichloroethane, 1,1,2- | $C_2H_3Cl_3$ | | | | |
| Trichloroethylene | $C_2HCl_3$ | 0.7 | 150 | 3 | 65 |
| Trichlorofluoromethane | $CCl_3F$ | | | | |
| Trichloronitromethane | $CCl_3NO_2$ | | | | |
| Trichlorophenoxyacetic acid, 2,4,5- | $C_8H_5O_3Cl_3$ | 1.0 | 100 | 5 | 100 |
| Trichloropropane 1,2,3- | $C_3H_5Cl_3$ | | | | |
| Trichlorotrifluoroethane, 1,1,1- | $C_2Cl_3F_3$ | | | | |
| Trichlorotrifluoroethane, 1,1,2- | $C_2Cl_3F_3$ | | | | |
| Triethylamine | $C_6H_{15}N$ | 0.9 | 110 | 5 | 90 |




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|---|---|---|---|---|---|
| Trifluoroethane, 1,1,1- | $C_2H_3F_3$ | | | | |
| Trifluoroethane, 1,1,2- | $C_2H_3F_3$ | | | | |
| Trifluoroethaneanol, 2,2,2- | $C_2H_3F_3O$ | | | | |
| Trifluoromethane | $CHF_3$ | | | | |
| Trimethylamine | $C_3H_9N$ | 0.5 | 200 | 3 | 50 |
| Trimethylbenzene mixtures | $C_9H_{12}$ | 0.3 | 300 | 2 | 35 |
| Trimethylbenzene, 1,3,5- | $C_9H_{12}$ | 0.3 | 300 | 2 | 35 |
| Trinitroluene 2,4,6- | $C_7H_5N_3O_6$ | | | | |
| Turpentine | $C_{10}H_{16}$ | 0.6 | 167 | 3 | 60 |
| TVOC | | 1.0 | 100 | 5 | 100 |
| Undecane, n- | $C_{11}H_{24}$ | 0.9 | 110 | 5 | 100 |
| Vinyl acetate | $C_4H_6O_2$ | 1.1 | 90 | 6 | 110 |
| Vinyl bromide | $C_2H_3Br$ | 1.0 | 100 | 5 | 100 |
| Vinyl chloride | $C_2H_3Cl$ | 2.1 | 50 | 10 | 200 |
| Vinyl-2-pyrrolidinone, 1- | $C_6H_9NO$ | 0.9 | 110 | 5 | 90 |
| Xylene mixed isomers | $C_8H_{10}$ | 0.4 | 230 | 2 | 40 |
| Xylene, m- | $C_8H_{10}$ | 0.4 | 230 | 2 | 50 |
| Xylene, o- | $C_8H_{10}$ | 0.6 | 167 | 3 | 60 |
| Xylene, p- | $C_8H_{10}$ | 0.6 | 180 | 3 | 50 |
| Xylidine, all | $C_8H_{11}N$ | 0.7 | 140 | 4 | 70 |




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