

Detecting Benzene Levels with the MX6 iBrid® Gas Monitor



Benzene is a colorless, sweet-smelling chemical that is derived from crude oil, natural gas, or coal. Benzene is found naturally in crude oil, petroleum-based products such as gasoline, diesel and jet fuels, solvents, and lubricating oils. All these products contain some amount of benzene, so it will be present in any place that produces or processes these products. Because of its known carcinogenic properties, benzene exposure levels are heavily regulated. The U.S. Occupational Safety and Health Administration (OSHA) has set the permissible exposure limit (PEL), the average concentration that a worker may be exposed to for an eight-hour workday, for benzene at 1 part per million (PPM). In addition, there are numerous environmental regulations that guard against the presence of high benzene concentrations in the atmosphere.

Benzene is often found in the presence of other volatile organic compounds (VOCs) such as toluene, xylene, and ethylbenzene to name a few. Because the typical technologies used to measure the level of benzene in a given atmosphere also detect these other BTEX compounds and many others at the same time, it is difficult to determine the concentration of benzene accurately. The most common method for quickly obtaining a direct reading of the benzene concentration is to sample the atmosphere using a portable gas monitor such as the Industrial Scientific MX6 iBrid® Gas Detector. When equipped with a photo-ionization detector (PID) sensor and a benzene pre-filter (or “scrubbing”) tube, the MX6 can display benzene-specific readings. The pre-filter tube will remove many of the non-

benzene contaminants of the atmosphere being tested and allow the benzene to pass through the filter and pump to be detected and measured by the PID.

When to use the MX6 to detect benzene. If you are trying to determine the level of benzene in the atmosphere and your detector (regardless of the type or detection technology) shows a positive concentration of VOCs, it is time to get out the MX6, benzene pre-filter tube, and tube adapter. Remove a fresh benzene prefilter tube from its package, break off the ends to open the gas path, place the tube in the adapter, and attach it to the sample inlet of the MX6 according to the manufacturer’s instructions. Sample the atmosphere for the prescribed amount of time according to the instructions. The MX6 will display the new VOC readings on the PID sensor, now showing the true benzene concentration.

Calibration is the key to an accurate benzene reading. With the low exposure limit regulations for benzene, it is extremely important that benzene concentration measurements are



as accurate as possible. When detecting benzene, the performance and accuracy of the PID sensor in your MX6 ultimately depends on how well and frequently the sensor is calibrated. Set the MX6 to calibrate the PID sensor to a 5 PPM concentration of benzene with the reading response factor also set to benzene. It is also best practice to use a gas cylinder with 5 PPM of benzene for calibration. While it is possible to calibrate the MX6 PID using a docking station and a benzene gas cylinder, manually calibrating the PID sensor will minimize any potential for interference from other calibration gases on the sensor. **Because the prefilter tube does remove a small amount of the benzene concentration from the sample along with other hydrocarbons, you will always obtain the best accuracy by calibrating the PID sensor with a fresh pre-filter tube in place.**

Once the MX6 and PID are calibrated, you are ready to take out a fresh tube and determine the concentration of benzene in your atmosphere. Doing so will ensure that your workers are not being overexposed and environmental regulations for atmospheric benzene levels are not being exceeded.

NOTE: It is vitally important that the pre-filter tube is only used for one sample and one measurement. If the orange section of the tube completely changes color before the sample is completed,

the tube has become saturated. Other hydrocarbons have broken through and your benzene reading will not be accurate. Never accept the readings of other sensors in the monitor when the prefilter tube is in place. The tube will scrub other gases from the test sample and other sensor readings may be erroneously low. The sample flow through the tube can be affected by temperature. Read the manufacturer's instructions thoroughly for proper temperature-based sample times.