

 Application Note	<h2>TravelPanel50 Usage</h2>	Date	1-1-2000
		Nº	AN2000-10
		By	Lars Boettern

Using the Travelpanel 50R to make sure your airline respirator air is safe to use

Air used to supply NIOSH approved airline respirators must meet "Grade D" criteria

Industrial air distribution systems typically rely on oil lubricated compressors. Before industrial air may be used to supply NIOSH approved airline respirators, it must be regulated, filtered and monitored to insure that it meets Compressed Gas Association (CGA) Grade D breathing air requirements. Whether the compressor being used is portable or installed, piston or screw, OSHA 1910.134 requires that all breathing air compressors be equipped with "suitable in-line sorbent beds and filters." Additionally, 1910.134 requires that oil lubricated compressors be equipped with a "high temperature alarm or carbon monoxide monitor, or both." If a carbon monoxide monitor is not included the code requires that the air from the compressor must be "frequently tested" to insure that it meets Grade D specifications. Why all this concern with compressor air quality? Because the air produced by oil lubricated compressors, especially when obtained from portable compressors commonly used in sand blasting, asbestos removal and painting applications, unless filtered and monitored, is frequently unfit for use!

Untested compressor air can be dangerous

There are three potential sources of contamination: the quality of the inlet air, the compressor itself, and the fittings and lines used to distribute air to the respirator wearers. Potential contaminants include lubrication mists, vapors, oils, greases, rust, liquid and gaseous water, airline fabrication byproducts (slag, flux, metal particles) and industrial contaminants within the atmosphere prior to compression (such as carbon monoxide).

The most obvious source of contamination is the quality of the inlet air being used to supply the compressor. It is very important to situate breathing compressors so that they do not "suck-in" or "entrain" contaminants. In fact, one of the most common sources of inlet air contamination is the "entrainment" of a portable compressors' own exhaust. OSHA 1910.134 specifies that breathing air compressors must be constructed and situated so as to "avoid entry of contaminated air into the system." Inlet air must contain no less than 19.5 % and no more than 23.5 % oxygen, no more than 10 ppm carbon monoxide, and no more than 1000 ppm carbon dioxide.

Another issue is the amount of moisture present in inlet air. Although not dangerous in the sense of toxicity, excessive moisture in the airstream can lead to rusting, filter damage, or actually prevent the proper operation of some types of air-supplying respirators. When inlet air at room temperature and normal humidity is compressed, the dew point (temperature at which water will condense out of the gaseous state) is raised significantly. This presents problems downstream of the compressor since the water will condense out of the airstream when heat is lost to the surrounding atmosphere. (Most breathing air compressors are fitted with an aftercooler, a coarse pre-filter, and an auto draining water trap designed to reduce excessive downstream moisture.)

The second source of contamination is the compressor itself. All oil lubricated compressors, regardless of age and maintenance record, contaminate the airstream to some degree with lubricant oil mists and particles of rust. (In fact, Grade D breathing air may permissibly contain up to 5 mg per cubic meter of condensed lubricant oil.) Carbon monoxide presents a more insidious danger. If a compressor begins to overheat to the point that the lubricant oil begins to burn or "smoke", even trivial or otherwise permissible concentrations of lubricant oil can produce lethal concentrations of carbon monoxide. Grade D air may not contain more than 10 ppm carbon monoxide.

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The third source of potential contamination (especially in the case of permanently installed air delivery systems) are the lines, fittings and other elements of the system used to distribute air from the compressor to individual respirator users.

Three stage air purification system removes particulates, liquids, and even odors!

Fortunately, Biosystems' Travelpanel 50R portable air purification panel makes filtering, regulating and monitoring breathing air convenient and easy. The Travelpanel 50R system is designed to remove water, oil and particulate contaminants, and provide up to 50 cubic feet per minute of purified air to respirator wearers.

The Travelpanel 50R purifies breathing air in three stages. Inlet air is first directed through a pre-filter assembly. The pre filter element is designed to intercept most particulate contaminants present in the inlet air source. The pre filter assembly also removes most of the liquid contaminants. Inlet vanes cause the air to spin as it enters the pre-filter bell. As the air spins water and oil are centrifugally separated from the airstream. Liquids collect on the inner surface of the bell, and flow to the bottom. When sufficient fluid has collected in the bottom of the bell, a built in "float" causes the water trap valve to open and the fluid to drain.

The inlet air is next directed through a coalescing filter. Most of the water and other liquids present should have been removed as the air passed through the pre-filter. Remaining liquid and particulate contaminants are removed by the coalescing filter. The coalescing filter is equipped with a manual filter drain. Pressing the manual filter drain stem at the bottom of the housing opens the drain and allows any accumulated fluids to be vented. The coalescing filter is a "High Efficiency Particulate Airfilter" designed to remove 99.9% of all remaining particulate contaminants as well as water and oil droplets greater than 0.3 microns in diameter.

The third stage of filtration is an activated carbon "adsorber" filter designed to finish the purification process. The carbon filter removes nuisance odor as well as any other remaining organic contaminants. Any remaining particulates are removed during this phase of filtration. The pre-filter and coalescing filter housings should be examined regularly during use. Windows in the filter bowl allow the filters to be checked for discoloration or the buildup of fluids. A filter change indicator is provided to help you determine when filters are in need of replacement.

After the inlet air has been filtered, it is regulated to meet the requirements of the respirators being used. A pressure relief valve guards against accidental over pressurization. The Travelpanel 50R may be used to provide air for up to four respirator wearers. A single regulator is used to adjust the outlet pressure for all four quick connect airline fittings. The pressure may be set anywhere between 0 and (the NIOSH maximum) of 125 pounds per square inch.

Travelpanel 50R filtration is not designed to remove carbon monoxide. A carbon monoxide monitor is provided to continuously sample the purified air to insure that the concentration of CO does not exceed the permissible limit for Grade D breathing air. Carbon monoxide readings are continuously displayed on the instrument LCD. If carbon monoxide readings rise above 10 ppm, a high intensity audible alarm is activated, notifying respirator wearers that their compressed air source is contaminated, and no longer meets the minimum requirements for Grade D breathing air.

The Travelpanel 50R is designed to be operated while the gasketed, waterproof case is in a closed upright position. Outrigger legs make sure the Travelpanel 50R doesn't tip over during operation, while a built-in window provides a view of carbon monoxide readings.

Travelpanel 50R converts industrial air to Grade D breathing air

The Travelpanel 50R is designed to insure that the air being used to supply airline respirator wearers meets or exceeds Grade D specifications when used together with a compressor which

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is permissible for use as a breathing air source. Make sure the compressor inlet is situated such that contaminants are not drawn into the system! An alarm condition indicating the presence of carbon monoxide in the air being used to supply airline respirators is very serious. In the event of an alarm condition it is important to follow established procedures. Discontinue respirator use as soon as is safely possible. Leave any hazardous location immediately, and follow manufacturer guidelines for proper respirator use when exiting potentially hazardous locations.

Remember that carbon monoxide is both common and invisible. If you don't continuously monitor airline air, you'll never know if it's really safe to breathe.

Please call Biosystems Customer Service at (860) 344-1079 if you have any additional questions.