

Who Tests the Air Testers?

By Mike Carlson and Ed Golla, Ph.D., CIH

Breathing air from compressed gas sources is used by fire departments, divers, hospitals, and commercial industry. Firefighters using SCBA tanks, divers using SCUBA tanks, healthcare workers and patients, and industrial workers using supplied breathing air apparatus are potentially exposed to unhealthy levels of oxygen, carbon monoxide, carbon dioxide, and total volatile hydrocarbons when equipment is not functioning properly. How do they know that their compressed air is safe to breathe?

Each year, users of compressed breathing air send many samples of air to laboratories for testing to specifications and standard requirements set by many different groups. Some of the better known ones in the United States are the Occupational Safety and Health Agency (OSHA), National Fire Protection Association (NFPA), Compressed Gas Association (CGA), and Professional Association of Diving Instructors (PADI). Even some state agencies such as the Florida Department of Health have breathing air testing requirements. Some of these specifications and standards require the air testing laboratory to be accredited by a laboratory accreditation organization such as the American Industrial Hygiene Association (AIHA) or American Analytical Laboratory Association (A2LA).

Individual laboratories have developed air sampling equipment and methods to collect representative samples from the breathing air supply systems and the ambient environment. The laboratories have developed and use analytical procedures to quantify the collected samples. The samples are analyzed by chemical analysis techniques and compared to specifications and standards such as those mentioned above. But how do the users of compressed air know that they laboratory that is testing their air is competent?

The air testers themselves decided two years ago to answer this question. Approximately a dozen air testing laboratories in the USA and Canada started a round-robin compressed air proficiency testing group (CAPT). CAPT was begun based on a discussion with AIHA management about the problem of compressed air testing laboratories being required by the AIHA to be accredited as an operating industrial hygiene laboratory. This requires participating in a quarterly proficiency-testing program for detecting organic solvents. The AIHA was asked if it would consider a separate accreditation program for compressed-air testing laboratories. The response was that it was possible based on the new policies of the AIHA and that the prospective CAPT group should start the process by becoming a part of the AIHA proficiency testing subcommittee (AAB-PT), which is responsible for (among other things) recommending new proficiency testing programs.

In October of 2000 at a meeting of the AAB-PT subcommittee, the founding CAPT members were given the go ahead to initiate contact with laboratories involved with testing air. The response was and continues to be very positive from the air-testing industry. After numerous email discussions among the initial members of the group about what we should do, in June of 2001 we sent out the first air samples that contained seven possible analyte reporting results. The round was successfully completed in September of 2002.

Establishing the CAPT group means that laboratories can now anonymously compare their test results to the test results of other commercial, governmental, and university air testing laboratories. These labs now have an easy, low cost, quarterly verification method for knowing they are producing results consistent with other air testing labs. Laboratories are also able to use their CAPT test results as part of their laboratory accreditation programs or to demonstrate to customers that they are competent at testing air samples. One governmental group is considering adding CAPT participation to its contract requirements.

The CAPT group, which is run by consensus of the participating laboratories, now meets routinely via e-mail, teleconferences, site visits, and at general industry events to discuss issues concerning test round performance, laboratory proficiencies, corrective actions, correspondence with accreditation groups, and other program issues. We continue as an independent group of laboratories with the only purpose of providing a method for obtaining air test samples and comparative anonymous test results at a reasonable price on a quarterly basis.

The program itself involves purchasing gas samples from an ISO 9000-registered gas supplier. The supplier provides samples consisting of the following components and ranges.

Oxygen	Range 15 to 30 percent
Carbon dioxide	Range 300 to 1500 ppm
Carbon monoxide	Range 5 to 25 ppm
Methane	Range 5 to 15 ppm
Ethane	Range 4 to 20 ppm
Nitrogen	Balance of Mixture

Typically, there are four testing rounds per year. The samples are appropriately identified by CAPT round number and analyzed by the participating labs per each lab's standard analytical methods as if the samples were routine ones obtained from clients. **Figure 1** details the process.

CAPT has finished eleven rounds of testing as of spring of 2004. The participating laboratories feel strongly that achieving and maintaining high standards of performance is the reason for our existence, and we hope that other compressed-air testing laboratories feel the same way. We hope that all will join the CAPT group in our efforts to ensure the health and safety of people who breathe compressed air.

Please contact the coordinating laboratory representative, Mike Carlson for more information about the CAPT program at mcarlson@airtesting.com.

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