COMPRESSED GAS ASSOCIATION, INC.

SAFETY ALERT

SA-12—2001

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BLENDED BREATHING AIR FATALITIES

Two workers lost their lives when the supplied breathing air cylinders they were breathing from contained low levels of oxygen. The two workers were working on top of a scaffold, sandblasting the interior of a boiler. A third worker was outside the entry to the boiler to make sure the breathing lines did not become tangled and served as a communications link. After an unknown amount of time passed, the third worker discovered that the two co-workers had collapsed and were lying on the bottom of the tank. Emergency personnel removed the workers from the tank, but resuscitation efforts were unsuccessful. Further investigation revealed the blended breathing air supply involved 3 separate 12-packs of cylinders. Each cylinder was analyzed and found to have varying oxygen concentration levels between 5% and 10%.

The following fill recommendations are being made in the interest of worker safety:

1. **A Certificate of Analysis or Product Certification** shall be available and properly documented on the source cylinder's purity as noted in CGA P-15, *Filling of Industrial and Medical Nonflammable Compressed Gas Cylinders*, section 4.2.2, General considerations, and section 4.5 Analytical program for CGA grades of breathing air [1].

2. **Proper fill systems and procedures must be designed, developed, and implemented** to ensure breathing air specifications will be achieved with the means to analytically prove the oxygen concentration of each cylinder filled as noted in CGA G-7, *Compressed Air for Human Respiration,* section 3.2, Synthetic air [2].

3. **All individuals must be properly trained** and have a full understanding of the fill process, fill procedures/techniques, and analytical equipment as outlined in CGA G-7, section 3.2, Synthetic air [2].

4. **Final analysis of each individual cylinder** must be performed per lot to prove the oxygen concentration is within range as depicted in CGA G-7.1, *Commodity Specification for Air*, Table 1, and at least one cylinder per lot must be analyzed to ensure the entire lot meets Grade "D" specification requirements for impurities as depicted in CGA G-7.1, Table 1. An additional analysis for moisture shall be in accordance with 29 CFR 1910.134 [3, 4].

For further details, refer to 29 CFR 1910.134, CGA G-7.1, and CGA G-7 [4, 3, 2]. In Canada, refer to CSA International Standard Z180.1, *Compressed Breathing Air and Systems* [5].

The CGA and the National Welding Supply Association (NWSA) believe that these recommendations ensure the industrial gases industry continues to offer safe and effective products to the customers it serves.

References

Unless otherwise stated the latest edition shall apply.

[1] CGA P-15, *Filling of Industrial and Medical Nonflammable Compressed Gas Cylinders*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151.

[2] CGA G-7, *Compressed Air for Human Respiration*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151.

[3] CGA G-7.1, *Commodity Specification for Air*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151.

[4] *Code of Federal Regulations*, Title 29 CFR Part 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[5] CSA International Z180.1, *Compressed Breathing Air and Systems*, CSA International, 178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3.

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