Information Regarding 1-Bromopropane and the Adopted Notice of Intended Change (Threshold Limit Value Decrease from 10 ppm to 0.1 ppm)

Technical Information Paper No. 55-022-1014

PURPOSE. To provide an overview of 1-bromopropane (1-BP) and the adopted American Conference of Governmental Industrial Hygienists (ACGIH®) Notice of Intended Change (NIC) decreasing the Threshold Limit Value-Time Weighted Average (TLV-TWA) from 10 parts per million (ppm) to 0.1 ppm. (ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.)

POINTS OF MAJOR INTEREST AND FACTS

Background

In 2011, the ACGIH published the Notice of Intended Change (NIC) to lower the 1-BP 8-hour TLV-TWA from 10 ppm to 0.1 ppm. In 2012, the ACGIH reclassified 1-BP as a "Confirmed Animal Carcinogen with Unknown Relevance to Humans." On January 31, 2014, the ACGIH Board of Directors issued their Annual Report indicating that the NIC for 1-BP had been adopted. The 8-hour TLV-TWA for 1-BP, as determined by the ACGIH, is now 0.1 ppm."

Impact

Past employee 8-hour occupational exposures to airborne 1-BP concentrations that were below the former ACGIH TLV-TWA of 10 ppm will likely exceed the adopted TLV-TWA of 0.1 ppm. Workplaces using 1-BP will now require further evaluation to characterize employees' occupational exposures to this chemical substance. Workers will likely have concerns and questions as a result of this change in the TLV-TWA.

Health Effects

a. Employees exposed to 1-BP may experience the following symptoms: short-term irritation of the airways eyes and skin as well as dizziness and difficulty concentrating. If an employee experiences any of these symptoms, they should immediately contact the occupational health clinic to receive care. Employees can also visit their primary care

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providers to discuss personal health concerns. Primary care providers can contact the occupational health clinic to receive medical guidance for 1-BP.

b. There is no bio-marker lab test for 1-BP. In lieu of laboratory tests, a periodic occupational health assessment should be conducted. The assessment should include a detailed occupational history and changes to an employee's personal medical history since the last visit.

Facts

a. Major Uses. 1-BP is a common organic solvent used in the cleaning and degreasing of metals, cleaning of electronic circuit boards, the formulation of adhesives and aerosols, as a solvent for adhesives, in coating operations, and as a dry cleaning solvent.

b. Chemical Information and Nomenclature. Synonyms for 1-BP include 1-BP, n-propyl bromide, Propyl bromide, and NPB. The Chemical Abstracts Service Registry Number is 106-94-5 and the chemical formula is C_3H_7Br. 1-BP is a colorless to off-white, non-flammable liquid with characteristic hydrocarbon odor.

c. Routes of Exposure. 1-BP enters the body via inhalation and skin absorption. The risk of health effects depends on concentration and duration of exposure.

d. Air Sampling. Air sampling methods include Occupational Safety and Health Administration (or OSHA) Method PV2061 and National Institute for Occupational Safety and Health (or NIOSH) Method 1025. Both methods use standard size (6-mm o.d., 100/50-mg sections) coconut shell charcoal tubes. Details regarding these two methods can be found at: https://www.osha.gov/dts/sltc/methods/partial/pv2061/2061.html and http://www.cdc.gov/niosh/docs/2003-154/pdfs/1025.pdf. Always check with your industrial hygiene analytical lab regarding any specific requirements.

Recommendations for Reducing/Controlling Exposures

a. Substitution. Switch to a suitable alternative that does not contain 1-BP. Ensure that the alternative product is not more hazardous than 1-BP. Consult your local Industrial Hygiene/Safety Office for assistance with suitability.

b. Engineering Controls (Ventilation). Use local exhaust ventilation to capture contaminated air at the source, before 1-BP is spread into the breathing

zone. Possible activities where local exhaust ventilation may be needed include parts drying and vapor degreasing.

c. Other Engineering/Administrative Controls. Other control options include controlled hoists, effective cooling coils, and using lids on containers. Vapor degreasing should be isolated from other work areas. Waste 1-BP-soaked rags should be kept in a sealed container. Minimize use of 1-BP, if possible. Employers can also help to control employee exposure by scheduling reduced work times in contaminated areas and by promoting hazard recognition and work practice training.

d. Personal Protective Equipment (PPE). PPE is the last line of defense because its use does not eliminate the hazard from the workplace and its failure can result in worker exposure. A respirator may be required depending on the air concentration of 1-BP. Exposures need to be evaluated with air monitoring in order to select appropriate respiratory protection, particularly because of the proposed 100-fold decrease in the TLV. The PPE for skin protection includes protective gloves and chemical protective clothing, such as aprons or sleeves. 1-BP can penetrate some common glove materials within 30 minutes to 2 hours. Gloves that are considered to be well-suited for applications with 1-BP include laminate film, supported polyvinyl alcohol, and viton/butyl unsupported.

POINT OF CONTACT

The AIPH point of contact for this information is Occupational Health Sciences Portfolio, Industrial Hygiene Field Service Program, commercial 410-436-3118, or DSN: 584-3118.

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