Call for Public Comments on Proposed ERPGs for Nitrogen Trifluoride

The AIHA Guideline Foundation (AGF) Emergency Response Planning (ERP) Committee develops Emergency Response Planning Guidelines (ERPGs) for responding to potential releases of airborne substances for use in community emergency planning. ERPGs are air concentration guidelines for single exposures to agents and are intended for use as tools to assess the adequacy of accident prevention and emergency response plans, including transportation emergency planning, community emergency response plans and incident prevention and mitigation.

The ERP Committee has proposed the following values for ERPGs for Nitrogen Trifluoride. In addition to providing comments, the Committee also welcomes any additional references or resources that could be provided to them for consideration. The public comment period ends on April 11, 2016. Comments should be sent to the AGF addressed to Laurie Mutdosch (lmutdosch@aiha.org) or

AIHA Guideline Foundation
3141 Fairview Park Drive, Suite 777
Falls Church, VA 22042

RECOMMENDED ERPGS FOR NITROGEN TRIFLUORIDE AND RATIONALES

A. ERPG-3: 800 ppm (2320 mg/m³)

**800 ppm is the maximum airborne concentration below** which nearly all individuals could be exposed to for up to one hour without experiencing or developing life-threatening health effects. The one-hour LC50’s in monkeys and dogs were approximately 10,000 and 9600 ppm, and the highest nonlethal levels were 8520 and 8550, respectively (Vernot 1973). The highest nonlethal level for a 1 hour exposure to rats was 4120 ppm (Vernot 1973). Based on the monkey data, most adults could survive a 1-hr exposure to 8,000 ppm; however, since infants do not have the NADH cofactor involved in metabolizing methemoglobin, a level of 800 ppm is selected for ERPG-3.

B. ERPG-2: 400 ppm (1160 mg/m³)

**400 ppm is the maximum airborne concentration** below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious adverse health effects or symptoms which could impair an individual’s ability to take protective action. No adverse effects were observed in mice, rats, dogs, and monkeys in a one hour exposure to 2000 ppm of NF₃, and 8,000 ppm did not produce serious health effects in monkeys (Vernot 1973). This would suggest that most individuals could be exposed to 800 ppm without frank toxicity, and this is well below the threshold for CNS depression. None the less, because of the uncertainty of effect in infants, a level of 400 ppm is selected for ERPG-2.

C. ERPG-1: 200 ppm (580 mg/m³)

**200 ppm nitrogen trifluoride is the maximum airborne concentration below** which nearly all individuals could be exposed for up to one hour without experiencing more than a transient mild irritation or objectionable odor. In monkeys, exposure to 2,000 ppm produces 10%
methemoglobin (Vernot 1973) which suggest humans exposed to 200 ppm would be not exhibit more than 5% methemoglobin. However, in infants with low hemoglobin levels, methemoglobinemia can produce cyanosis at levels of 3% methemoglobin in these infants. (Greer 2005) A level of 200 ppm should be protective of all infants, except those with very low hemoglobin levels.

History of Nitrogen Trifluoride ERPG

First published in 2005:

ERPG-1  NA;  ERPG-2  400 ppm;  ERPG-3  800 ppm

Updated and revised in 2016:

ERPG-1  200 ppm;  ERPG-2  400 ppm;  ERPG-3  800 ppm

References


4. www.epa.gov/oppt/aegl/...full URL to the Interim AEGL documentation ... pdf


11. DuPont Co., Haskell Laboratory (Unpublished Data):

12. 1960a. HL-22-60. “Acute inhalation test with crude nitrogen trifluoride (87%)”

13. NF3, 4% trans-N2F2, 3% cis-N2F2, 4% N2F2, traces N2O.”


17. 2003b Dupont 12037. “Inhalation Pilot Developmental Toxicity Study in Rats”


