CLIP, Chemical Laboratory Information Profile

"Only when you know the hazards, can you take the necessary precautionary measures."

Nitric Acid (approx. 70%) HNO_3 CAS No.: 7697-37-2

Synonyms: Concentrated nitric acid, Aqua fortis

Physical Properties

Colorless to yellow–brown liquid with a pungent odor.

Vapor pressure at 20 °C:	9.4 torr
Melting point:	– 42 °C
Boiling point:	122 °C

Exposure Limits

OSHA PEL:	2 ppm
ACGIH TLV:	2 ppm
STEL:	4 ppm

Hazardous Characteristics

Overall toxicity	Flammability	Destructive to skin/eye	Absorbed through skin	Sensitizer?	Self-reactive?	Incompatible with:
3	0	4	0	No	No	Flammables, combustibles, other reducing agents; bases; most metals; many organic compounds; rubber; wood.*

0: None (or very low); 1: Slight; 2: Moderate; 3: High; 4: Severe.

***Reactivity Hazards**

Nitric acid is a very strong oxidizing agent. As such, it is frequently involved in reactive chemical accidents. Even when dilute, it is a relatively strong oxidizing agent. Often, the reaction products include carbon dioxide and nitrogen dioxide; consequently, reactions in closed vessels and in vessels with restricted openings can result in explosions. See Bretherick's *Handbook of Reactive Chemical Hazards* for details and for other incompatibilities.

Cited as known to be or reasonably anticipated to be carcinogenic in NTP-9? No

Identified as a reproductive toxin in Frazier and Hage, *Reproductive Hazards of the Workplace*? No, however some reactions with nitric acid produce N_2O (so-called nitrous oxide) that is identified by Frazier and Hage as a reproductive toxin.

Typical symptoms of acute exposures:

When inhaled: coughing, sore throat, lung edema. When ingested: sore throat, abdominal pain. On the skin: pain, yellow necrotic patches that slough off, severe burns. In the eyes: pain, blurred vision, blindness. CAUTION: Even 1M acid is destructive.

Principal target organ(s) or system(s):

Respiratory system, skin, eyes.

Storage Requirements

Store separately, in a cool, dry, well-ventilated location, away from other oxidizing agents (such as perchloric acid, potassium permanganate), away from flammables, combustibles, and other reducing agents including acetic and other organic acids.

Additional Remarks

At ordinary temperatures, the vapor pressure of nitric acid greatly exceeds the limits established by OSHA and ACGIH. Accordingly, users will be likely to be over-exposed to the vapors of this compound unless appropriate precautions are rigidly maintained; see the MSDS for details. Symptoms of lung edema are not manifest immediately in victims who have inhaled nitric acid vapors or mist; some hours may elapse first; physical effort can exaggerate these symptoms. Rest is essential for persons exposed to excess vapor or mist. Note that the properties of fuming (more hazardous) nitric acid are not described in this CLIP.

Notes

ReadMe

This Chemical Laboratory Information Profile is *not* a Material Safety Data Sheet. It is a brief summary for teachers and their students that describes some of the hazards of this chemical as it is typically used in laboratories. On the basis of your knowledge of these hazards and before using or handling this chemical, *you need to select the precautions and first-aid procedures to be followed*. For that information as well as for other useful information, refer to Material Safety Data Sheets, container labels, and references in the scientific literature that pertain to this chemical.

Reproductive Toxins

Some substances that in fact are reproductive toxins are not yet recognized as such. For the best readily available and up-to-date information, refer to "DART/ETIC". See the TOXNET home page at *www.sis.nlm.nih.gov* and click on "Toxicology search". *Note that some of the data in DART/ETIC have not been peer-reviewed.* See also Linda M. Frazier and Marvin L. Hage, *Reproductive Hazards of the Workplace*; Wiley, 1998; and T. H. Shepard, *Catalog of Teratogenic Agents*, 9th ed.; Johns Hopkins University Press, 1998.

Abbreviations

ACGIH TLV—American Conference of Governmental Industrial Hygienists–Threshold Limit Value. C—Ceiling. CAS—Chemical Abstracts Service. mg/m^3—milligrams per cubic meter. NA—Not applicable. NE—Not established. NI—No information. NTP-9—National Toxicology Program, Ninth Annual Report on Carcinogens. OSHA PEL—Occupational Safety and Health Administration–Permissible Exposure Limit. ppm—parts per million. STEL/C—Short-term exposure limit and ceiling.

Prepared by: Jay A. Young

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