NIOSH/OSHA STANDARDS COMPLETION PROGRAM

DRAFT TECHNICAL STANDARD AND

SUPPORTING DOCUMENTATION FOR

*** TELLURIUM HEXAFLUORIDE ***

NIOSH/OSHA Draft Technical Standard and Supporting Documentation for TELLURIUM HEXAFLUORIDE

The basic text of this document contains the draft technical standard approved by the Joint Review Committee of the NIOSH/OSHA Standards Completion Program and the supporting documentation for the substance TELLURIUM HEXAFLUORIDE.

The SCP draft technical standards are recommendations to the Department of Labor for its consideration in rulemaking and have no legal status until final rules have been promulgated by that agency. This draft standard is provided for your information only.

The References and Sources, Respirator Table Documentation and Use/Exposure and Control Documentation are the working documents used by the various SCP working groups during the development of the draft technical standard and serve as the technical foundation for the standard. The classification for each substance and the regulatory statements were derived following a decision logic established for the various sections of the standard.

(a) Definitions. (1) "Permissible exposure" means exposure of employees to airborne concentrations of tellurium hexafluoride not in excess of 0.02 parts per million (ppm) (0.2 milligrams per cubic meter (mg/M3)), averaged over an eight-hour work shift (time weighted average), as stated in § 1910.1000, Table Z-1.

(2) "Action level" means one half of the permissible exposure for tellurium hexafluoride.

(b) Exposure determination and measurement. (1) Each employer who has a place of employment in which tellurium hexafluoride is released into the workplace air shall determine if any employee may be exposed to airborne concentrations of tellurium hexafluoride at or above the action level. The determination shall be made each time there is a change in production, process, or control measures which could result in an increase in airborne concentrations of tellurium hexafluoride.

(2) A written record of the determination shall be made and shall contain at least the following information:

(i) Any information, observations, or calculations which may indicate employee exposure to tellurium hexafluoride;

(ii) Any measurements of tellurium hexafluoride taken;

(iii) Any employee complaints of symptoms which may be attributable to exposure to tellurium hexafluoride; and

(iv) Date of determination, work being performed at the time, location within work site, name, and social security number of each employee considered.

(3) If the employer determines that any employee may be exposed to tellurium hexafluoride at or above the action level, the exposure of the employee in each work operation who is believed to have the greatest exposure shall be measured. The exposure measurement shall be representative of the maximum eight-hour time weighted average exposure of the employee.

(4) If the exposure measurement taken pursuant to paragraph (b) (3) of this section reveals employee exposure to tellurium hexafluoride at or above the action level, the employer shall:

(i) Identify all employees who may be exposed at or above the action level; and

(ii) Measure the exposure of the employees so identified.

(5) If an employee exposure measurement reveals that an employee is exposed to tellurium hexafluoride at or above the action level, but not above the permissible exposure, the exposure of that employee shall be measured at least every two months.

(6) If an employee exposure measurement reveals that an employee is exposed to tellurium hexafluoride above the permissible exposure, the employer shall:

(i) Measure the exposure monthly of the employee so exposed; and

(ii) Institute control measures as required by paragraph (d) of this section; and

(iii) Individually notify, in writing, within five days, every employee who is found to be exposed to tellurium hexafluoride above the permissible exposure. The employee shall also be notified of the corrective action being taken to reduce the exposure to at or below the permissible exposure.

(7) If two consecutive employee exposure measurements taken at least one week apart reveal that the employee is exposed to tellurium hexafluoride

below the action level, the employer may terminate measurement for the employee.

(8) For purposes of this paragraph, employee exposure is that which would occur if the employee were not using a respirator.

(c) Methods of measurement. (1) An employee's exposure shall be obtained by any combination of long term or short term samples which represents the employee's actual exposure averaged over an eight-hour work shift (See Appendix B (iv) of this section).

(2) The method of measurement shall have an accuracy, to a confidence level of 95 percent, of not less than that given in Table 1.

Table 1

Concentration	Required Accuracy
Above permissible exposure	± 25%
At or below permissible exposure and above the action level	± 35%
At or below the action level	± 50%

(d) Compliance. (1) No employee shall be exposed to tellurium hexafluoride above the permissible exposure as defined in paragraph (a)(1) of this section.

(2) Employee exposures to airborne concentrations of tellurium hexafluoride shall be controlled to at or below the permissible exposure by engineering and work practice controls:

(i) Engineering and work practice controls shall be instituted to reduce exposures to at or below the permissible exposure, except to the extent that such controls are not technically feasible.

(ii) Wherever engineering and work practice controls are not sufficient to reduce exposures to at or below the permissible exposure, they shall nonetheless be used to reduce exposure to the lowest level feasible and shall be supplemented by respirators in accordance with paragraph (d)(4) of this section.

(3) Engineering controls. When mechanical ventilation is used to control exposure, measurements which demonstrate system effectiveness, for example, air velocity, static pressure, or air volume, shall be made at least every three months. Measurements of system effectiveness shall also be made within five days of any change in production, process, or control which might result in an increase in airborne concentrations of tellurium hexafluoride.

(4) Compliance with the permissible exposure shall not be achieved by the use of respirators except:

(i) During the time period necessary to install or implement engineering or work practice controls; or

(ii) In work situations in which engineering and work practice controls are technically not feasible; or

(iii) To supplement engineering and work practice controls when such controls fail to reduce airborne concentrations of tellurium hexafluoride to at or below the permissible exposure; or

(iv) For operations which require entry into tanks or closed vessels; or

(v) In emergencies.

(5) Where respirators are needed and permitted under this paragraph to reduce employee exposure, the employer shall select and provide the appropriate respirator from Table 2 and shall ensure that the employee uses the respirator provided.

TABLE 2 RESPIRATORY PROTECTION FOR TELLURIUM HEXAFLUORIDE

CONDITION	PERMISSIBLE RESPIRATORY PROTECTION
Gas Concentration	
0.2 ppm or less	Any supplied-air respirator. Any self-contained breathing apparatus.
1 ppm or less	Any supplied-air respirator with a full facepiece, helmet or hood. A Type C supplied-air respirator operated in pressure - demand or other positive pressure or continuous-flow mode. Any self-contained breathing apparatus with a full facepiece.
Greater than 1 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied - air respirator with a full facepiece operated in pressure - demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against tellurium hexafluoride. Any escape self-contained breathing apparatus.

(6) Respirators shall be approved by the Mining Enforcement and Safety Administration (formerly Bureau of Mines) or by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11.

(7) The employer shall institute a respiratory protection program in accordance with § 1910.134(b), (d), (e), and (f).

(e) Fire and safety. The employer shall familiarize himself with the information contained in the Substance Technical Guidelines (Appendix B of this section) for tellurium hexafluoride.

(f) Reserved.

(g) Spills and disposal. In the event that tellurium hexafluoride is released the employer shall immediately provide available ventilation to disperse the gas.

(h) Reserved.

(i) Training and information. (1) Each employer who has a workplace in which tellurium hexafluoride is present shall keep a copy of this regulation with Appendixes A, B and C at the workplace. This material shall be made readily available to affected employees.

(2) Each employer who has employees exposed to tellurium hexafluoride above the action level or employees who work where a release of tellurium hexafluoride may occur, shall annually:

(i) Inform affected employees of the information contained in the Substance Safety Data Sheet for tellurium hexafluoride (Appendix A of this section);

(ii) Advise affected employees as to the signs and symptoms of exposure to tellurium hexafluoride.

(iii) Instruct affected employees to advise the employer of the development of signs and symptoms of exposure to tellurium hexafluoride which are listed in Appendix A of the section;

(iv) Instruct affected employees to inform the employer if they develop any of the medical conditions listed in paragraph (j)(2) of this section; and

(v) Provide training to ensure that employees understand the precautions of safe use, emergency procedures, and the correct use of protective equipment relative to tellurium hexafluoride.

(j) Medical surveillance. (1) The employer shall provide medical procedures as required by this paragraph. All medical procedures shall be performed by or under the supervision of a physician at no cost to the employee.

(2) The employer shall obtain from each employee who is exposed, or will be exposed, to airborne concentrations of tellurium hexafluoride at or above the action level information as to whether such employee has a history of chronic lung disease.

(3) The employer shall provide a medical examination for the employee if:

(i) The employee provides a history of any of the medical conditions listed in paragraph (j)(2) of this section; or

(ii) The employee informs the employer of the development of any of the medical conditions listed in paragraph (j)(2) of this section or any of the signs or symptoms of exposure to tellurium hexafluoride which are listed in Appendix A which the employee suspects are caused by exposure to tellurium hexafluoride.

(4) The employer shall provide to the examining physician the following information:

(i) A copy of this regulation with Appendixes A, B and C for tellurium hexafluoride;

(ii) A description of the affected employee's duties as they relate to his exposure to tellurium hexafluoride;

(iii) A description of any personal protective equipment and respirators required to be used;

(iv) The results of any measurements which may indicate the affected employee's exposure;

(v) The affected employee's anticipated exposure; and

(vi) Upon request of the physician, any available information from previous medical examinations of the affected employee.

(5) Where a medical examination is required by paragraph (j)(3) of this section, following such examination the employer shall obtain a written opinion from the examining physician which conforms with paragraph (j)(6) of this section.

(6)(i) The physician's written opinion shall be a signed statement by the examining physician specifically stating: (A) Whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health from exposure to tellurium hexafluoride or would directly or indirectly aggravate any detected medical condition;

(B) Any recommended limitations upon the employee's exposure to tellurium hexafluoride including limitations upon the use of personal protective equipment and respirators;

(C) That the employee has been informed by the physician of any detected medical conditions which require further medical examination or treatment.

(ii) The physician's written opinion shall not reveal specific medical findings or diagnoses unrelated to exposure to tellurium hexafluoride.

(iii) The employer shall provide the employee with a copy of the physician's written opinion.

(7) No employee shall be exposed to airborne concentrations of tellurium hexafluoride in such a way as would put the employee at increased risk of material impairment of his health from such exposure. This determination may be based on the physician's written opinion.

(8) The employer shall provide emergency and follow-up medical examinations and treatment for any employee injured through exposure to tellurium hexafluoride.

(9) If an employee refuses any required medical examination, the employer shall inform the employee of the possible health consequences of such refusal and obtain a signed statement from the employee indicating that the employee understands the risk involved by refusal to be examined.

(10) No medical procedure which would be performed pursuant to this section need be performed if records of a previous such procedure performed within the past six months are acceptable to the examining physician.

(k) Recordkeeping. (1) Exposure determination. (i) The employer shall keep an accurate record of all determinations required to be made pursuant to paragraph (b)(1) of this section.

(ii) This record shall include the written determination required in paragraph (b)(2) of this section.

(iii) This record shall be maintained until replaced by a more recent record.

(2) Exposure measurements. (i) The employer shall keep an accurate record of all measurements taken to determine employee exposure to tellurium hexafluoride.

(ii) This record shall include:
(A) The date of measurement;
(B) Operations involving exposure to tellurium hexafluoride which are being monitored;
(C) Sampling and analytical methods used and evidence of their accuracy, including the method, results and date of calibration of sampling equipment;
(D) Number, duration, and results of samples taken; and
(E) Name, social security number and exposure of the employee monitored.
(iii) This record shall be maintained until replaced by a more recent record but in no event for less than one year.
(3) Mechanical ventilation. (i) When mechanical ventilation is used as an engineering control, the employer shall maintain an accurate record of the measurements demonstrating the effectiveness of such ventilation required by paragraph (d)(3) of this section.
(ii) This record shall include:
(A) Date of measurement;
(B) Type of measurement taken;
(C) Result of measurement.
(iii) These records shall be maintained for at least one year.
(4) Employee training and information. (i) The employer shall keep an accurate record of all employee training and information required by paragraph (i) of this section.
(ii) This record shall include:
(A) Date of training;
(B) Name and social security number of employee trained;
(C) Content or scope of training provided.
(iii) This record shall be maintained until replaced by a more recent record.
(5) Medical surveillance. (i) The employer shall keep an accurate record of employee medical surveillance required by paragraph (j) of this section.
(ii) This record shall include:
(A) Information concerning medical conditions obtained from the employee pursuant to paragraph (j)(2) of this section;
(B) Any employee medical complaints relative to exposure to tellurium hexafluoride;
(C) A copy of information provided to the physician pursuant to paragraph (j)(4)(ii), (iii), (iv), (v), and (vi) of this section.
(D) Physician's written opinion; and
(E) A signed statement of any refusal to be examined.
(iii) This record shall be maintained for the duration of the employment of the affected employee.
(6) Access to records. (i) All records required to be maintained by this section shall be made available upon request to authorized representatives of the Assistant Secretary of Labor for Occupational Safety and Health and the Director of the National Institute for Occupational Safety and Health.
(ii) Employee exposure determination and exposure measurement records required to be maintained by this section shall be made available to employees and former employees and their designated representatives.

(iii) Employee medical records required to be maintained by this section shall be made available upon written request to a physician designated by the employee or former employee.

(l) Employee observation of measurement. (1) The employer shall give affected employees or their representatives an opportunity to observe any measurement of employee exposure to tellurium hexafluoride which is conducted pursuant to this section.

(2) When observation of measurement of employee exposure to tellurium hexafluoride requires entry into an area where the use of personal protective devices, including respirators, is required, the observer shall be provided with and required to use such equipment and comply with all other applicable safety procedures.

(3) Without interfering with the measurement, observers shall be entitled to:

(i) Receive an explanation of the measurement procedure.

(ii) Visually observe all steps related to the measurement of the airborne concentration of tellurium hexafluoride that are being performed at the place of exposure; and

(iii) Record the results obtained.

NOTE: The information contained in the following appendixes is advisory in nature and is not intended, by itself, to create any additional obligations not otherwise imposed or detract from any existing obligation.

APPENDIX A

SUBSTANCE SAFETY DATA SHEET FOR TELLURIUM HEXAFLUORIDE

I. SUBSTANCE IDENTIFICATION

A. Substance: Tellurium hexafluoride

B. Permissible Exposure: 0.02 parts of tellurium hexafluoride per million parts of air (ppm) (0.2 milligrams of tellurium hexafluoride per cubic meter of air (mg/M3)), over an eight-hour work shift.

C. Appearance and Odor: Colorless gas with a repulsive odor

II. HEALTH HAZARD DATA

A. Ways in which the chemical affects your body: Tellurium hexafluoride can affect your body if you inhale it.

B. Effects of Overexposure:

1. Short-term Exposure: Tellurium hexafluoride may cause a garlic odor to the breath, headaches and difficulty in breathing. Tellurium exposure experience with animals indicates that delayed severe breathing difficulties might occur.

2. Long-term Exposure: None known.

3. Reporting Signs and Symptoms: You should inform your employer if you develop any signs or symptoms and suspect that they are caused by exposure to tellurium hexafluoride.

III. EMERGENCY FIRST AID PROCEDURES

A. Breathing: If you or any other person breathes in large amounts of tellurium hexafluoride move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

B. Rescue: Move affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty yourself. Understand your emergency rescue procedures and know the locations of the equipment before the need arises.

IV. RESPIRATORS AND PROTECTIVE CLOTHING

A. Respirators: Respirators are not the best way to control exposure to tellurium hexafluoride. You can only be required to wear them for routine use if your employer is in the process of installing controls or control measures prove inadequate. You may be required to wear respirators for non-routine activities or in emergencies. If respirators are worn, they must have a Mining Enforcement and Safety Administration (MESA) or National Institute for Occupational Safety and Health (NIOSH) approval label. (Older respirators may have a Bureau of Mines approval label.) For effective protection, respirators must fit your face and head snugly. Respirators should not be loosened or removed in work situations where there use is required. If you can smell tellurium hexafluoride while wearing a respirator, the respirator is not working correctly; go immediately to fresh air. If you experience difficulty breathing while wearing a respirator, tell your employer.

B. Protective Clothing: Not applicable.

C. Eye Protection: Not applicable.

V. PRECAUTIONS FOR SAFE USE, HANDLING AND STORAGE

A. Tellurium hexafluoride must be stored in tightly closed containers in a well-ventilated area.

B. Ask your supervisor where tellurium hexafluoride is used in your work area and for any additional safety and health rules.

VI. ACCESS TO INFORMATION

A. Each year your employer is required to inform you of the information contained in this Substance Safety Data Sheet for tellurium hexafluoride. In addition, your employer must instruct you in the safe use of tellurium hexafluoride, emergency procedures, and the correct use of protective equipment.

B. Your employer is required to determine whether you are being exposed to tellurium hexafluoride. You or your representative have the right to observe employee exposure

measurements and to record the results obtained. If your employer determines that you are being overexposed, he is required to inform you of the exposure and of the actions which are being taken to reduce your exposure.

C. Your employer is required to keep records of exposure determinations, exposure measurements, and medical surveillance. Your employer is required to make records of exposure determinations and your exposure measurements available to you or your representative upon your request. Your employer is required to release your medical records to your physician upon your written request.

APPENDIX B

SUBSTANCE TECHNICAL GUIDELINES FOR TELLURIUM HEXAFLUORIDE

I. PHYSICAL AND CHEMICAL DATA

A. Substance Identification

1. Synonyms: None
2. Formula: TeF_6
3. Molecular weight: 241.6

B. Physical Data

1. Boiling point (760 mm Hg): -38.4 C (-38 F) (sublimes)
2. Specific gravity (Water = 1): Not applicable
3. Vapor density (air = 1 at boiling point of tellurium hexafluoride): 8.3
4. Melting point: -37.8 C (-36 F) (triple-point)
5. Vapor pressure at 20 C (68 F): Greater than 1 atmosphere
6. Solubility in water, % by weight at 20 C (68 F): Reacts slowly
7. Evaporation rate (butyl acetate = 1): Not pertinent
8. Appearance and Odor: Colorless gas with a repulsive odor

II. FIRE, EXPLOSION AND REACTIVITY HAZARD DATA

A. Fire,

1. Not combustible

B. Reactivity

1. Conditions contributing to instability: None.
2. Incompatibilites: None.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen fluoride) may be released when tellurium hexafluoride decomposes.
4. Special precautions: See 29 CFR 1910.101 for specific regulations on storage of compressed gas cylinders.

III. LEAK PROCEDURES

A. If tellurium hexafluoride is leaked, the following steps should be taken:

1. Ventilate area of leak to disperse the gas.

2. Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.

B. Persons not wearing protective equipment should be restricted from areas of leaks until cleanup has been completed.

IV. MONITORING AND MEASUREMENT PROCEDURES

A. EXPOSURE ABOVE THE ACTION LEVEL: Measurements taken for the purpose of determining employee exposure under this section are best taken such that the average 8-hour exposure may be determined from a single eight-hour sample or two (2) 4-hour samples. Several short time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). Sampling and analyses may be performed by instruments such as detector tubes certified by NIOSH under 42 CFR part 84, portable direct-reading instruments, dosimeters, or gas and vapor adsorption tubes with subsequent chemical analyses. The method of measurement must determine the concentration of tellurium hexafluoride to plus or minus 35%.

B. EXPOSURE ABOVE THE PERMISSIBLE EXPOSURE: The monitoring and measurements under this section should be essentially the same as described under paragraph IV. A. Laboratories performing chemical analyses should be accredited in Industrial Hygiene Chemistry by the American Industrial Hygiene Association. The method of measurement must determine the concentration of tellurium hexafluoride to plus or minus 25%.

C. METHODS: Methods meeting these accuracy requirements are available from the National Technical Information Service, U. S. Department of Commerce, Springfield, Virginia 22161 under the title "NIOSH Analytical Methods for Set M" (Order number XXXXXXXXXX).

D. QUALIFIED PERSONS: Since many of the duties relating to employee protection are dependent on the results of monitoring and measuring procedures, employers should assure that the evaluation of employee exposures is performed by a competent industrial hygienist or other technically qualified person.

V. MISCELLANEOUS PRECAUTIONS

A. Store tellurium hexafluoride in tightly closed containers in well ventilated area.

B. Employers should advise employees of all areas and operations where exposure to tellurium hexafluoride could occur.

VI. COMMON OPERATIONS

Common operations in which exposure to tellurium hexafluoride is likely to occur are: during its production and during use in scientific research.

APPENDIX C - MEDICAL SURVEILLANCE GUIDELINES

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I. ROUTE OF ENTRY

Inhalation.

II. TOXICOLOGY

Tellurium hexafluoride gas is a severe respiratory irritant. Animals exposed to 1 ppm for 4 hours developed pulmonary edema; 5 ppm for 4 hours was fatal. Human experience has indicated that exposure to tellurium hexafluoride caused headache and dyspnea. No systemic effects have been reported from industrial exposure, but relatively few studies are available.

III. SIGNS AND SYMPTOMS

Headache; dyspnea; by analogy to effects caused in animals it may cause pulmonary edema.

IV. SPECIAL TESTS

None in common usage.

V. TREATMENT

Remove from exposure. If a solution of the gas is swallowed, immediately administer water orally and induce vomiting. Give artificial resuscitation if indicated. Consideration should be given to hospitalization and observation for the possible delayed onset of pulmonary edema. Recovery is usually complete.

VI. SURVEILLANCE AND PREVENTIVE CONSIDERATIONS

A. GENERAL

Tellurium hexafluoride causes pulmonary edema in animals and dyspnea in humans. It is important that the physician become familiar with plant operating conditions in which exposure to tellurium hexafluoride occurs. Those with skin disease may not tolerate the wearing of protective clothing and those with chronic respiratory disease may not tolerate the wearing of negative pressure respirators.

B. PREPLACEMENT

Routine medical histories and physial examinations are not required. However, the employer must screen employees for history of certain medical conditions (listed below) which might place the employee at increased risk from tellurium hexafluoride exposure. Only those giving a positive history of these conditions must be referred for further medical examinations.

1. Chronic respiratory disease -- Tellurium hexafluoride causes respiratory irritation. In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of tellurium hexafluoride might cause exacerbation of symptoms due to its irritant properties.

C. PERIODIC EXAMINATIONS

Routine periodic examinations are not required. However, if the employer becomes aware of an employee with the above listed conditions, he must refer such employee for further medical examination.

VII. REFERENCES

1. American Conference of Governmental Industrial Hygienists: "Tellurium Hexafluoride," Documentation of the Threshold Limit Values for Substances in Workroom Air (3d ed., 2d printing), Cincinnati, 1974, p. 246.

2. Hygienic Guide Series: "Tellurium," American Industrial Hygiene Association Journal, 25:198-201, 1964.

3. Cerwenka, E.A., Jr. and W.C. Cooper: "Toxicology of Selenium and Tellurium and Their Compounds," Archives of Environmental Health, 3:71:-82, 1961.

4. Cooper, W.C.: Tellurium, Van Nostrand Reinhold Company, New York, 1971, pp. 317, 320-321.

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REFERENCES AND SOURCES
TELLURIUM HEXAFLUORIDE
1910.93

(f) Personal Protective Equipment, and, (h) Sanitation

Tellurium hexafluoride melts at -37.8 degrees C and sublimes at -38.4 degrees C. Since it is highly unlikely to be encountered in other than the gaseous state and since there is no data indicating any adverse effects resulting from contact with tellurium hexafluoride, these sections are reserved.

SUBSTANCE TECHNICAL GUIDELINES

The references cited for this document include:

Kirk-Othmer, "Encyclopedia of Chemical Technology," 2nd edition, Vol. 19, p. 756 (K-O)

"Gmelin's Handbuch der Anorganischem Chemie," Vol. 11, p. 317 (Gmelin)

Sources of data items used:

I. A. 1. Synonyms: None
2. Formula: Gmelin
3. Molecular weight: Gmelin

B. 1. Boiling point: Gmelin
2. Specific gravity: Not applicable
3. Vapor density: ADL
4. Melting point: Gmelin
5. Vapor density: ADL
6. Solubility in water: Gmelin; K-O
7. Evaporation rate: Not applicable
8. Appearance and odor: Gmelin

II. A. 1. Flash point: Not applicable
2. Autoignition temperature: Not applicable
3. Flammable limits: Not applicable
4. Extinguishing media: Not applicable
5. Special fire fighting procedures: ADL
6. Unusual fire and explosion hazards: ADL

B. 1. Conditions contributing to instability: ADL
2. Incompatibilities: None
3. Hazardous decomposition products: Gmelin; K-O
4. Special precautions: None

III. A. Steps if released or spilled: ADL

B. Waste disposal method: ADL

V. Miscellaneous precautions: ADL

USE/EXPOSURE AND CONTROL DOCUMENT

References used in the preparation of this document include:

"Chemical Abstracts," American Chemical Society, Vol. 31 - 80, 1937 - 1974 (CA)

"Merck Index of Chemicals and Drugs," Merck and Co., Inc., 8th edition, 1968 (Merck)

Sax, N. I., "Dangerous Properties of Industrial Materials," Reinhold Publishing Co., 3rd edition, 1968 (Sax)

References for Specific Use/Exposure

1. CA
2. Merck

References for Specific Control Methods

ADL estimate was the reference used in both Specific Control Methods.

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RESPIRATOR TABLE DOCUMENTATION

SUBSTANCE: Tellurium hexafluoride

D. O. L. STANDARD: 0.02 ppm

WARNING PROPERTIES:

Odor Threshold: There is no quantitative information available concerning the odor threshold of tellurium hexafluoride. The Documentation of TLV's, however, notes that this gas has an unpleasant odor.

Eye Irritation Level: Tellurium hexafluoride is not known to be an eye irritant.

Evaluation of Warning Properties: Since there is no quantitative information available relating the warning properties to air concentrations of tellurium hexafluoride, this compound is treated as a material with poor warning properties. Gas sorbent respirator equipment is not permitted.

IDLH: 1 ppm

Basis for IDLH Value: This IDLH is based upon the report in the Documentation of TLV's that animals "showed evidence of pulmonary edema (disturbed breathing) at the lowest exposure tested, 1 ppm for four hours . . . a one hour exposure at 1 ppm produced greatly accelerated respiration but no mortality." The IDLH has been conservatively set, but there is no other acute inhalation toxicity information upon which to base an IDLH. Exposure for four hours to higher concentrations (5, 10, 25, 50 and 100 ppm TeF6) "proved invariably fatal to all exposed animals."

Other Toxicological Information: According to the Documentation of TLV's, "acute inhalation toxicity studies of small numbers of four animal species made under the same conditions as those for SeF6 showed evidence of pulmonary edema (disturbed breathing) at the lowest exposure tested, 1 ppm for four hours (Ct = 4 ppm - hours); all other exposures (5, 10, 25, 50 and 100 ppm TeF6) proved invariably fatal to all exposed animals; a one-hour exposure at 1 ppm produced greatly accelerated respiration but no mortality. A daily repeated one-hour exposure at 1 ppm for five days resulted in 'no recognizable injury among the animals.' As this constituted an exposure of Ct = 5 without effect, intermittently over a five-day period, whereas serious effects were seen after a single exposure of Ct = 4, tolerance development against the acute effects would seem a reasonable interpretation . . . On the basis that TeF6 is approximately two and one-half times as acutely toxic as ozone, a TLV of 0.02 ppm (0.2 mg/M3) is recommended to protect against the acute toxic effects on the respiratory tract . . ."

LFL: Tellurium hexafluoride is not combustible.

VAPOR PRESSURE AT 20 C: Tellurium hexafluoride is a gas at 20 C.

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	Use/Exposure	Principal Route of Entry	Currently Used Control Methods
1.	Inhalation of gas and skin contact with gas during use for scientific studies - physical and chemical properties (magnetic spin, force constants spectra, electron diffraction, crystal structure, corrosive action, reactions)	A,D	Process enclosure; local exhaust ventilation; general dilution ventilation
2.	Inhalation of gas and skin contact with gas during the synthesis of tellurium hexafluoride (direct fluorination of tellurium metals)	A,D	Process enclosure; local exhaust ventilation; general dilution ventilation

A -- Inhalation
B -- Skin and eye contact resulting in localized irritation
C -- Ingestion
D -- Skin contact resulting in absorption and subsequent systemic poisoning

------ JES2 JOB STATISTICS ------

876 CARDS READ

0 SYSOUT PRINT RECORDS

0 SYSOUT PUNCH RECORDS

0.00 MINUTES EXECUTION TIME

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*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
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*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
*** JES2 NJE *A*   FWMMITS  OSH    JOB 1917   END   PRINTER8   MITS-PERIF-0205    4.29.03
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