

NIOSH/OSHA STANDARDS COMPLETION PROGRAM

DRAFT TECHNICAL STANDARD AND
SUPPORTING DOCUMENTATION FOR

*** PETROLEUM DISTILLATES ***

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for PETROLEUM DISTILLATES

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 PETROLEUM DISTILLATES.

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.

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(a) DEFINITIONS

- (1) PERMISSIBLE EXPOSURE - "Permissible Exposure" means inhalation of petroleum distillates (naphtha) in concentrations not in excess of 500 parts per million (ppm) (2,000 milligrams per cubic meter, mg/cu.m.) averaged over an eight hour work shift, as stated in section 1910.93, Table G-1.
- (2) ACTION LEVEL - "Action Level" means one half (1/2) of the permissible exposure for petroleum distillates (naphtha).
- (3) Petroleum Distillates (naphtha): means a paraffinic petroleum product composed of hydrocarbon compounds with five to eight carbon atoms. Petroleum distillates (naphtha) have a flash point range of -40 to 20C (-40 to 68F) and a boiling range of 30 to 127C (86 to 260F).
Ref. Merck Index 8th Edition

(b) EMPLOYEE INFORMATION - Each employer who has a workplace in which petroleum distillates (naphtha) is present shall:

- (1) STANDARD AVAILABILITY - Keep a copy of this section with its appendices A, B and C, at the workplace. This material shall be made readily available to affected employees; and
- (2) PRESENCE OF PETROLEUM DISTILLATES (NAPHTHA) - Inform affected employees of the quantity, location, and manner of use or storage of petroleum distillates (naphtha).

(c) EXPOSURE MEASUREMENT

- (1) INITIAL DETERMINATION - Each employer who has a place of employment in which petroleum distillates (naphtha) is released into the workplace air shall determine if any employee may be exposed to airborne concentrations of petroleum distillates (naphtha) 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 petroleum distillates (naphtha). A written determination shall be made and it shall contain at least the following information:
 - (i) Any information, observations, or calculations which would indicate employee exposure to petroleum distillates (naphtha);
 - (ii) Any measurements of airborne concentrations of petroleum distillates taken;
 - (iii) Any employee complaints of symptoms which may be attributable to exposure to petroleum distillates (naphtha); and
 - (iv) Date of determination, work being performed at the time, location within work site, name, and social security number of each employee considered.
- (2) INITIAL EXPOSURE MEASUREMENT - If the employer determines that any employee may be exposed to airborne concentrations of petroleum distillates (naphtha) at or above the action level, the exposure of the employee believed to have the greatest exposure shall be measured. The exposure measurement shall be representative of the maximum exposure of the employee.
- (3) IDENTIFICATION OF EXPOSED EMPLOYEES - If the exposure measurement taken under paragraph (c)(2) of this section reveals employee exposure to airborne concentrations of petroleum distillates (naphtha) at or above the action level, the employer shall:
 - (i) Identify all employees who may be exposed at or above

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- the action level; and
- (ii) Measure the exposure of the employees so identified.
- (4) EXPOSURE ABOVE THE ACTION LEVEL - If an employee exposure measurement reveals that an employee is exposed to airborne concentrations of petroleum distillates (naphtha) 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.
- (5) EXPOSURE ABOVE THE PERMISSIBLE EXPOSURE - If an employee exposure measurement reveals that an employee is exposed to airborne concentrations of petroleum distillates (naphtha) above the permissible exposure, the employer shall:
- (i) Inform the employee of the exposure as required by paragraph (N)(1) of this section; and
- (ii) Measure the exposure of the employee at least monthly; and
- (iii) Institute control measures as required by paragraph (E) of this section.
- (6) TERMINATION OF EXPOSURE MEASUREMENT - If two consecutive employee exposure measurements taken at least one week apart reveal that the employee is exposed to airborne concentrations of petroleum distillates (naphtha) below the action level, the employer may terminate measurement for the employee. For purposes of this subparagraph, use of respirators shall not constitute reduction of employee exposure below the action level.
- (d) METHODS OF MEASUREMENT - 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 (Appendix B (iv)). The method of measurement shall have an accuracy, to a confidence level of 95%, of not less than that given in Table 1 below.

Table 1

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

- (e) Methods of Compliance
- (1) Engineering controls - No employee shall be exposed to petroleum distillates (naphtha) above the permissible limit as defined in paragraph (a)(1) of this section. Engineering and work practice controls shall be used to reduce exposure to petroleum distillates (naphtha) to at or below the permissible exposure.
- (i) When mechanical ventilation is used to control exposure, measurements which demonstrate system efficiency (for example: air velocity, static pressure, or air volume) shall be made at least every three months. Measurements of system efficiency shall also be made within five work days of any change in production, process or control which might result in a reduction in control.
- (ii) Where a fan is located in duct work and where petroleum distillates (naphtha) is present in concentrations greater than 2500 ppm, one fourth of the lower flammable limit, the fan rotating element shall consist of, or be lined with, non-sparking material. There shall be sufficient clearance

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between the fan rotating element and the fan casing so as to prevent contact.

- (iii) In the design of open surface tank ventilation for the purposes of section 1910.94 (d), operations involving petroleum distillates (naphtha) shall be classified as B-1 at 70 F.

(2) Respirators

- (i) Compliance with the permissible exposure may not be achieved by the use of respirators except:
 - a. During the time period necessary to install engineering controls; or
 - b. In work situations in which engineering controls are technically not feasible; or
 - c. In work situations in which feasible engineering and work practice controls are insufficient to reduce employees exposure to at or below the permissible exposure. Where technically feasible engineering and work practice controls are not sufficient to reduce exposure to at or below permissible exposure, they shall be used to reduce exposure to the lowest level feasible; or
 - d. For operations not exceeding 40 hours per year; or
 - e. In emergencies.
- (ii) Respirators shall be jointly approved by the mining enforcement and safety administration (formerly Bureau of Mines) and by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11.
- (iii) Employers shall select and provide the appropriate respirator from Table 2 and shall ensure that the employee uses the respirator provided.
- (iv) Employers shall institute a respiratory protection program in accordance with sections 1910.134(b), (d), (e), and (f).

TABLE 2 RESPIRATORY PROTECTION FOR PETROLEUM DISTILLATES (NAPHTHA)

CONDITION	PERMISSIBLE RESPIRATORY PROTECTION

Vapor Concentration	
Equal to or less than 1000 ppm	A chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).

Equal to or less than 5,000 ppm	A gas mask with a chin-style organic vapor canister.

Equal to or less than 10,000 ppm	A gas mask with a front- or back-mounted organic vapor canister. Any supplied-air respirator with a full facepiece, helmet or hood. Any self-contained breathing apparatus with a full facepiece.

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Greater than 10,000 ppm or escape and entry 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 organic vapors. Any escape self-contained breathing apparatus.

(f) Fire and Safety

Employers shall familiarize themselves with the information contained in the Substance Technical Guidelines for petroleum distillates (naphtha) which is contained in Appendix B in order to ensure the safe handling and use of petroleum distillates (naphtha).

- (1) Electrical - For the purposes of compliance with section 1910.309, locations classified as hazardous locations due to the presence of petroleum distillates (naphtha) shall be Class I Group D.
- (2) Portable fire extinguishers - For the purposes of compliance with section 1910.157, petroleum distillates (naphtha) are classified as a Class B fire hazard.
- (3) Powered industrial trucks - For the purposes of compliance with section 1910.178, locations classified as hazardous locations due to the presence of petroleum distillates (naphtha) shall be Class I Group D.
- (4) Flammable liquids - For the purposes of compliance with section 1910.106, liquid petroleum distillates (naphtha) are classified as a Class IB flammable liquid. Spray finishing operations shall be performed in accordance with sections 1910.107 and 1910.94(c). Dip tank operations shall be performed in accordance with sections 1910.108 and 1910.94 (d).
- (5) Sources of ignition - Sources of ignition such as smoking or open flames are prohibited where petroleum distillates (naphtha) are handled, used or stored in a manner so as to create a potential fire or explosion hazard.
- (6) Storage - Petroleum distillates shall be stored so as not to come in contact with strong oxidizers.

(g) Personal Protective Equipment

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(1) Skin Contact

- (i) Employers shall provide, and require employees to use, impervious clothing, gloves, face shields (8-inch minimum) and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact to liquid petroleum distillates (naphtha). Face shields shall comply with section 1910.133(a)(6).
- (ii) Employers shall ensure that clothing wet with liquid petroleum distillates (naphtha) are placed in closed containers. Employers shall provide for the cleaning or disposal of such clothing and if the clothing is to be laundered or otherwise cleaned, shall inform the person performing this operation of the hazardous properties of petroleum distillates (naphtha).
- (iii) Employers shall ensure that clothing which becomes wet with liquid petroleum distillates (naphtha) be removed immediately and not reworn until the petroleum distillates (naphtha) are removed from the clothing.

(2) Eye Contact

- (i) Employers shall provide, and require employees to use, splash-proof safety goggles (cup-cover type dust and splash safety goggles), which comply with section 1910.133 (a)(6), where eye contact to liquid petroleum distillates (naphtha) may occur.

(h) Spills

- (1) Spills of petroleum distillates (naphtha) shall be cleaned up immediately after eliminating potential sources of ignition and utilizing available ventilation.
- (2) Liquid petroleum distillates (naphtha) may not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

(i) Sanitation

- (1) Employers shall ensure that employees whose skin becomes wet with liquid petroleum distillates (naphtha) promptly wash or shower using soap or mild detergent to remove any petroleum distillates (naphtha) from the skin.

(j) Training and Information - Each employer who has employees exposed to petroleum distillates (naphtha) in excess of the action level, or employees who may have skin or eye contact with liquid petroleum distillates (naphtha), or employees who work where accidental release, spill, fire, or explosion of petroleum distillates (naphtha) may occur, shall annually:

- (1) Substance Safety Data Sheet - Inform each employee of the information contained in the Substance Safety Data Sheet for petroleum distillates (naphtha), which is contained in Appendix A; and

(2) Medical -

- (I) Advise employees as to the signs and symptoms of exposure to petroleum distillates (naphtha).
- (II) Instruct the employees to advise the employer of the development of signs and symptoms of exposure to petroleum distillates (naphtha) which are listed in Appendix A.

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(III) Instruct the employees to inform the employer if they develop any of the medical conditions listed in (k)(2) of this section; and

(3) Procedures -

(I) Provide training to ensure that employees understand the precautions of safe use, emergency procedures, and the correct use of protective equipment relative to petroleum distillates (naphtha).

(II) The procedures required by (j)(1), (2), and (3)(I) shall be provided to employees at the expense of the employer during the employee's normal working hours.

(k) Medical Surveillance

(1) The employer shall provide medical procedures as required by paragraph (k). These procedures shall be provided at no cost to the employee.

(2) Preplacement Questionnaire - The employer shall obtain from each employee who will be exposed to liquid petroleum distillates (naphtha), or airborne concentrations of petroleum distillates (naphtha) at or above the action level, a written statement as to whether such employee has a history of any of the following:

- (i) Skin disease
- (ii) Chronic lung disease
- (iii) Liver disease
- (iv) Kidney disease

(3) Preplacement Medical Examination - The employer shall provide a medical examination for an employee if the employee provides a history of any of the conditions named in paragraph (k)(2).

(4) Results of Preplacement Examination - The employer shall obtain a physician's written opinion based on the medical examination pursuant to paragraph (k)(3).

(5) Periodic Medical Examinations - The employer shall provide a medical examination for an employee if the employee advises the employer of the development of:

- (i) Any of the medical conditions listed in (k)(2).
- (ii) Signs and symptoms listed in Appendix A which the employee suspects may be caused by exposure to petroleum distillates (naphtha).

(6) Results of Periodic Examinations - The employer shall obtain a physician's written opinion based on the medical examination pursuant to paragraph (k)(5).

(7) Exclusion or Removal from Exposure - No employee shall continue to be exposed to petroleum distillates (naphtha) if such exposure could place the employee at increased risk of material impairment of his health.

(8) Emergency Procedures - The employer shall provide emergency and follow-up medical examinations and treatment for any employee injured through exposure to petroleum distillates.

(9) Informing the Physician - The employer shall provide to the examining physician the following information:

- (i) A copy of this section with its Appendices A, B, and C;
- (ii) A description of the employee's duties as they relate to his exposure to petroleum distillates (naphtha);

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- (iii) A description of any personal protective equipment, including respirators, required to be used;
 - (iv) The results of any employee's exposure measurement, if available;
 - (v) The employee's anticipated exposure level; and
 - (vi) Upon request of the physician, information from previous medical examination of the employee.
- (10) Physician's Written Opinion
- (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 conditions which could be directly or indirectly aggravated by exposure to petroleum distillates or which could significantly interfere with the ability of the employee to follow recommended or required procedures for protecting himself from unusual or emergency exposure.
 - (B) Any recommended limitations upon the employee's exposure to petroleum distillates (naphtha).
 - (C) The employee has been informed by the physician of any detected medical conditions which require further medical examination or treatment.
 - (ii) The written opinion shall not reveal medical information unrelated to exposure to petroleum distillates (naphtha).
- (11) Refusal to be Medically Examined - 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 risks involved by refusing to be examined.
- (1) Recordkeeping.
- (1) Initial determination.
- (i) The employer shall keep an accurate record of all initial determinations required to be made pursuant to paragraph (c)(1) of this section.
 - (ii) The record shall include the written determination and any supporting documentation as required in paragraph (c)(1) 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 petroleum distillates (naphtha).
 - (ii) This record shall include:
 - (a) The date of measurement;
 - (b) A reference to the subparagraph of this regulation which required the measurement, if any;
 - (c) Operations involving exposure to petroleum distillates (naphtha) which are being monitored;
 - (d) Sampling and analytical methods used and evidence of their accuracy;
 - (e) Number, duration, and results of samples taken;

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- (f) 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 a record of measurements demonstrating the effectiveness of such ventilation as required by paragraph (e)(1)(i) of this section.
 - (ii) This record shall include:
 - (a) Date of measurement;
 - (b) Type of measurement taken;
 - (c) Result of measurement.
 - (iii) This record shall be maintained for at least one year.
- (4) Training and information.
 - (i) The employer shall keep an accurate record of all employee training and advice required by paragraph (j) of this section.
 - (ii) The record shall include:
 - (a) Date of training;
 - (b) Name and Social Security number of employees trained;
 - (c) Substance of training provided.
 - (iii) This record shall be maintained until replaced by a more recent record.
- (5) Medical records.
 - (i) The employer shall keep an accurate medical record for each employee.
 - (ii) The record shall include:
 - (a) Physician's written opinion;
 - (b) Preplacement questionnaire;
 - (c) Any employee medical complaints relative to exposure to petr
 - (d) A signed statement of any refusal to be examined;
 - (e) A copy of information provided to the physician pursuant to paragraph (k)(9)(ii) through (vi) of this section.
 - (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 and the Director.
 - (ii) Employee 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.
- (m) Observation of monitoring.
 - (1) Duty.

The employer shall give affected employees or their representatives an opportunity to observe any monitoring of employee exposure to

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petroleum distillates (naphtha) which is conducted pursuant to this section.

(2) Exercise of opportunity to observe monitoring.

- (i) When observation of the monitoring of employee exposure to petroleum distillates (naphtha) requires entry into an area where the use of personal protective devices is required, the observer shall use such equipment and comply with all other applicable safety procedures.
- (ii) Without interfering with the measurement, observers shall be entitled to:
 - (a) Receive an explanation of the measurement procedures;
 - (b) Visually observe all steps related to the measurement of exposure to petroleum distillates (naphtha) that are being performed at the place of exposure.
 - (c) Record the results obtained.

(n) Employee notification.

- (1) The employer shall notify in writing, within five work days, every employee who is found to be exposed to petroleum distillates (naphtha) above the permissible exposure. The employee shall also be notified of the level of his exposure and the corrective action being taken to reduce the exposure to at or below the permissible exposure.
- (2) Pursuant to paragraph (k) of this Section, when an employee is medically examined the employer shall provide the employee with a copy of the physician's written opinion.

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APPENDIX A

SUBSTANCE SAFETY DATA SHEET

I. SUBSTANCE IDENTIFICATION

SUBSTANCE: Petroleum distillates (naphtha)

PERMISSIBLE EXPOSURE: 500 parts of petroleum distillates (naphtha) per million parts of air (ppm) or 2000 milligrams of petroleum distillates (naphtha) per cubic meter of air (mg/cu m)

APPEARANCE AND ODOR: Colorless liquid with an odor like gasoline and kerosene.

II. HEALTH HAZARD DATA

A. Comments: Petroleum distillates (naphtha) may contain benzene. Benzene may cause damage to the tissues that form your blood.

B. Ways in Which the Chemical Affects Your Body: Petroleum distillates (naphtha) can affect your body if you inhale them or if they come in contact with your eyes or skin or if you swallow them.

C. Effects of Overexposure:

1. Short-Term Overexposure: Overexposure to petroleum distillates (naphtha) may cause dizziness, drowsiness, headache and nausea. They may also cause irritation of the eyes, throat, and skin.

2. Long-Term Overexposure: Prolonged overexposure may cause drying and cracking of the skin.

3. Reporting Signs and Symptoms: You should inform your employer if you develop any signs or symptoms associated with petroleum distillates (naphtha) exposure.

III. EMERGENCY FIRST AID PROCEDURES

A. Eye Exposure: If petroleum distillates (naphtha) get into your eyes, wash the eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation persists, get medical attention. Contact lenses should not be worn when working with this chemical.

B. Skin Exposure: If petroleum distillates (naphtha) get on your skin, promptly wash the contaminated skin using soap or mild detergent. If petroleum distillates (naphtha) soak through your clothing, remove the clothing immediately and wash the skin using soap or mild detergent. If irritation persists after washing, get medical attention. Do not wear the clothing again until the

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petroleum distillates (naphtha) have been removed. Replace or repair impervious clothing that has developed leaks.

- C. Breathing: If you or any other person breathes in large amounts of petroleum distillates (naphtha) remove 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.
- D. Swallowing: When petroleum distillates (naphtha) have been swallowed, do not cause vomiting. Get medical attention immediately.
- E. 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 petroleum distillates (naphtha). You can only be required to wear them for routine use if your employer is in the process of installing controls or if 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)/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 their use is required. If you can smell petroleum distillates (naphtha) 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: You must wear impervious clothing, gloves, face shield or other appropriate protective clothing to prevent repeated or prolonged skin contact with liquid petroleum distillates (naphtha).
- C. EYE PROTECTION: You must wear splash-proof safety goggles (cup cover type dust and splash safety goggles) where eye contact to liquid petroleum distillates (naphtha) may occur.

V. PRECAUTIONS FOR SAFE USE, HANDLING AND STORAGE

- A. Petroleum distillates (naphtha) are flammable liquids and their vapors easily form explosive mixtures with air.
- B. Petroleum distillates (naphtha) must be stored in tightly closed containers in a cool, well ventilated area away from heat, sparks, flames and strong oxidizers.
- C. Sources of ignition such as smoking and open flames are prohibited wherever petroleum distillates (naphtha) are handled, used or stored in a manner that could create a potential fire or explosion hazard.

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- D. You must use non-sparking tools when opening or closing metal containers of petroleum distillates (naphtha), and containers must be bonded and grounded when pouring or transferring liquid petroleum distillates (naphtha).
- E. If your skin becomes contaminated with liquid petroleum distillates (naphtha), you must promptly wash or shower to remove the petroleum distillates (naphtha) from your skin.
- F. Clothing wet with petroleum distillates (naphtha) can be easily ignited. You must immediately remove any clothing that becomes wet with liquid petroleum distillates (naphtha) and this clothing must not be reworn until the petroleum distillates (naphtha) are removed from the clothing.
- G. Fire extinguishers, where provided, must be readily available and you should know where they are and how to operate them.
- H. Ask your supervisor where petroleum distillates (naphtha) are used in your work area and for any additional plant safety and health rules.

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APPENDIX B

SUBSTANCE TECHNICAL GUIDELINES
PETROLEUM DISTILLATES

- I. PHYSICAL AND CHEMICAL DATA
- A. Substance Identification
1. Synonyms: Petroleum naphtha; aliphatic petroleum naphtha; petroleum ether (95 - 115 C); naphtha, petroleum
 2. Formula: C_6H_{14} - C_7H_{16} - C_8H_{18} mixture
 3. Molecular weight: 100 (approximately)
- B. Physical Data
1. Boiling point (760 mm Hg): 30 to 127 C (86 - 260F)
 2. Specific gravity (water=1): 0.74
 3. Vapor density (air=1 at boiling point of petroleum distillates (naphtha)): 3.4 (approximately)
 4. Melting point: data not available
 5. Vapor pressure at 20 C (68 F): 40 mm Hg (approximately)
 6. Solubility in water, % by weight at 20 C (68 F): 0.04 (approximately)
 7. Evaporation rate (butyl acetate=1): 10 (approximately)
 8. Appearance and odor: Colorless liquid with an odor like gasoline and kerosene
- II. FIRE, EXPLOSION AND REACTIVITY HAZARD DATA
- A. Fire
1. Flash point: -40 to 20 C (-40 to 68 F) (closed cup)
 2. Autoignition temperature: 232-260 C (450-500 F)
 3. Flammable limits in air, % by volume: Lower: 1; Upper: 6
 4. Extinguishing media: Foam, carbon dioxide, dry chemical
 5. Special fire-fighting procedures: Do not use a solid stream of water since the stream will scatter and spread the fire. Use water spray to cool containers exposed to a fire.
 6. Unusual fire and explosion hazards: Petroleum distillates (naphtha) are flammable liquids. Their vapors can easily form explosive mixtures with air. All ignition sources must be controlled where petroleum distillates (naphtha) are handled, used or stored. Petroleum distillates (naphtha) vapors are heavier than air and may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which petroleum distillates (naphtha) are handled.
 7. For purposes of conforming with the requirements of 29 CFR 1910.106, petroleum distillates (naphtha) are classified as Class IB flammable liquids. At 2500 ppm, one-fourth of the lower flammable limit, petroleum distillates (naphtha) are considered to be a potential fire and explosion hazard.
 8. For purposes of complying with 29 CFR 1910.309, the classification of hazardous locations as described in Article

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500 of the National Electrical Code for petroleum distillates (naphtha) shall be Class I Group D.

B. Reactivity

1. Conditions contributing to instability: Heat
2. Incompatibilities: Contact with strong oxidizing agents may cause fire and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving petroleum distillates (naphtha).
4. Special precautions: Petroleum distillates (naphtha) will attack some forms of plastics, rubber and coatings

III. SPILL, LEAK AND DISPOSAL PROCEDURES

A. If petroleum distillates (naphtha) are spilled or leaked, the following steps should be taken:

1. Remove all ignition sources
2. Ventilate area of spill or leak
3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for vapors to completely clear hood duct work, then burn the paper. Large quantities can be collected, and atomized in a suitable combustion chamber. Petroleum distillates (naphtha) may not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

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

C. Waste disposal methods:

Petroleum distillates (naphtha) may be disposed of by atomizing in a suitable combustion chamber.

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 eight-hour exposure may be determined from a single eight-hour sample or two (2) 4-hour samples. Short term interval samples (up to 30 minutes) may also be used to determine average exposure level if a minimum of five (5) measurements are taken in a random manner over the eight-hour work shift. Random sampling means that any portion of the work shift has the same chance of being sampled as any other. The arithmetic average of all such random equal duration samples taken on one (1) work shift is an estimate of an employee's average level of exposure for that work shift. 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, gas and vapor adsorption tubes with subsequent chemical analyses or dosimeters. The method of measurement must determine the concentration of petroleum distillates (naphtha) to plus or minus 35%.

b. EXPOSURE ABOVE THE PERMISSIBLE EXPOSURE: The monitoring 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

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Industrial Hygiene Association (AIHA). The method of measurement must determine the concentration of petroleum distillates (naphtha) to plus or minus 25%. Methods meeting these accuracy requirements are available from NIOSH.

V. MISCELLANEOUS PRECAUTIONS

- A. Store petroleum distillates (naphtha) in tightly closed containers in a cool, well-ventilated area.
- B. High exposures to petroleum distillates (naphtha) can occur when transferring the liquid from one container to another.
- C. Non-sparking tools must be used to open and close metal petroleum distillates (naphtha) containers. These containers must be effectively grounded and bonded prior to pouring.
- D. Petroleum distillates (naphtha) may contain benzene or other toxic hydrocarbons.
- E. Employers must advise employees of all plant areas and operations where exposure to petroleum distillates (naphtha) could occur.

VI. COMMON OPERATIONS

Common operations in which exposure to petroleum distillates (naphtha) is likely to occur are: their use as a degreaser, solvent in the rubber paint, varnish, lacquer and pesticides industries and extractant.

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APPENDIX C - MEDICAL SURVEILLANCE GUIDELINES

I. ROUTE OF ENTRY

Inhalation.

II. TOXICOLOGY

Petroleum distillates (naphtha) vapor are mild narcotics and mucous membrane irritants. There have been few toxicologic studies, either on animals or man. While 4,000 to 7,000 ppm are tolerated for one hour by human subjects, symptoms of narcosis, such as dizziness and drowsiness, occur at those concentrations. Continuing exposure may produce signs of inebriation, followed by headache or nausea. Exposure at 10,000 to 20,000 ppm is regarded as immediately hazardous to life. The higher boiling fractions may produce irritation of the eyes, nose and throat in addition to symptoms of mild narcosis. The liquid is a defatting agent and repeated or prolonged skin contact results in drying and cracking. No chronic systemic effects have been reported from widespread industrial use. If benzene is present in the distillate, however, the hazard of both acute and chronic poisoning is increased; the presence of elevated phenol in the urine is indicative of benzene exposure.

III. SIGNS AND SYMPTOMS

Dizziness, drowsiness, headache and nausea; irritation of the eyes, nose and throat; prolonged skin exposure results in drying and cracking.

IV. SPECIAL TESTS

If the presence of benzene is suspected, measurement of urinary phenols may be indicated.

V. TREATMENT

Remove from exposure. Flush eyes with water and wash skin with soap and water. Do not induce vomiting if swallowed. Give artificial resuscitation if indicated. Recovery is usually rapid and complete.

VI. SURVEILLANCE AND PREVENTIVE CONSIDERATIONS

A. GENERAL

Most reported effects of petroleum distillates are caused by its narcotic and irritant properties. The physician should be aware that small quantities of benzene may be present. It is important that the physician becomes familiar with plant operating conditions in which exposure to petroleum distillates 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.

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B. PREPLACEMENT

Routine medical histories and physical examination 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 petroleum distillates exposure. Only those giving a positive history of these conditions must be referred for further medical examinations.

1. Skin disease -- Petroleum distillates are skin defatting agents and can cause dermatitis on prolonged exposure. Persons with preexisting skin disorders may be more susceptible to the effects of this agent.
2. Chronic respiratory disease -- In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of petroleum distillates might cause exacerbation of symptoms due to irritant properties.
3. Liver disease -- Although petroleum distillates are not known as a liver toxin in humans, the importance of this organ in the biotransformation and detoxification of foreign substances should be considered before exposing persons with impaired liver function.
4. Kidney disease -- Although petroleum distillates are not known as a kidney toxin in humans, the importance of this organ in the elimination of toxic substances justifies special consideration in those with impaired renal function.

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.

References

1. Browning, Ethel: "Toxicity and Metabolism of Industrial Solvents," Elsevier Publishing Company, Amsterdam, 1965, pp. 145158.
2. Patty, Frank A.: Industrial Hygiene and Toxicology, Vol. II - Toxicology (2d ed. revised), Interscience Publishing Company, New York, -1963, pp. 1195, 1196, 1199.
3. Hygienic Guide Series: "Petroleum Naphtha," American Industrial Hygiene Association Journal, 24:427-428, 1963.

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4. Pagnotto, Leonard D., et al.: "Industrial Benzene Exposure from Petroleum Naphtha: I. Rubber Coating Industry," American Industrial Hygiene Association Journal, 22:417-421, 1961.

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REFERENCES AND SOURCES
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1910.93

- (d) Methods of Compliance - Open surface tank classification based on relative evaporation rate of 2.75 hrs. A. K. Doolittle, "The Technology of Solvents and Plasticizers", John Wiley & Sons, Inc., New York, 1954, pp. 354-357.
- (e) Fire and Safety
 - (1) Electrical - Classification based on "Fire Hazard Classification of Chemical Vapors Relative to Explosion-proof Electrical Equipment," H. Carhart et al., National Academy of Sciences, 1973, report to U. S. Coast Guard, report no. CG-C-92-74, p. 29.
- (f) Personal Protective Equipment, and, (h) Sanitation
 - General: Browning, "Toxicity and Metabolism of Ind. Solvents"; Gleason, "Clinical Toxicology of Commercial Products"; and AIHA Hyg. Guides
 - Eye: Analogy to other hydrocarbons
 - Skin: Browning, "Toxicity and Metabolism of Ind. Solvent"; AIHA Hyg. Guides; Patty, "Ind. Hyg. and Tox."; and Sax, "Dangerous Properties of Ind. Materials"
 - Ingestion: Sax, "Dangerous Properties of Ind. Materials"; and AIHA Hyg. Guides

COMMENTS

General: According to Browning, petroleum distillate (taken as being petroleum naphtha) "is chiefly a mixture of paraffin hydrocarbons but may contain aromatic hydrocarbons in relatively small amount, including benzene and its derivatives and cyclo-paraffin aromatics." Browning notes that one researcher found that the percentage of benzene in the total aromatic content is only 0.121. High aromatic naphthas, however, can contain up to 93 percent aromatics. The latter is noted as containing 85 percent of aromatics consisting chiefly of indanes, indenenes, naphthalenes, and diphenyls. Gleason considers petroleum naphtha to be "a general term describing petroleum distillates that consist of various mixtures of predominately aliphatic (straight-chain or paraffinic) hydrocarbons (C5 to C13)." Stoddard solvent is considered to be one of the higher boiling fractions of petroleum naphtha. AIHA notes that benzene quantities ranging to over 10 percent may be present in some grades.

Eye - Classification: 2
Output statement numbers: 10
Exceptions: None

Grant reports in general for mixtures of hydrocarbons that "various liquid hydrocarbons of petroleum cause little or no injury on direct external contact with the eye. In particular, kerosene Deo-base, Stoddard solvent, and petroleum oil on rabbit and human corneas are essentially innocuous. Liquid petrolatum and purified deodorized kerosene such as used for insecticide solvent can be a to human eyes without causing discomfort or signs of irritation.

"More volatile derivatives, high-test gasoline in particular

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cause smarting and pain on splash contact with the eye, but only slight transient corneal epithelial disturbance." He adds that p butane injected into the anterior chamber of rabbits as a gas caused no disturbance.

For solvents, Grant states "A splash of a chemically inert solvent usually causes immediate stinging and smarting pain, and may cause loss of some or all of the corneal epithelium, particul if it is a good fat solvent, but as a general rule it does not da the corneal stroma underlying the epithelium. Even if all the epithelium is lost from the cornea as a result of splash of ordin organic solvents, it generally regenerates in a few days without residual permanent damage. While the epithelium is missing, the stroma may be slightly swollen and the posterior surface of the c may appear wrinkled."

A classification of 2 is concluded appropriate to prevent th possible effects cited.

Skin - Classification: 2

Output statement numbers: 2, 7b, 16i, 21

Exceptions: None

Browning notes that patch-testing results on 100 human subjects with "heavy aromatic naphtha causes no signi- ficant degree of primary skin irritation." A mild photo- sensitising effect was observed with exposure of the tested sites to ultraviolet light; in one subject the reaction persisted for 6 hours. As a class, Browning, AIHA, and Patty note that repeated or prolonged contact with these materials defats the skin and can cause dermatitis. Sax lists its acute and chronic local effects as being of slight toxic hazard. Its acute systemic toxic hazard by skin absorption are also listed as being slight.

Petroleum distillates have a vapor pressure of about 40 mm H 20 degrees C. Their flash point is between -40 and 68 degrees F, and they are about 0.04% soluble in water.

A classification of 2 is concluded appropriate to prevent th possible effects cited.

Ingestion - Classification: 0

Output statement numbers: None

Exceptions: None

Sax lists the acute local effects of ingestion as being of moderate toxic hazard. The acute and chronic systemic toxic haza are listed as being slight. The most hazardous ingredient of this substance must be considered to be benzene, which, according to its AIHA Guide, is not a common problem in industry in regard to ingestion and has serious effects only if aspirated into the lungs.

It is therefore concluded that ingestion of this substance, context of this standard, would not be a hazard in the industrial environment, especially since it has a significant vapor pressure

SUBSTANCE TECHNICAL GUIDELINES

PETROLEUM DISTILLATES

I. PHYSICAL AND CHEMICAL DATA

A. Substance Identification

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1. Synonyms: Petroleum naphtha; aliphatic petroleum naphtha; petroleum ether (95 - 115 C); naphtha, petroleum
2. Formula: C_6H_{14} - C_7H_{16} - C_8H_{18} mixture
3. Molecular weight: 100 (approximately)

B. Physical Data

1. Boiling point (760 mm Hg): 30 to 127 C (86 - 260F)
2. Specific gravity (water=1): 0.74
3. Vapor density (air=1 at boiling point of petroleum distillates (naphtha)): 3.4 (approximately)
4. Melting point: Data not available
5. Vapor pressure at 20 C (68 F): 40 mm Hg (approximately)
6. Solubility in water, % by weight at 20 C (68 F): 0.04 (approximately)
7. Evaporation rate (butyl acetate=1): 10 (approximately)
8. Appearance and odor: Colorless liquid with an odor like gasoline and kerosene

II. FIRE, EXPLOSION AND REACTIVITY HAZARD DATA

A. Fire

1. Flash point: -40 to 20 C (-40 to 68 F) (closed cup)
2. Autoignition temperature: 232-260 C (450-500 F)
3. Flammable limits in air, % by volume: Lower: 1; Upper: 6
4. Extinguishing media: Foam, carbon dioxide, dry chemical
5. Special fire-fighting procedures: Do not use a solid stream of water since the stream will scatter and spread the fire. Use water spray to cool containers exposed to a fire.
6. Unusual fire and explosion hazards: Petroleum distillates (naphtha) are flammable liquids. Their vapors can easily form explosive mixtures with air. All ignition sources must be controlled where petroleum distillates (naphtha) are handled, used or stored in a manner that could create a potential fire or explosion hazard. Petroleum distillates (naphtha) vapors are heavier than air and may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which petroleum distillates (naphtha) are handled.
7. For purposes of conforming with the requirements of 29 CFR 1910.106, petroleum distillates (naphtha) are classified as Class IB flammable liquids. For example, 2500 ppm, approximately one-fourth of the lower flammable limit, is one situation in which petroleum distillates (naphtha) are considered to be a potential fire and explosion hazard.
8. For purposes of complying with 29 CFR 1910.309, the classification of hazardous locations as described in Article 500 of the National Electrical Code for petroleum distillates (naphtha) shall be Class I Group D.

B. Reactivity

1. Conditions contributing to instability: Heat.
2. Incompatibilities: Contact with strong oxidizing agents may cause fire and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving petroleum distillates (naphtha).

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4. Special precautions: Petroleum distillates (naphtha) will attack some forms of plastics, rubber and coatings.

III. SPILL, LEAK AND DISPOSAL PROCEDURES

- A. If petroleum distillates (naphtha) are spilled or leaked, the following steps should be taken:
1. Remove all ignition sources
 2. Ventilate area of spill or leak
 3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for vapors to completely clear hood duct work, then burn the paper. Large quantities can be collected, and atomized in a suitable combustion chamber. Petroleum distillates (naphtha) may not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.
- B. Persons not wearing protective equipment should be restricted from areas of spills or leaks until cleanup has been completed.
- C. Waste disposal methods: Petroleum distillates (naphtha) may be disposed of by atomizing in a suitable combustion chamber.

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 eight-hour exposure may be determined from a single eight-hour sample or two (2) 4-hour samples. Short term interval samples (up to 30 minutes) may also be used to determine average exposure level if a minimum of five (5) measurements are taken in a random manner over the eight-hour work shift. Random sampling means that any portion of the work shift has the same chance of being sampled as any other. The arithmetic average of all such random equal duration samples taken on one (1) work shift is an estimate of an employee's average level of exposure for that work shift. 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, gas and vapor adsorption tubes with subsequent chemical analyses or dosimeters. The method of measurement must determine the concentration of petroleum distillates (naphtha) to plus or minus 35%.
- b. EXPOSURE ABOVE THE PERMISSIBLE EXPOSURE: The monitoring 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 (AIHA). The method of measurement must determine the concentration of petroleum distillates (naphtha) to plus or minus 25%. Methods meeting these accuracy requirements are available from NIOSH.

V. MISCELLANEOUS PRECAUTIONS

- A. Store petroleum distillates (naphtha) in tightly closed containers in a cool, well-ventilated area.
- B. High exposures to petroleum distillates (naphtha) can occur when transferring the liquid from one container to another.

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- C. Non-sparking tools must be used to open and close metal petroleum distillates (naphtha) containers. These containers must be effectively grounded and bonded prior to pouring.
- D. Petroleum distillates (naphtha) may contain benzene or other toxic hydrocarbons.
- E. Employers should advise employees of all plant areas and operations where exposure to petroleum distillates (naphtha) could occur.

VI. COMMON OPERATIONS

Common operations in which exposure to petroleum distillates (naphtha) is likely to occur are: Their use as a degreaser, solvent in the rubber paint, varnish, lacquer and pesticides industries and extractant.

RESPIRATOR TABLE DOCUMENTATION

SUBSTANCE: Petroleum distillates (naphtha)

D. O. L. STANDARD: 500 ppm

WARNING PROPERTIES:

Odor Threshold: The odor thresholds of the main constituents of petroleum naphtha (i. e. heptane, octane, pentane, etc.) are below the individual permissible exposure limits.

Eye Irritation Level: According to Gafafer, the naphthas irritate the conjunctiva. The American Petroleum Institute states that irritation of the conjunctiva occurs "when the eyes are exposed to high vapor concentrations (of petroleum naphtha) in air. The irritation is mild and transitory." No quantitative information is available concerning the threshold of eye irritation, how

Evaluation of Warning Properties: Since the odor of each of the main constituents of petroleum naphtha is detectable at concentrations below the individual permissible exposure limits of the constituents, petroleum naphtha is treated as a material with adequate warning properties. Gas sorbent respiratory equipment is permitted.

IDLH: 10,000 ppm

Basis for IDLH Value: This IDLH is based upon the report in the AIHA Hygienic Guides that the "atmospheric concentrations immediately hazardous to life (are from) 10,000 to 20,000 ppm." In addition, concerning the short exposure tolerance to petroleum naphtha, the Hygienic Guides state that "4000 to may be tolerated for one hour but not without development of definite symptoms of narcosis."

Other Toxicological Information: According to Browning, "petroleum naphtha is chiefly a mixture of paraffin hydrocarbons but may contain aromatic hydrocarbons in relatively small amounts, including benzene and its derivatives and cyclo-paraffin aromatics." According to Gerarde, the percentage of benzene in the total aromatic content is 0.121.

Browning reports that "from animal experiments it appears that both these varieties of naphtha (petroleum naphtha) have a lower toxicity than tar solvent naphtha. Fairhall remarks that their lower toxicity is due to the fact that they contain constituents which are far more toxicologically inert than those of coal tar naphtha."

The AIHA Hygienic Guides state that the severity of the health hazard of petroleum naphtha is "low for both acute and chronic exposures by both inhalation and skin routes (provided benzene content is low) . . . with more volatile fractions, acute inhalation effects are largely those of naphtha. The subject may become inebriated (naphtha jag) and later headache or nausea may appear. In more severe cases, dizziness and unconsciousness, and in some cases convulsions, may occur. The margin of safety between loss of consciousness

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and death is narrower than with many anesthetic agents. The higher boil fractions may produce, in addition to the above symptoms, irritation of respiratory passages and eyes by high air concentrations as obtained from heating the liquid in an unexhausted space or by spray gun operations."

LFL: 10,000 ppm

VAPOR PRESSURE AT 20 C: Approximately 40 mm Hg

SATURATED CONCENTRATION AT 20 C: Approximately 52,600 ppm

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USE/EXPOSURE AND CONTROL DOCUMENT
PETROLEUM DISTILLATES

Use/Exposure	Principal Route of Entry	Currently Used Control Methods
1. Inhalation of vapors and skin contact with liquid during dry cleaning operations	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)
2. Inhalation of vapors and skin contact with liquid during degreasing operations	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)
3. Inhalation of vapor and skin contact with liquid as a solvent in the rubber industry during the manufacture of waterproof cloth, shoe adhesives and rubber tires	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)
4. Inhalation of vapor and skin contact with liquid during the use of petroleum naphtha as an extractant	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)
5. Inhalation of vapors and skin contact with liquid during preparation and use of paint, varnish, and lacquer industries as a solvent, diluent or thinner especially in spray or dip operations	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)
6. Inhalation of vapors and liquid contact with skin in the use as a solvent for pesticides	A,B	General dilution ventilation; local exhaust ventilation; personal protective equipment (gloves, clothing goggles)

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

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systemic poisoning

Naphtha is a general term applied to various mixtures of petroleum hydrocarbons, usually limited to those with boiling ranges between 100 and 450 degrees F. Typical naphthas and boiling ranges include Petroleum Ether, 104 to 140 degrees F. Rubber Solvent Naphtha, 100 to 300 degrees F. Stoddard Solvent or Mineral Spirits, 300 to 400 degrees F. Gasoline is a mixture of petroleum hydrocarbons, boiling over a similar range (100 to 400 degrees F) but is usually less highly refined than naphthas used as solvents. Naturally occurring aromatic hydrocarbons, such as benzene, toluene and xylene, may be found in the lower boiling naphthas.

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

1,361 CARDS READ

0 SYSOUT PRINT RECORDS

0 SYSOUT PUNCH RECORDS

0.00 MINUTES EXECUTION TIME

