

11

NIOSH/OSHA STANDARDS COMPLETION PROGRAM

DRAFT TECHNICAL STANDARD AND
SUPPORTING DOCUMENTATION FOR

*** DIBUTYLPHTHALATE ***

1

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

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 DIBUTYLPHTHALATE.

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.

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

(a) DEFINITIONS

- (1) PERMISSIBLE EXPOSURE - "Permissible Exposure" means inhalation of dibutylphthalate in concentrations not in excess of 5 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 dibutylphthalate.

(b) EMPLOYEE INFORMATION - Each employer who has a workplace in which dibutylphthalate 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 DIBUTYLPHTHALATE - Inform affected employees of the quantity, location, and manner of use or storage of dibutylphthalate.

(c) EXPOSURE MEASUREMENT

- (1) INITIAL DETERMINATION - Each employer who has a place of employment in which dibutylphthalate is released into the workplace air shall determine if any employee may be exposed to airborne concentrations of dibutylphthalate 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 dibutylphthalate. 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 dibutylphthalate;
 - (ii) Any measurements of airborne concentrations of dibutylphthalate taken;
 - (iii) Any employee complaints of symptoms which may be attributable to exposure to dibutylphthalate; 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 dibutylphthalate 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 dibutylphthalate 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.
- (4) EXPOSURE ABOVE THE ACTION LEVEL - If an employee exposure measurement reveals that an employee is exposed to airborne concentrations of dibutylphthalate 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.

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

- (5) EXPOSURE ABOVE THE PERMISSIBLE EXPOSURE - If an employee exposure measurement reveals that an employee is exposed to airborne concentrations of dibutylphthalate 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 dibutylphthalate 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 dibutylphthalate 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 dibutylphthalate 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.
- (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

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

- 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 DIBUTYLPHTHALATE

Condition	
Particulate Concentration	
Equal to or less than 25 mg/m ³	
Equal to or less than 50 mg/m ³	Any supplied-air respirator.
Equal to or less than 250 mg/m ³	Any supplied-air respirator with a full facepiece, helmet or hood. Any self-contained breathing apparatus with a full facepiece.
Equal to or less than 5 g/m ³	iciency particulate filter. A Type C supplied-air respirator operated in pressure-demand (positive pressure) or continuous flow mode.
Greater than 5 g/m ³ or Entry and Escape from Unknown Concentrations	air respirator with a full facepiece operated in pressure-demand (positive pressure) or continuous flow mode and an auxiliary self-contained air supply operated in

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

pressure-demand mode.

Fire Fighting Self-contained breathing apparatus with a full facepiece
operated in pressure-demand (positive pressure) mode.

- (±) Fire and Safety - Employers shall familiarize themselves with the information contained in the Substance Technical Guidelines for dibutylphthalate which is contained in Appendix B in order to ensure the safe handling and use of dibutylphthalate.
- (1) Electrical - For the purposes of compliance with section 1910.309, locations classified as hazardous locations due to the presence of dibutylphthalate shall be Class I Group D.
- (2) Portable fire extinguishers - For the purposes of compliance with section 1910.157, dibutylphthalate is 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 dibutylphthalate shall be Class I Group D.
- (4) Combustible liquids - For the purposes of compliance with section 1910.106, liquid dibutylphthalate is classified as a Class IIIB combustible 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 dibutylphthalate is handled, used or stored in a manner so as to create a potential fire or explosion hazard.
- (6) Storage - Dibutylphthalate shall be stored so as not to come in contact with nitrates, strong oxidizers, strong acids or strong alkalies.
- (g) Reserved
- (h) Spills
- (1) Spills of dibutylphthalate shall be cleaned up immediately after eliminating potential sources of ignition and utilizing available ventilation.
- (i) Reserved
- (j) Training and Information - Each employer who has employees exposed to dibutylphthalate in excess of the action level, or employees who may have skin or eye contact with liquid dibutylphthalate, or employees who work where accidental release, spill, fire, or explosion of dibutylphthalate may occur, shall annually:
- (1) Substance Safety Data Sheet - Inform each employee of the information contained in the Substance Safety Data Sheet for dibutylphthalate, which is contained in Appendix A; and
- (2) Medical -
- (I) Advise employees as to the signs and symptoms of exposure to dibutylphthalate.

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

- (II) Instruct the employees to advise the employer of the development of signs and symptoms of exposure to dibutylphthalate which are listed in Appendix A.
- (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 dibutylphthalate.
 - (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) (Reserved)
- (l) 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 for at least one year.
 - (2) Exposure measurements.
 - (i) The employer shall keep an accurate record of all measurements taken to determine employee exposure to dibutylphthalate.
 - (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 dibutylphthalate which are being monitored;
 - (d) Sampling and analytical methods used and evidence of their accuracy;
 - (e) Number, duration, and results of samples taken;
 - (f) Name, Social Security number, and exposure of the employee monitored.
 - (iii) This record shall be maintained for 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 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:

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

- (a) Date of training;
- (b) Name and Social Security number of employees trained;
- (c) Substance of training provided.
- (iii) This record shall be maintained for at least one year.
- (iii) This record shall be maintained for the duration of the employment of the affected employee.
- (5) 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.
- (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 dibutylphthalate which is conducted pursuant to this section.
 - (2) Exercise of opportunity to observe monitoring.
 - (i) When observation of the monitoring of employee exposure to dibutylphthalate 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 dibutylphthalate 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 dibutylphthalate 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.

APPENDIX A

SUBSTANCE SAFETY DATA SHEET

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

Dibutylphthalate

I. SUBSTANCE IDENTIFICATION

SUBSTANCE: Dibutylphthalate

PERMISSIBLE EXPOSURE: 5 milligrams of dibutylphthalate per cubic meter of air (mg/cu m)

APPEARANCE AND ODOR: Colorless oily liquid with a very weak aromatic odor

II. HEALTH HAZARD DATA

A. Ways in Which the Chemical Affects Your Body: Dibutylphthalate can affect your body if you swallow it or if it comes in contact with your skin or eyes or if you inhale it as a mist or spray.

B. Effects of Overexposure:

1. Short-Term Overexposure: Swallowing dibutylphthalate may cause nausea, dizziness, light sensitivity, and watering and redness of the eyes. Overexposure to hot vapors or mists of dibutylphthalate may cause nose and throat irritation.

2. Reporting Signs and Symptoms: You should inform your employer if you develop any signs and symptoms associated with dibutylphthalate exposure.

III. EMERGENCY FIRST AID PROCEDURES

A. Eye Exposure: If dibutylphthalate gets into your eyes, wash the eyes promptly with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention if any discomfort continues. Contact lenses should not be worn when working with this chemical.

B. Skin Exposure: If dibutylphthalate saturates your clothing, remove and clean the clothing before wearing again. Wash any dibutylphthalate from your skin regularly, particularly when you have had much skin contact. If there is skin irritation, get medical attention.

C. Breathing: If you or any other person breathes in large amounts of dibutylphthalate 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 dibutylphthalate has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the affected person to vomit by having him touch the back of his throat with his finger or by giving him large amounts (one pint or more) of warm salt water (two tablespoons of salt per pint of water). Do not make an unconscious person vomit.

IV. RESPIRATORS AND PROTECTIVE CLOTHING

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

- A. RESPIRATORS: Respirators are not the best way to control exposure to dibutylphthalate. You can only be required to wear them for routine use if your employer is in the process of installing controls or other 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.) If you experience difficulty breathing while wearing a respirator, go immediately to fresh air and tell your employer.
- B. PROTECTIVE CLOTHING: You must wear impervious clothing, gloves, face shield and other appropriate protective clothing to prevent repeated or prolonged skin contact with liquid dibutylphthalate
- C. EYE PROTECTION: Not applicable.
- V. PRECAUTIONS FOR SAFE USE, HANDLING AND STORAGE
- Dibutylphthalate is a combustible liquid and its vapors can form explosive mixtures with air at elevated temperatures. It must be stored in tightly closed containers in a cool, well-ventilated area away from heat, sparks and flames. Store dibutylphthalate away from nitrates, strong oxidizers, strong alkalies, and strong acids. Sources of ignition such as smoking and open flames are prohibited wherever dibutylphthalate is handled, used or stored in a manner that could create a potential fire or explosion hazard. Fire extinguishers, where provided, must be readily available and you should know where they are and how to operate them. Ask your supervisor where dibutylphthalate is used in your work area and for any additional plant safety rules.

APPENDIX B

SUBSTANCE TECHNICAL GUIDELINES
DIBUTYLPHTHALATE

- I. PHYSICAL AND CHEMICAL DATA
- A. Substance Identification
1. Synonyms: DBP; dibutyl 1,2-benzenedicarboxylate
 2. Formula: $C_6H_4(CO_2C_4H_9)_2$
 3. Molecular weight: 278
- B. Physical Data
1. Boiling point (760 mm Hg): 335 C (635 F)
 2. Specific gravity (Water=1): 1.05
 3. Vapor density (air=1 at boiling point of dibutylphthalate): 9.6
 4. Melting point: -37 C (-35 F)
 5. Vapor pressure at 20 C (68 F): Less than 0.01 mm Hg

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

6. Solubility in water, % by weight at 20 C (68 F): 0.45
7. Evaporation rate (butyl acetate=1): Almost zero
8. Appearance and odor: Colorless oily liquid with a very weak aromatic odor.

II. FIRE, EXPLOSION AND REACTIVITY HAZARD DATA

A. Fire

1. Flash point: 157 C (315 F) (closed cup)
2. Autoignition temperature: 403 C (757 F)
3. Flammable limits in air, % by volume: Lower: 0.5 (calculated at flash point)
4. Extinguishing media: Dry chemical, foam, carbon dioxide
5. Special fire-fighting procedures: Do not use a solid stream of water since stream will scatter and spread fire. Use water spray to cool containers exposed to a fire.
6. Unusual fire and explosion hazards: Dibutylphthalate is a combustible liquid. Its vapors can form explosive mixtures with air at elevated temperatures. All ignition sources must be controlled when dibutylphthalate is used, handled or stored. Dibutylphthalate 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 dibutylphthalate is handled.
7. For purposes of complying with 29 CFR 1910.309, the classification of hazardous locations as described in Article 500 of the National Electric Code for dibutylphthalate is Class I, Group D.

B. Reactivity

1. Conditions contributing to instability: None
2. Incompatibilities: Contact with nitrates, strong oxidizers, strong alkalies, and strong acids may cause fire and explosion.
3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving dibutylphthalate
4. Special Precautions: None

PROCEDURES

A. If dibutylphthalate is 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 and burn the paper. Large quantities can be collected and atomized in a suitable combustion chamber.

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

C. Waste Disposal Methods:

Dibutylphthalate may be disposed of:

1. By absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a sanitary land fill.
2. By atomizing in a suitable combustion chamber.

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

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 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 8-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 dibutylphthalate 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 dibutylphthalate to plus or minus 25%. Methods meeting these accuracy requirements are available in the "NIOSH Monitoring Methods Manual".

V. MISCELLANEOUS PRECAUTIONS

- A. Ingestion of dibutylphthalate may be toxic. Employees must be warned not to use dibutylphthalate as a substitute for vegetable oils in cooking foods.
- B. Contamination of dibutylphthalate with phthalic anhydride commonly occurs and increases the health hazard.
- C. Employers must advise employees of all plant areas and operations where exposure to dibutylphthalate could occur.

VI. COMMON OPERATIONS

Common operations in which exposure to dibutylphthalate is likely to occur are: its manufacture, the formulation of coatings, laminates and polyvinyl acetate water-based paints, its use as a solvent for dyes and oils, as a fixitive for perfumes, as a lubricant in the textile industry and as a plasticizer for polyvinyl chloride and other plastics.

APPENDIX C - MEDICAL SURVEILLANCE GUIDELINES

I. ROUTE OF ENTRY

Ingestion, inhalation.

II. TOXICOLOGY

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

Extensive experience with dibutylphthalate as an insect repellant has shown that it is relatively non-irritating to the skin, eyes, and mucous membranes. Aerosols from heated dibutylphthalate may cause irritation of the eyes and upper respiratory tract. In one report of a human case, accidental ingestion of ten grams of this compound by a chemical operator produced nausea and dizziness with lacrimation, photophobia, and conjunctivitis, but recovery was prompt and uneventful. Animal experiments to determine dermal and oral toxicity of dibutylphthalate showed that extremely high doses were required to produce toxic effects. Dibutylphthalate was found to be teratogenic by intraperitoneal injection of doses representing one-tenth, one-fifth, and one-third of the LD50 value into female rats at the 5th, 10th, and 15th day of gestation. This probably is of no significance in industrial exposures.

III. SIGNS AND SYMPTOMS

Aerosols from heated dibutylphthalate may cause irritation of the upper respiratory tract.

IV. SPECIAL TESTS

None in common usage.

V. TREATMENT

None specific.

VI. SURVEILLANCE AND PREVENTIVE CONSIDERATIONS

A. GENERAL

Most reported effects of dibutylphthalate are caused by its irritant properties. It is important that the physician become familiar with plant operating conditions in which exposure to dibutylphthalate 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

None required.

C. PERIODIC EXAMINATIONS

None required.

References

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

1. Patty, Frank A.: Industrial Hygiene and Toxicology, Vol. II - Toxicology (2d ed. revised), Interscience Publishers, New York, 1963, pp. 1904-1906.
2. Grant, W. Morton: Toxicology of the Eye (2d ed.), Charles C. Thomas, Illinois, 1974, pp. 361-362.
3. Singh, A. R., et al.: "Teratogenicity of Phthalate Esters in Rats," Journal of Pharmaceutical Sciences, 61:51-55, 1972.
4. Karel, L., et al.: "The Intraperitoneal Toxicity of Some Glycols, Glycol Ethers, Glycol Esters, and Phthalates in Mice," Journal of Pharmacology and Experimental Therapeutics, 90:338-347, 1947.

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

REFERENCES AND SOURCES
DIBUTYLPHTHALATE

1910.93

- (f) Personal Protective Equipment, and, (h) Sanitation
Eye: Grant, "Toxicology of the Eye;" "Dibutylphthalate," Union Carbide Toxicology Study
Skin: Patty, "Industrial Hygiene and Toxicology"
Ingestion: Patty, "Industrial Hygiene and Toxicology;" "Dibutylphthalate," Union Carbide Toxicology Study

COMMENTS

Eye - Classification: 2

Output statement numbers: 10

Exceptions: None

Grant reports "contact with the surface of human eyes has occurred by accidental droplets splashed as well as by experimental application, and this has caused immediate severe stinging pain. The pain stimulated profuse tearing which washed the oily liquid away, and the eyes were not appreciably damaged." Union Carbide notes "flooding the rabbit eye with an excess of the chemical caused a reaction no more severe than moderate inflammation." A classification of 2 is concluded to be warranted.

Skin - Classification: 0

Output statement numbers: None

Exceptions: None

Patty states "these phthalate esters are in general among the most inert of all industrial materials. They are rarely the cause of skin difficulties. They are not absorbed through the skin." He specifically reports for dibutylphthalate that it is not irritating to the skin and that its rabbit skin penetration LD50 is greater than 20 ml/kg. All sources examined agreed with his statements. It is concluded that skin contact does not present a hazard. The flash point of the substance is 315 degrees F.

Ingestion - Classification: 0

Output statement numbers: None

Exceptions: None

Patty reports "dibutyl phthalate has a low acute and chronic toxicity." Smyth found that all rats tolerated 0.25 per cent and that some animals tolerated 1.25 per cent for a year." Union Carbide gives an acute oral dose LD50 in rats of 12.6 g/kg. It is concluded that ingestion would not present a hazard in the industrial environment.

RESPIRATOR TABLE DOCUMENTATION

SUBSTANCE: Dibutylphthalate

D.O.L. STANDARD: 5 mg/M3

—EYE IRRITATION LEVEL: According to Grant, dibutylphthalate in "contact with the surface of human eyes has occurred by accidental droplet splash as well as by experimental application, and this has caused immediate severe stinging pain. The pain stimulated profuse tearing which washed the oily liquid away, and the eyes were not appreciably damaged."

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

IDLH: 9300 mg/M3

Basis for IDLH Value: Since dibutylphthalate has a very low toxicity, there is no evidence in the available toxicological information of an IDLH concentration for dibutylphthalate. The chosen IDLH (9300 mg/M3) is based upon an analogy with dimethylphthalate for which an IDLH concentration of 9300 mg/M3 has been selected.

Other Toxicological Information: The following information can be found in the Documentation of TLV's:

"Dibutylphthalate has low acute and chronic oral toxicity accord to Smyth. The maximal concentration that did not inhibit growth of rat one-year feeding study was 0.25% of the diet. In vitro studies with pancreatic lipase indicated that dibutylphthalate is metabolized similar to fat in the diet.

"Cagianut reported that a chemical operator who swallowed by accident (ca. 140 mg/kg) dibutylphthalate became nauseated and dizzy, experienced lacrimation and conjunctivitis, but made a prompt and uneventful recovery.

"Although no specific information has been reported on the local effects of dibutylphthalate, the phthalate esters closely related to it are regarded as inert. They rarely cause skin difficulties, but are somewhat irritating to the eyes and nose.

"From the standpoint of hazard by inhalation, the dibutyl ester presents little problem because of its low vapor pressure; inhalation of significant amounts would occur only by spray or mist exposures. Its wide use as an insect repellent for man during World War II resulted in no reports of toxic symptoms.

"A TLV of 5 mg/M3 is recommended more from the standpoint of controlling excessive air-borne mists of dibutylphthalate rather than as a health measure."

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYL PHTHALATE

USE/EXPOSURE AND CONTROL DOCUMENT
DIBUTYL PHTHALATE

	Use/Exposure	Principal Route of Entry	Currently Used Control Methods
1.	Inhalation of vapor(*) and mists and skin contact with liquid during spray application of polyvinyl acetate surface coatings by spraying, dipping or crushing	A,B	Local exhaust ventilation; personal protective equipment (respiratory protection and gloves)
2.	Inhalation of vapor and mists and skin contact with liquid during spray application of polyester and epoxy resins	A,B	Local exhaust ventilation; personal protective equipment (respiratory protection and gloves)
3.	Inhalation of vapor during hand and dip application of polyvinyl acetate, polyester and epoxy resins	A	Local exhaust ventilation; general dilution ventilation
4.	Inhalation of vapor during molding and forming of cellulose acetate butyrate, and acetate propionate and polyvinyl acetate	A	Local exhaust ventilation; general dilution ventilation
5.	Inhalation of vapor during the application of polyvinyl acetate adhesives (solvent or hot-melt types)	A	Local exhaust ventilation; general dilution ventilation
6.	Inhalation of vapor during the manufacture of nitrile rubber	A	General dilution ventilation
7.	Inhalation of vapor during the molding of polyester and epoxy articles	A	General dilution ventilation
8.	Inhalation of vapor and skin contact with liquid during the subdivision of large quantities and handling of dibutyl phthalate	A,B	General dilution ventilation; personal protective equipment (gloves)
9.	Inhalation of vapor during the manufacture of polyvinyl acetate surface coatings	A	General dilution ventilation

NIOSH/OSHA Draft Technical Standard
and Supporting Documentation for DIBUTYLPHTHALATE

10.	Inhalation of vapor and mists and skin contact with liquid during the spray application of nitrocellulose lacquer surface coatings (including paper coatings)	A,B	Local exhaust ventilation
11.	Inhalation of vapor during the forming of ethyl cellulose articles	A	General dilution ventilation
12.	Inhalation of vapor during the manufacture of dibutyl phthalate	A	General dilution ventilation
13.	Inhalation of vapor during the production of polyvinyl acetate	A	General dilution ventilation
14.	Inhalation of vapor during the production of cellulose acetate butyrate	A	General dilution ventilation
15.	Inhalation of vapor during the production of cellulose acetate propionate	A	General dilution ventilation
16.	Inhalation of vapor during the production of polyvinyl acetate adhesives	A	General dilution ventilation
17.	Inhalation of vapor during the brush application of nitrocellulose surface coatings	A	General dilution ventilation
18.	Inhalation of vapor during the manufacture of polyester and epoxy resins	A	General dilution ventilation
19.	Inhalation of vapor during the manufacture of nitrocellulose surface coatings	A	General dilution ventilation
20.	Inhalation of vapor during the manufacture of explosives and propellants using dibutyl phthalate	A	Local exhaust ventilation

A -- Inhalation

B -- Skin contact resulting in localized irritation

C -- Ingestion

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and Supporting Documentation for DIBUTYLPHTHALATE

- D -- Skin contact resulting in
absorption and subsequent
systemic poisoning
- * -- These are actually fumes or
aerosols for all exposure
situations