

OCCUPATIONAL SAFETY AND HEALTH GUIDELINE FOR CLOPIDOL

INTRODUCTION

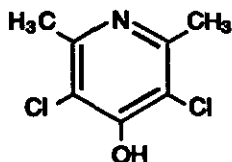
This guideline summarizes pertinent information about clopidol for workers and employers as well as for physicians, industrial hygienists, and other occupational safety and health professionals who may need such information to conduct effective occupational safety and health programs. Recommendations may be superseded by new developments in these fields; readers are therefore advised to regard these recommendations as general guidelines and to determine periodically whether new information is available.

SUBSTANCE IDENTIFICATION

• Formula



• Structure



• Synonyms

3,5-Dichloro-2,6-dimethyl-4-pyridinol; methylchloropindol; clopidol; Farmcoccid; Coccidiostat C; Coyden; Lerbek

• Identifiers

1. CAS No.: 2971-90-6
2. RTECS No.: UU7711500
3. DOT UN: None
4. DOT label: None

• Appearance and odor

Clopidol is a white to light brown crystalline solid.

CHEMICAL AND PHYSICAL PROPERTIES

• Physical data

1. Molecular weight: 192.06
2. Boiling point (760 mm Hg): Data not available
3. Specific gravity: Data not available
4. Vapor density: Data not available
5. Melting point: Greater than 320°C (608°F)
6. Vapor pressure at 20°C (68°F): Data not available
7. Solubility: Insoluble in water

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Education and Information Division

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

8. Evaporation rate: Data not available

Reactivity

1. Conditions contributing to instability: Heat. In cloud form, clopidol dust may explode if ignited.

2. Incompatibilities: None reported

3. Hazardous decomposition products: Toxic gases (such as chlorine and oxides of nitrogen) may be released in a fire involving clopidol.

4. Special precautions: None reported

Flammability

The National Fire Protection Association has not assigned a flammability rating to clopidol; this substance is not combustible.

1. Flash point: Not applicable

2. Autoignition temperature: Not applicable

3. Flammable limits in air: Not applicable

4. Extinguishant: Use an extinguishant that is suitable for the materials involved in the surrounding fire.

Fires involving clopidol should be fought upwind from the maximum distance possible. Isolate the hazard area and deny access to unnecessary personnel. Firefighters should wear a full set of protective clothing and self-contained breathing apparatus when fighting fires involving clopidol.

EXPOSURE LIMITS

OSHA PEL

The current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for clopidol is 15 mg/m³ (total dust) and 5 mg/m³ (respirable fraction) as 8-hr time-weighted average (TWA) concentrations [29 CFR 1910.1000, Table Z-1].

NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended expo-

sure limit (REL) of 10 mg/m³ (total dust) and 5 mg/m³ (respirable fraction) as TWAs for up to a 10-hr workday and a 40-hr workweek and 20 mg/m³ as a short-term exposure limit (STEL). A STEL is a 15-min TWA exposure which should not be exceeded at any time during the workday [NIOSH 1992].

• ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has assigned clopidol a threshold limit value (TLV) of 10 mg/m³ (total dust) as a TWA for a normal 8-hr workday and a 40-hr workweek [ACGIH 1993].

• Rationale for limits

The OSHA and ACGIH limits are based on the risk of physical irritation associated with exposure to clopidol.

HEALTH HAZARD INFORMATION

• Routes of exposure

Exposure to clopidol can occur through inhalation and eye or skin contact.

• Summary of toxicology

1. *Effects on Animals:* Clopidol is an antibiotic used in veterinary medicine as a coccidiostat in poultry. This substance has a low order of acute and chronic toxicity in experimental animals [ACGIH 1991]. The oral LD₅₀ in rabbits and guinea pigs is greater than 8 g/kg [NIOSH 1993]. The oral LD₅₀ in rats is 18 g/kg [NIOSH 1993; Merck 1983]. Rats fed 15 mg/kg clopidol daily for 2 years showed no adverse effects [ACGIH 1991]. Dogs fed 5 mg/kg clopidol daily (duration of experiment not specified) also showed no adverse effects [ACGIH 1991].

2. *Effects on Humans:* In humans, exposure to clopidol dust may cause physical irritation of the eyes, nose, throat, and skin [NJDH 1986]. No chronic effects have been reported [NJDH 1986].

• Signs and symptoms of exposure

1. *Acute exposure:* Acute exposure to clopidol may cause redness and itching of the eyes, runny nose, sore throat, coughing, and redness and irritation of the skin.

2. *Chronic exposure*: No signs or symptoms of chronic exposure to clopidol have been reported.

• **Emergency procedures**

WARNING!

Seek immediate medical attention for severely affected victims or for victims with signs and symptoms of irritation!

Keep unconscious victims warm and on their sides to avoid choking if vomiting occurs. Initiate the following emergency procedures:

1. *Eye exposure*: Irritation may result. **Immediately and thoroughly** flush the eyes with large amounts of water, occasionally lifting the upper and lower eyelids.
2. *Skin exposure*: Irritation may result. **Immediately and thoroughly** wash contaminated skin with soap and water.
3. *Inhalation exposure*: Move the victim to fresh air **immediately**. Have the victim blow his or her nose, or use a soft tissue to remove particulates or residues from the nostrils.

If the victim is not breathing, clean any chemical contamination from the victim's lips and perform cardiopulmonary resuscitation (CPR); if breathing is difficult, give oxygen.

4. *Ingestion exposure*: Seek medical attention and take the following steps if a large amount of clopidol is ingested:

—Have the victim rinse the contaminated mouth cavity several times with a fluid such as water.

—Have the victim drink a fluid such as water.

5. *Rescue*: Remove an incapacitated worker from further exposure and implement appropriate emergency procedures (e.g., those listed on the material safety data sheet required by OSHA's hazard communication standard [29 CFR 1910.1200]). All workers should be familiar with emergency procedures and the location and proper use of emergency equipment.

EXPOSURE SOURCES AND CONTROL METHODS

The following operations may involve clopidol and may result in worker exposures to this substance:

—Manufacture and formulation of this substance

—Use as a coccidiostat in poultry

The following methods are effective in controlling worker exposures to clopidol, depending on the feasibility of implementation:

—Process enclosure

—Local exhaust ventilation

—General dilution ventilation

—Personal protective equipment

Good sources of information about control methods are as follows:

1. ACGIH [1992]. *Industrial ventilation—a manual of recommended practice*. 21st ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
2. Burton DJ [1986]. *Industrial ventilation—a self study companion*. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
3. Alden JL, Kane JM [1982]. *Design of industrial ventilation systems*. New York, NY: Industrial Press, Inc.
4. Wadden RA, Scheff PA [1987]. *Engineering design for control of workplace hazards*. New York, NY: McGraw-Hill.
5. Plog BA [1988]. *Fundamentals of industrial hygiene*. Chicago, IL: National Safety Council.

MEDICAL MONITORING

Workers who may be exposed to toxic substances should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury and disease. The program should include education of employers and workers about work-related hazards, early detection of

adverse health effects, and referral of workers for diagnosis and treatment. The occurrence of disease or other work-related adverse health effects should prompt immediate evaluation of primary preventive measures (e.g., industrial hygiene monitoring, engineering controls, and personal protective equipment). A medical monitoring program is intended to supplement, not replace, such measures. To place workers effectively and to detect and control work-related health effects, medical evaluations should be performed (1) before job placement, (2) periodically during the term of employment, and (3) at the time of job transfer or termination.

- **Preplacement medical evaluation**

Before a worker is placed in a job with a potential for exposure to clopidol, a licensed health care professional should evaluate and document the worker's baseline health status with thorough medical, environmental, and occupational histories, a physical examination, and physiologic and laboratory tests appropriate for the anticipated occupational risks. These should concentrate on the function and integrity of the eyes and skin.

A preplacement medical evaluation is recommended to detect and assess medical conditions that may be aggravated or may result in increased risk when a worker is exposed to clopidol at or below the prescribed exposure limit. The licensed health care professional should consider the probable frequency, intensity, and duration of exposure as well as the nature and degree of any applicable medical condition. Such conditions (which should not be regarded as absolute contraindications to job placement) include a history and other findings consistent with diseases of the eyes or skin.

- **Periodic medical examinations and biological monitoring**

Occupational health interviews and physical examinations should be performed at regular intervals during the employment period, as mandated by any applicable Federal, State, or local standard. Where no standard exists and the hazard is minimal, evaluations should be conducted every 3 to 5 years or as frequently as recommended by an experienced occupational health physician. Additional examinations may be necessary if a worker develops symptoms attributable to clopidol exposure. The interviews, examinations, and medical screening tests should focus on identifying the adverse effects of clopidol on the eyes and skin. Current health status should be compared with the baseline health sta-

tus of the individual worker or with expected values for a suitable reference population.

Biological monitoring involves sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite. No biological monitoring test acceptable for routine use has yet been developed for clopidol.

- **Medical examinations recommended at the time of job transfer or termination**

The medical, environmental, and occupational history interviews, the physical examination, and selected physiologic or laboratory tests that were conducted at the time of job placement should be repeated at the time of job transfer or termination. Any changes in the worker's health status should be compared with those expected for a suitable reference population.

WORKPLACE MONITORING AND MEASUREMENT

A worker's exposure to airborne clopidol is determined by using a glass fiber filter (37 mm). Samples are collected at a recommended flow rate of 1.0 liter/min until a recommended air volume of 120 liters is collected (total dust) or with a 10-mm nylon cyclone preceding the glass fiber filter at a flow rate of 1.7 liter/min until a recommended air volume of 204 liters is collected (respirable fraction). Analysis is conducted by high performance liquid chromatography using an ultraviolet detector. This method is included in the OSHA Laboratory In-House Methods File [OSHA 1989].

PERSONAL HYGIENE

If clopidol collects on the skin in excessive amounts, workers should wash the affected areas with soap and water.

Clothing excessively contaminated with clopidol should be removed to avoid local irritation of the skin.

A worker who handles clopidol should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, or applying cosmetics.

Workers should not eat, drink, use tobacco products, or

apply cosmetics in areas where clopidol or a solution containing clopidol is handled, processed, or stored.

STORAGE

Clopidol should be stored in a cool, dry, well-ventilated area in tightly sealed containers. Containers of clopidol should be protected from physical damage and should be stored separately from heat, sparks, and open flame.

SPILLS

In the event of a spill involving clopidol, persons not wearing protective equipment and clothing should be restricted from contaminated areas until cleanup is complete. The following steps should be undertaken following a spill:

1. Notify safety personnel.
2. Remove all sources of heat and ignition.
3. Collect spilled material in the most convenient and safe manner and deposit in sealed containers for reclamation or disposal.
4. Absorb liquid clopidol-containing formulations in vermiculite, dry sand, earth, or similar material.

SPECIAL REQUIREMENTS

U.S. Environmental Protection Agency (EPA) requirements for emergency planning, reportable quantities of hazardous releases, community right-to-know, and hazardous waste management may change over time. Users are therefore advised to determine periodically whether new information is available.

• Emergency planning requirements

Clopidol is not subject to EPA emergency planning requirements under the Superfund Amendments and Reauthorization Act (SARA) [42 USC 11022].

• Reportable quantity requirements for hazardous releases

Employers are not required by the emergency release notification provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

[40 CFR 355.40] to notify the National Response Center of an accidental release of clopidol; there is no reportable quantity for this substance.

• Community right-to-know requirements

Employers are not required by Section 313 of SARA to submit a Toxic Chemical Release Inventory Form (Form R) to EPA reporting the amount of clopidol emitted or released from their facility annually.

• Hazardous waste management requirements

EPA considers a waste to be hazardous if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.21-261.24. Although clopidol is not specifically listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) [42 USC 6901 et seq.], EPA requires employers to treat waste as hazardous if it exhibits any of the characteristics discussed above.

Providing detailed information about the removal and disposal of specific chemicals is beyond the scope of this guideline. The U.S. Department of Transportation, EPA, and State and local regulations should be followed to ensure that removal, transport, and disposal of this substance are conducted in accordance with existing regulations. To be certain that chemical waste disposal meets EPA regulatory requirements, employers should address any questions to the RCRA hotline at (800) 424-9346 or at (202) 382-3000 in Washington, D.C. In addition, relevant State and local authorities should be contacted for information about their requirements for waste removal and disposal.

RESPIRATORY PROTECTION

• Conditions for respirator use

Good industrial hygiene practice requires that engineering controls be used where feasible to reduce workplace concentrations of hazardous materials to the prescribed exposure limit. However, some situations may require the use of respirators to control exposure. Respirators must be worn if the ambient concentration of clopidol exceeds prescribed exposure limits. Respirators may be used (1) before engineering controls have been installed, (2) during work operations such as maintenance or repair activities that involve unknown exposures, (3) during operations that require entry into tanks or closed vessels, and (4) during emergencies. Workers should use

only those respirators that have been approved by NIOSH and the Mine Safety and Health Administration (MSHA).

- **Respiratory protection program**

Employers should institute a complete respiratory protection program that, at a minimum, complies with the requirements of OSHA's respiratory protection standard [29 CFR 1910.134]. Such a program must include respirator selection, an evaluation of the worker's ability to perform the work while wearing a respirator, the regular training of personnel, respirator fit testing, periodic workplace monitoring, and regular respirator maintenance, inspection, and cleaning. The implementation of an adequate respiratory protection program (including selection of the correct respirator) requires that a knowledgeable person be in charge of the program and that the program be evaluated regularly. For additional information about the selection and use of respirators and about the medical screening of respirator users, consult the *NIOSH Respirator Decision Logic* [NIOSH 1987b] and the *NIOSH Guide to Industrial Respiratory Protection* [NIOSH 1987a].

PERSONAL PROTECTIVE EQUIPMENT

Protective clothing should be worn to prevent excessive skin contact with clopidol. Safety glasses, goggles, or face shields should be worn during operations in which clopidol might contact the eyes.

REFERENCES CITED

ACGIH [1991]. Documentation of the threshold limit values and biological exposure indices. 6th ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

ACGIH [1993]. 1993-1994 Threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

CFR. Code of Federal regulations. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.

NIOSH [1987a]. NIOSH guide to industrial respiratory protection. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 87-116.

NIOSH [1987b]. NIOSH respirator decision logic. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 87-108.

NIOSH [1992]. NIOSH recommendations for occupational safety and health: compendium of policy documents and statements. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 92-100.

NIOSH [1993]. Registry of toxic effects of chemical substances database: clopidol. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Standards Development and Technology Transfer, Technical Information Branch.

NJDH [1986]. Hazardous Substance Fact Sheet. Clopidol. Trenton, NJ: New Jersey Department of Health.

OSHA [1989]. OSHA laboratory in-house methods file. Salt Lake City, UT: U.S. Department of Labor, Occupational Safety and Health Administration, OSHA Analytical Laboratory.

Windholz M, ed. [1983]. Merck Index. 10th ed. Rahway, NJ: Merck & Company.