



Right to Know Hazardous Substance Fact Sheet

Common Name: **BENZOYL PEROXIDE**

Synonyms: Benoxyl; Benzoperoxide; Dibenzoyl Peroxide

Chemical Name: Peroxide, Dibenzoyl

Date: August 2007

Revision: September 2016

CAS Number: 94-36-0

RTK Substance Number: 0215

DOT Number: UN 3104

Description and Use

Benzoyl Peroxide is a white, granular or crystalline (sand-like) solid. It is often used or shipped in an organic solvent or water. It is used as a catalyst in making plastics, and as a bleaching agent for oils, flours, waxes, and fats, and in skin creams.

Reasons for Citation

- ▶ **Benzoyl Peroxide** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- ▶ Immediately flush with large amounts of cool water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	2	-
FLAMMABILITY	4	-
REACTIVITY	4	-

FLAMMABLE AND REACTIVE
STRONG OXIDIZER
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Benzoyl Peroxide** can affect you when inhaled.
- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Benzoyl Peroxide** can irritate the nose, throat and lungs.
- ▶ **Benzoyl Peroxide** may cause a skin allergy.
- ▶ **Benzoyl Peroxide** may cause an asthma-like allergy.
- ▶ **Benzoyl Peroxide** is FLAMMABLE and REACTIVE and a DANGEROUS FIRE and EXPLOSION HAZARD.
- ▶ **Benzoyl Peroxide** is an *organic peroxide* which may explode if exposed to HEAT, SHOCK or FRICTION.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **5 mg/m³** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **5 mg/m³** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **5 mg/m³** averaged over an 8-hour workshift.

Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.

For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK Program website (<http://nj.gov/health/workplacehealthandsafety/right-to-know>) or in your facility's RTK Central File or Hazard Communication Standard file.

- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzoyl Peroxide**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Benzoyl Peroxide** can irritate the nose, throat, and lungs causing coughing and wheezing.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzoyl Peroxide** and can last for months or years:

Cancer Hazard

- ▶ While **Benzoyl Peroxide** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health, **Benzoyl Peroxide** has not been tested for its ability to affect reproduction.

Other Effects

- ▶ **Benzoyl Peroxide** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- ▶ **Benzoyl Peroxide** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, coughing, and/or chest tightness.

Medical

Medical Testing

For frequent or potentially high exposures (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Lung function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Evaluation by a qualified allergist can help diagnose skin allergy
- ▶ Chest x-ray and lung function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- ▶ Because smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.

- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where **Benzoyl Peroxide** may be present, check to make sure that an explosive concentration does not exist.
- ▶ Use a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- ▶ Avoid skin contact with **Benzoyl Peroxide**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend *Neoprene* for gloves and *DuPont Tychem® Polycoat, QC, CPF1, SL* and *CPF2* as protective materials for *hazardous dry powders* and *solids*.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- ▶ Wear eye protection with side shields or goggles when working with solids.
- ▶ Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **5 mg/m³**, use a NIOSH approved negative pressure, air purifying, particulate filter respirator. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Benzoyl Peroxide**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **50 mg/m³**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **1,500 mg/m³** is immediately dangerous to life and health. If the possibility of exposure above **1,500 mg/m³** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ Use water or water spray. **DO NOT USE HALOGENATED AGENTS.**
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Benzoic Acid*.
- ▶ **CONTAINERS MAY EXPLODE IN FIRE.**
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ **Benzoyl Peroxide** may ignite combustibles (wood, paper and oil).
- ▶ **Benzoyl Peroxide** may explode if subjected to **HEAT, IMPACT, BLOWS, SHOCK, FRICTION, or STATIC DISCHARGE.**

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Benzoyl Peroxide** is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources and protect from static discharge.
- ▶ Mix spilled material with water or wetted vermiculite and deposit into sealed polyethylene-lined or plastic containers.
- ▶ Do not use spark generating materials or material made of paper or wood for sweeping or handling spilled **Benzoyl Peroxide**.
- ▶ Keep **Benzoyl Peroxide** out of confined spaces, such as sewers, because of the possibility of an explosion.
- ▶ It may be necessary to contain and dispose of **Benzoyl Peroxide** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Benzoyl Peroxide** you should be trained on its proper handling and storage.

- ▶ **Benzoyl Peroxide** is a STRONG OXIDIZER which can react violently with COMBUSTIBLES (such as WOOD, OIL and PAPER); LITHIUM; ALUMINUM HYDRIDE; DIMETHYL ANILINE; AMINES; METALLIC NAPHTHENATES; ALCOHOLS; INORGANIC and ORGANIC ACIDS; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); ETHERS; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and REDUCING AGENTS.
- ▶ Containers of **Benzoyl Peroxide** must be protected from HEAT, IMPACT, BLOWS, SHOCKS, FRICTION or STATIC DISCHARGE since explosions may occur.
- ▶ **Benzoyl Peroxide** is not compatible with METALS, DIRECT SUNLIGHT, RUBBER, and COATINGS.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Benzoyl Peroxide** is used, handled, or stored.
- ▶ Metal containers involving the transfer of **Benzoyl Peroxide** should be grounded and bonded.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **Benzoyl Peroxide**.
- ▶ Use explosion-proof electrical equipment and fittings wherever **Benzoyl Peroxide** is used, handled, manufactured, or stored.

Occupational Health Services Resources

The New Jersey Department of Health, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
 Right to Know Program
 PO Box 368
 Trenton, NJ 08625-0368
 Phone: 609-984-2202
 Fax: 609-984-7407
 E-mail: rtk@doh.nj.gov
 Web address:
<http://nj.gov/health/workplacehealthandsafety/right-to-know>

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 for commercial purposes.*

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **BENZOYL PEROXIDE**

Synonyms: Benoxyl; Benzoperoxide; Dibenzoyl Peroxide

CAS No: 94-36-0

Molecular Formula: C₁₄H₁₀O₄

RTK Substance No: 0215

Description: White, granular or crystalline solid with a faint odor, which is often diluted with an unreactive organic solvent, such as *Phthalate Ester*

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p>2 - Health</p> <p>4 - Fire</p> <p>4 - Reactivity</p> <p>DOT#: UN 3104</p> <p>ERG Guide #: 146</p> <p>Hazard Class: 5.2 (Organic Peroxide)</p>	<p>Use water or water spray. DO NOT USE HALOGENATED AGENTS.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Benzoic Acid</i>.</p> <p>CONTAINERS MAY EXPLODE IN FIRE.</p> <p>Use water spray to keep fire-exposed containers cool.</p> <p>Benzoyl Peroxide may ignite combustibles (wood, paper and oil).</p>	<p>Benzoyl Peroxide is a STRONG OXIDIZER which can react violently with COMBUSTIBLES (such as WOOD, OIL and PAPER); LITHIUM; ALUMINUM HYDRIDE; DIMETHYL ANILINE; AMINES; METALLIC NAPHTHENATES; ALCOHOLS; INORGANIC and ORGANIC ACIDS; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); ETHERS, OXIDIZING AGENTS (such as CHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and REDUCING AGENTS.</p> <p>Containers of Benzoyl Peroxide must be protected from HEAT, IMPACT, BLOWS, SHOCKS, FRICTION or STATIC DISCHARGE since explosions may occur.</p> <p>Benzoyl Peroxide is not compatible with METALS, DIRECT SUNLIGHT, RUBBER, and COATINGS.</p>

SPILL/LEAKS

Isolation Distance: 50 meters or 150 feet for liquids

25 meters or 75 feet for solids

Mix spilled material with water or wetted vermiculite and deposit into polyethylene-lined or plastic containers.

PHYSICAL PROPERTIES

Odor Threshold: Faint odor

Flash Point: 104°F (40°C)

Auto ignition Temperature: 176°F (80°C)

Specific Gravity: 1.334

Vapor Pressure: Less than 1 mm Hg at 68°F (20°C)

Water Solubility: Slightly soluble

Melting Point: Decomposes explosively at 217° to 223°F (103°C to 106°C)

EXPOSURE LIMITS

OSHA: 5 mg/m³, 8-hr TWA

NIOSH: 5 mg/m³, 10-hr TWA

ACGIH: 5 mg/m³, 8-hr TWA

IDLH LEVEL: 1,500 mg/m³

The Protective Action Criteria values are:
PAC-1 = 15 mg/m³ PAC-2 = 1,200 mg/m³
PAC-3 = 7,000 mg/m³

PROTECTIVE EQUIPMENT

Gloves: Neoprene

Coveralls: *DuPont Tychem® Polycoat, QC, CPF1, SL* and *CPF2* for solid **Benzoyl Peroxide**

Boots: Neoprene

Respirator: > 5 mg/m³ APR with High Efficiency filters
> 50 mg/m³ SA, > 1500 mg/m³ SCBA

HEALTH EFFECTS

Eyes: Irritation

Skin: Irritation

Acute: Nose and throat irritation with coughing and wheezing

Chronic: Skin allergy with itching and skin rash. Asthma-like allergy with shortness of breath, wheezing and coughing.

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention.

Remove contaminated clothing. Wash contaminated skin with soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer to a medical facility.