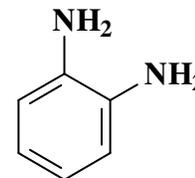
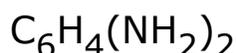




DuPont Protection Technologies

o-Phenylenediamine Technical (o-Diaminobenzene)



CAS Reg. No. 95-54-5

o-Phenylenediamine (OPD) is a solid amine product offered in two package forms to meet your needs. It is available in molten form and as light brown flakes which tend to darken on storage.

o-Phenylenediamine is soluble in water, alcohol, and ether, and only slightly soluble in chloroform. OPD is sensitive to air and/or moisture, and the presence of either tends to hasten color deterioration.

Specifications

o-Phenylenediamine	Technical Grade
Purity, % min	99.5
m + p-Phenylenediamine, % max.	0.25
Water, % max	0.10

Uses

OPD is used as an intermediate in manufacturing fungicides, corrosion inhibitors, and pigments. OPD is an effective surfactant for binding and removing sulfur impurities, with applications in mining and other industries. OPD is also used for removing aldehyde impurities in polymeric materials.

Storage of Flaked OPD

o-Phenylenediamine flakes are packed under nitrogen in polyethylene-lined fiber drums and in foil-lined bulk bags to protect from air and moisture. To further ensure product stability, a bag of desiccant is included in each drum. o-Phenylenediamine flakes will remain stable for at least six months if stored in the original unopened containers, at temperatures not

Typical Physical Properties*

Property	Typical Value
CAS Name	1,2-benzenediamine
Molecular Formula	C ₆ H ₄ (NH ₂) ₂
Molecular Weight	108.1
Bulk Density (flakes)	0.74 g/cc
Specific Gravity @ 160°C (320°F)	1.031
Boiling Point (760 mm Hg), °C	256
	°F 493
Freezing Point Range	°C 101
	°F 214
Vapor Pressure, Pa @ 20°C (68°F)	0.108
Solubility in Water, 20°C (68°F)	39.3 mg/ml
Vapor Density	3.7 (Air = 1)
pH Information	8.7 (water extract)
Odor	Slight Aromatic

*These properties are drawn from various DuPont and other literature sources. DuPont makes no warranty, express or implied, that future production will demonstrate these typical properties.

exceeding 40°C (104°F). If stored at excessive temperatures, or if held beyond the six-month shelf life, the product may darken or become lumpy. This product degradation can be caused by an oxidation process that is influenced by air, moisture, and temperature. In severe cases of degradation, the odor of ammonia may be detected.

Drums and bulk bags should be stored in a cool, well ventilated area, separated from other combustible and readily oxidizable materials, and the containers protected from physical damage. Bulk bags should not be double-stacked, as this may damage the container or flakes. Fire protection with an automatic or remotely controlled sprinkler system or water deluge system should be considered.

Storage of Molten OPD

Molten o-Phenylenediamine is supplied in tank trucks and sea tanks and has a freezing point of approximately 100°C (212°F). Carbon or stainless steel tanks are suitable for bulk storage of molten phenylenediamines. Storage tanks should be heated and insulated to hold the tank contents above 120°C (248°F) which is 20°C (36°F) above the freezing point. Steel piping with steam tracing or jacketing and insulation is used for transferring hot molten OPD. Consider use of a circulating loop of piping between the storage tank and use point, to provide uniform heating and avoid freezing at cold spots.

o-Phenylenediamine degrades in the presence of air and/or moisture. Therefore, storage tanks should be blanketed with nitrogen to protect product quality. OPD vapor should be removed from the vented nitrogen via a scrubber on the tank vent. Oxidation of vented phenylenediamines forms a black dye which will discolor adjacent facilities.

Bulk Unloading

OPD flakes are available in convenient 500 kg (1102.3 lb) bulk bags. These reduce exposure and unloading costs, and improve cycle time. Contact us for details on dimensions and handling.

Tank trucks and isotanks are loaded with molten o-phenylenediamine at about 120°C (248°F; 30 psig steam minimum, 50 psig steam recommended) and the material is protected from air and moisture by dry nitrogen at 10-20 psig in the vapor space of the bulk container. Valves and lines require steam heat to unload. Bulk containers are equipped with external steam coils for heating as necessary prior to unloading. Unloading is accomplished by maintaining a few pounds of nitrogen pressure on the vapor space of the bulk container and pumping to storage with a suitable pump. Positive nitrogen pressure must be maintained on the bulk container during the entire unloading operation.

Personal Safety and First Aid

Health Hazards

o-Phenylenediamine is harmful if inhaled. DuPont recommends an airborne exposure limit of 0.1 mg/m³, 8- and 12-hr time weighted average, and avoidance of skin contact. o-Phenylenediamine can cause irritation to the skin and eyes. Repeated contact can cause allergic skin or asthmatic respiratory reactions in some people. Refer to the MSDS for additional information.

Safety Precautions

Avoid contact of o-Phenylenediamine with eyes, skin, and clothing. Avoid breathing dust or vapor. Use with adequate ventilation, and wash thoroughly after handling.

First Aid

If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

In case of contact with the eyes, flush eyes immediately with plenty of water for at least 15 minutes. Call a physician. Wash skin with plenty of soap and water. Wash contaminated clothing before reuse.

If molten material gets on skin, cool rapidly with cold water. Do not attempt to peel material from skin.

Personal Protective Equipment

Personnel emptying drums of flake o-Phenylenediamine should wear chemical safety glasses or chemical splash goggles, butyl or neoprene gloves, and appropriate respiratory protection. Disposable jackets or coveralls of spunbonded olefin (Tyvek®) may be used to protect clothing and skin from dust.

When connecting and disconnecting lines or handling molten o-phenylenediamine, such as truck unloading, more complete personal protective equipment should be worn. It is recommended that a full thermal suit with boots, gloves, and hood providing protection against conductive heat and a breathing air respirator be worn. Personnel cleaning up solidified spills of o-phenylenediamine should wear chemical splash goggles, rubber boots, rubber gloves, and appropriate respiratory protection. Wearing disposable coveralls or a butyl rubber suit should be considered.

Housekeeping

OPD flakes can generate dust in handling, which can stain skin, clothing, and other surfaces if left uncontrolled. Thus, OPD flakes should be handled at a location with negative pressure ventilation (e.g., walk-in hood) so that dust contact is avoided, and ventilation should include an efficient dust collection system.

Hazard in Case of Fire

o-Phenylenediamine is an OSHA Class IIIB Combustible material. Dust may form explosive mixtures in air. Follow appropriate National Fire Protection Association (NFPA) codes for handling and storage facilities.

Refer to the MSDS for additional information.

Accidental Release

Refer to the MSDS "Accidental Release Measures" section before proceeding with cleanup measures.

Evacuate the area, and keep upwind of the spill. If molten, contain spill with sand or earth dam. Allow to solidify and transfer to a metal container for disposal. If solid, avoid generating dust. In case of a punctured or leaking drum, over-pack the drum to contain product. Flush area with detergent and water. Refer to the MSDS for additional information.

Empty drums, drum liners, desiccants, and other packaging material should be disposed of in compliance with federal, state, and local regulations.

Waste Disposal

Comply with federal, state, and local regulations. If approved, may be incinerated, sent to an approved hazardous material disposal area, or transferred to a disposal contractor.

Packages

DuPont ships o-Phenylenediamine as flakes in 225-pound (102.1-kg) net fiber drums and in 500 kg (1102.3 lb) bulk bags. Molten OPD is supplied in tank trucks and sea tanks.

Hazard Classifications

DOT/IMO Proper Shipping Name PHENYLENEDIAMINES
Hazard Class 6.1
UN No. 1673
DOT/IMO Label TOXIC
Special Information The word HOT precedes the Proper Shipping Name when shipped in bulk
Reportable Quantity 181818 lb/82644 kg
(o-Phenylenediamine, based on 100 lb Reportable Quantity of biphenyl)
Packing Group III
Shipping Containers
Flakes Fiber drums, bulk bags
Molten Tank trucks, sea tanks

Order Placement and Product Information

United States

Phone (800) 944-6170 (call toll-free within the U.S.)
(302) 999-4617 (from outside U.S.)
Fax (302) 355-2766
Mail DuPont Protection Technologies
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DuPont S.A. de CV (Mexico) 52-81-8311-4371 ext 4015
DuPont Quimica de Venezuela 58-241-871-64-66

Asia Pacific

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88-21-63866366 (Shanghai)
DuPont China Ltd. 852-2734-5345 (Hong Kong)
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DuPont Malaysia 603-5569-3006
DuPont Singapore 65-273-2244
DuPont Australia 61-2-9923-6111

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