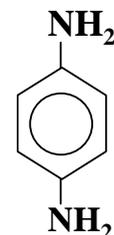


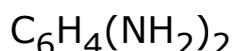


DuPont Protection Technologies



CAS Reg. No. 106-50-3

p-Phenylenediamine Technical (p-Diaminobenzene)



p-Phenylenediamine (PPD) is offered molten in bulk or in flakes. Two grades are available to meet your specific needs. PPD AD (flakes and molten), derived from an aniline-based process, is preferred for most uses including resin and polymer applications. DuPont PPD is intended only for industrial uses.

PPD AD	General uses
PPD AD Molten	General uses, bulk
PPD AD Ultra Pure	Special high purity

DuPont does not recommend and will not knowingly offer or sell p-phenylenediamine (PPD) for uses involving prolonged skin contact., such as products formulated with henna for tattoo applications or other skin coloration effects.

p-Phenylenediamine is soluble in water, alcohol, and ether, and only slightly soluble in chloroform. All grades of PPD are sensitive to air and/or moisture, and the presence of either tends to hasten color deterioration. This effect is less pronounced in the high purity grade.

Specifications

p-Phenylenediamine			
	Chambers Grade	PPD AD Grade	PPD AD Ultra Pure
p-Phenylenediamine, % min	99.5	99.5	99.95
m-Phenylenediamine, ppm max	1000	1000	200
o-Phenylenediamine, ppm max	1000	1000	200
Water, % max	0.10	0.10	0.05
Aniline, ppm max	500	500	250

Uses

PPD is used as an intermediate in performance resins and fibers, and as a curing agent for high temperature composites. It is also used in the formulation of urethane coatings, rubber chemicals, and textile dyes and pigments. PPD makes an excellent intermediate in formulating materials of high temperature stability, high strength, and chemical and electrical resistance.

Typical Physical Properties*

Property	Typical Value
Molecular Weight	108.1
Boiling Point (760 mm Hg), C	274
	F 525
Freezing Point, C	142
	F 288
Vapor Pressure, Pa @ 25°C	0.01
Solubility in Water, mg/ml @ 20°C	310
pH Information	9.45 (Water Extract)
Odor	Slight Aromatic
Formula	C ₆ H ₄ (NH ₂) ₂

*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.

NOTE: Harmful if inhaled. May cause skin and eye irritation. May cause allergic skin or asthmatic respiratory reaction. Refer to Material Safety Data Sheet.

Storage and Shelf Life

PPD flakes are supplied in 220.46-pound (100-kg) and 80-kg net fiber drums and in 1102.3 lb (500 kg) bulk bags. Molten PPD is supplied in tank trucks and tank cars, with a freezing point of 284°F (140°C) it is stored and handled hot as a liquid.

Storage and Shelf Life of Flake Product

p-Phenylenediamine flakes are packed under nitrogen to exclude air and moisture.

p-Phenylenediamine flakes will remain stable for at least six months if stored in the original unopened containers, at temperatures not exceeding 40°C (104°F). If exposed to higher 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. Fire protection with an automatic or remotely controlled sprinkler system or water deluge system should be considered.

Storage of Molten Product

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 at about 150-170°C (302-338°F). Steel piping with steam tracing or jacketing and insulation is used for transferring PPD because of the high freezing point. 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.

p-Phenylenediamine degrades in the presence of air and/or moisture. Therefore, storage tanks should be blanketed with nitrogen to protect product quality and for safety, as the flash point of PPD is near typical storage temperatures. PPD vapor should be removed from the vented nitrogen via a scrubber on the tank vent. Oxidation of vented phenylenediamines forms a black dye that will stain adjacent facilities.

Unloading Bulk Bags

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

Personal Safety and First Aid Health Hazards

p-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. p-Phenylenediamine can cause irritation to the skin and eyes. Repeated contact can cause

allergic skin or asthmatic respiratory reactions in some people.

PPD AD and PPD AD Ultra Pure contain low levels (<1ppm) of the human carcinogen 4-aminodiphenyl. Although these levels of 4-aminodiphenyl are below levels requiring OSHA labeling, DuPont advises that these products should not be used in products that have direct human contact.

Safety Precautions

Avoid contact of p-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, preferable 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

Where there is potential for skin contact, 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. If there is potential for contact with hot, molten materials, use personal protective equipment designed to protect against conductive heat at the temperatures in use.

When connecting and disconnecting lines or handling molten p-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 p-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.

Handling of PPD Flakes

PPD flakes can generate dust in handling, which can stain skin, clothing, and other surfaces if left uncontrolled. Thus, PPD flakes should be handled at a location with positive pressure forced ventilation so that dust contact is avoided, and ventilation should include an efficient dust collection system.

Bulk Delivery

Molten p-phenylenediamine is available in tank trucks and tank cars.

Hazard in Case of Fire

p-Phenylenediamine is an OSHA Class IIIB Combustible material. Dust from flakes 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, overpack 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.

Hazard Classifications

DOT/IMO Proper Shipping Name	PHENYLENEDIAMINES
Hazard Class	6.1
UN No.	1673
DOT/IMO Label	TOXIC
Special Information	Flash point: 154°C (309°F)
Reportable Quantity	5,000 lb/2,270 kg (p-Phenylenediamine)
Packing Group	III
Shipping Containers	
Flakes	Fiber and steel drums
Molten	Tank cars, tank trucks

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 Chestnut Run Plaza #728-3419 4250 Lancaster Avenue Wilmington, DE 19805

DuPont Subsidiaries – contact the office nearest you:

Europe

DuPont de Nemours (International) +32-3730 2292 (Belgium)

North/South America

DuPont do Brasil S.A.	55-11-4166-8289
DuPont Canada	905-821-5902
DuPont Chile S.A.	562-363-5-16
DuPont S.A. de CV (Mexico)	52-81-8311-4371 ext 4015
DuPont Quimica de Venezuela	58-241-871-64-66

Asia Pacific

DuPont China Holding Co. Ltd.	86-10-65058000 (Beijing) 88-21-63866366 (Shanghai)
DuPont China Ltd.	852-2734-5345 (Hong Kong)
E. I. DuPont India Ltd.	91-22-8390770
DuPont Kabushiki Kaisha (Japan)	81-3-5281-3428
DuPont (Korea) Inc.	82-2-222-5311
DuPont Taiwan Ltd.	886-2-25144386
DuPont Philippines	632-818-9911
DuPont Malaysia	603-5569-3006
DuPont Singapore	65-273-2244
DuPont Australia	61-2-9923-6111

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. We make no warranties, express or implied, and assume no liability in connection with any use of this information.

4/25/2011