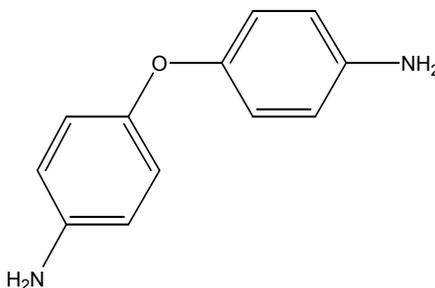


## 4,4'-OXYDIANILINE

CAS No. 101-80-4

First Listed in the *Fifth Annual Report on Carcinogens*



### CARCINOGENICITY

4,4'-Oxydianiline is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1978, 1982, NCI 1980). When administered in the diet, 4,4'-oxydianiline increased the incidence of adenomas of the harderian gland and hepatocellular adenomas or carcinomas in mice of both sexes, follicular cell adenomas in female mice, and hepatocellular carcinomas or neoplastic nodules and follicular cell adenomas or carcinomas of the thyroid in rats of both sexes. When administered by subcutaneous injection, the compound induced malignant liver cell tumors in rats.

No data were available to evaluate the carcinogenicity of 4,4'-oxydianiline in humans (IARC 1982, 1987).

### PROPERTIES

4,4'-Oxydianiline is a nonflammable, colorless, odorless, crystalline aromatic diamine that is insoluble in water, benzene, carbon tetrachloride, and ethanol, but is soluble in acetone. It is sensitive to prolonged exposure to air and light. It is incompatible with oxidizers. When heated to decomposition, it emits toxic fumes of nitrogen oxides (IARC 1982, 1987).

### USE

4,4'-Oxydianiline is used primarily in the production of polyimide and poly(ester)imide resins (NCI 1980). These resins are used in the manufacture of temperature-resistant products such as wire enamels, coatings, film, adhesives, insulating varnishes, coated fabrics, flame-retardant fibers, oil sealants and retainers; insulation for cables and printed circuits; and laminates and composites for aerospace vehicles (Sax 1987). 4,4'-Oxydianiline is also used as a raw material in the production of poly(amide)imide resins, which are used in the manufacture of heat-resistant wire enamels and coatings (IARC 1982). The compound is also used as an intermediate in the manufacture of epoxy resins and adhesives and in the production of aromatic polyether imides (IARC 1982, Kirk-Othmer 1982).

## PRODUCTION

In 1992, two U.S. producers of 4,4'-oxydianiline were identified (SRI 1992). The USITC reported that one U.S. company produced an undisclosed amount of 4,4'-oxydianiline from 1981 to 1988 (USITC 1989). Three domestic companies produced an undisclosed amount in 1980 (USITC 1981). Chem Sources (2001) identified nine U.S. suppliers of the compound in 2001. In 1980, the United States imported 48,500 lb of 4,4'-oxydianiline (USITC 1981). The 1979 TSCA Inventory listed four manufacturers producing a total of approximately 2,000 lb of 4,4'-oxydianiline in 1977 (TSCA 1979). This level of production was nearly constant from 1976 to 1978 (SRI 1982). This production volume is a significant decline from the estimated 100,000 to 1,000,000 lb reported to have been produced in 1974 (NCI 1980). 4,4'-Oxydianiline has been commercially produced in the United States since 1959 (IARC 1982). No export data were available.

## EXPOSURE

4,4'-Oxydianiline may be released in waste streams from its production and use in formulating polyimides. In atmosphere, it is expected to degrade rapidly reacting with photochemically produced hydroxyl radicals. The particulate phase removal proceeds via deposition. In soil, it undergoes covalent chemical bonding with humic material; moderate leaching is expected in absence of covalent binding (Spectrum 1999). Occupational exposure is most likely to occur during the manufacture of 4,4'-oxydianiline or in its use in production of polyimide-type resins (IARC 1982). Exposure may occur through inhalation of dust or through eye and skin contact (HSDB 2000). The National Occupational Hazard Survey, conducted by NIOSH from 1972 to 1974, estimated that 45 workers were potentially exposed to 4,4'-oxydianiline in the workplace (NIOSH 1976). This estimate was derived only from observations of the use of trade name products known to contain the compound. 4,4'-Oxydianiline was not included in the National Occupational Exposure Survey conducted by NIOSH from 1981 to 1983. The Toxic Chemical Release Inventory (EPA) listed three industrial facilities that produced, processed or otherwise used 4,4'-oxydianiline in 1999 (TRI99 2001). The facilities reported releases of 4,4'-oxydianiline to the environment which were estimated to total 618 lb.

## REGULATIONS

EPA regulates 4,4'-oxydianiline under the Superfund Amendments and Reauthorization Act (SARA), subjecting it to reporting requirements. EPA also regulates 4,4'-oxydianiline under the Toxic Substances Control Act (TSCA). The Interagency Testing Committee (ITC) of TSCA selected 4,4'-oxydianiline to be reviewed for consideration for health and environmental effects testing.

OSHA regulates the compound under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table 141.

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