

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

Acrylonitrile is produced commercially by the process of propylene ammoxidation, in which propylene, ammonia and air are reacted in a fluidized bed in the presence of a catalyst (EPA 1984, 1985a). Production in the United States has increased gradually over the past 20 years from 304,300 kkg^a in 1967 (Cogswell 1984) to 1,112,754 kkg in 1987 (USITC 1988).

Acrylonitrile is currently produced by five manufacturers at six locations in the United States: American Cyanamid Company, Avondale, Louisiana; BP America, Inc., Green Lake, Texas and Lima, Ohio; E.I. duPont de Nemours and Company, Inc., Beaumont, Texas; Monsanto Company, Chocolate Bayou, Texas; and Sterling Chemicals, Inc., Texas City, Texas (SRI 1988).

4.2 IMPORT

Imports of acrylonitrile have been relatively small. In recent years, imports of acrylonitrile have decreased from a high of 7,000 kkg in 1974 to negligible level in 1981 and thereafter.

A substantial fraction of the acrylonitrile produced in the United States is exported. Exports rose from 23,500 kkg in 1972 to 364,000 kkg (39% of United States production) in 1982 (Cogswell 1984).

4.3 USE

The primary use of acrylonitrile is as the raw material for the manufacture of acrylic and modacrylic fibers. Other major uses include the production of plastics (acrylonitrile-butadiene-styrene (ABS) and styrene-acrylonitrile (SAN)), nitrile rubbers, nitrile barrier resins, adiponitrile and acrylamide (EPA 1984).

Acrylonitrile has been used, in a mixture with carbon tetrachloride, as a fumigant for flour milling and bakery food processing equipment and for stored tobacco. However, most pesticide products containing acrylonitrile have been voluntarily withdrawn by the manufacturers (IARC 1979). Currently, acrylonitrile in combination with carbon tetrachloride is registered as a restricted-use pesticide.

^a1 kkg = 1,000 kg (1 metric ton, equivalent to 2,200 pounds)

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In 1982, 51% of the United States consumption of acrylonitrile was used for acrylic fibers, 18% for ABS and SAN resins, 14% for adiponitrile, 5% for acrylamide and 3% for nitrile elastomers. The remaining 9% was for miscellaneous uses (Cogswell 1984).

4.4 DISPOSAL

Because acrylonitrile is listed as a hazardous substance, disposal of waste acrylonitrile is controlled by a number of federal regulations (see Chapter 7). Rotary kiln, fluidized bed and liquid injection incineration are acceptable methods of acrylonitrile disposal (HSDB 1988). Underground injection is another disposal method. The most recent quantitative information on amount of acrylonitrile disposed in waste sites is for 1987. Emissions were 0.9 metric tons in surface water, 152 metric tons disposed through Publically Owned Treatment Works (POTW), 92 metric tons disposed of on land and 1,912 metric tons by underground injection (TRI 1988). Because acrylonitrile is relatively volatile and is also readily soluble in water, release to the environment from waste sites is of concern.