

SOURCE INVENTORY

CATEGORIES # 117, 118

ADHESIVES AND SEALANTS

1999 EMISSIONS

Introduction

Emissions reported in these categories are fugitive organic emissions resulting from the usage of adhesives and sealants. Adhesives and sealants are primarily used in wood, wood-related, and packaging activities. The emissions reported in these categories include emissions resulting from both industrial and consumer usage of adhesives and sealants.

Adhesives and sealants are generally categorized and distinguished by source types. Most adhesives and sealants are either of a water-based type or of a solvent-based type. Adhesives and sealants can also be found, although in a smaller quantity, in the form of hot melts (100% solids), radicured, powders, and reactive types.

Raw materials primarily used in the production of adhesive and sealants are rubber, starch, animal glues, bitumen, and synthetic resins. Other materials of smaller quantity that can be found in adhesive and sealant formulations include phenolic resins, formaldehyde, polyolefins, polyvinyl acetate, acrylics, polyvinyl chloride, polyesters, polyvinyl alcohol, and solvents, including hexane, heptane, xylene, toluene, methylene chloride, and 1,1,1-trichloroethane.

Methodologies

a. Permitted facilities

Companies utilizing large amounts of adhesives/sealants are monitored and regulated by the District's permit system. Throughput of adhesive and sealant usage for each permitted facility are tracked and recorded in the District's Data Bank system. Some of the industries affected under the District's permit system for the usage of adhesives and sealants include large wood production manufacturers, wood related construction companies, and packaging companies.

Emissions are calculated based on throughput data and emission factors. Emission factors used in the calculation are either derived from field tests and/or obtained from publications. If no specific factor is available, a generalized factor is used in the calculation.

b. Non-permitted facilities

Emissions from adhesive and sealant used in non-permitted industries are estimated based on a geographical area. These emissions are termed “area source” emissions. Non-permitted industries includes construction sites, small industrial companies, transportation facilities, dental and medical buildings, electric and electronics facilities, and other miscellaneous sites.

Data used to estimate area sources are based on "The Rauch Guide to the U.S. Adhesives and Sealants Industry, 1998 edition". Adjustments were made for 1999 using both the construction growth for each county in the Bay Area and the Rauch Guide's projection. In 1999, it was estimated that 1,800 thousand gallons of solvent-borne product and 8,166 thousand gallons of water-borne product were used in the Bay Area.

Emission factors used in the calculation of these area sources were taken from a 1985 ARB's report titled "Adhesives and Sealants". The emission factors used in the calculations were 1,230 lbs. of VOC per ton of solvent-borne adhesives/sealants and 90 lbs. of VOC per ton of water-borne adhesives/sealants.

Monthly Variation

Monthly distribution was estimated based on each company's reported quarterly seasonal percent throughput data.

County Distribution

The county location of each company as reported in the Data Bank was used to distribute emissions for each county.

TRENDS

History

Emissions through the years were estimated based on ARB's growth data on the construction industry.

Growth

Projections to year 2030 were based on the same growth profile of ARB's construction industry in the Bay Area.

Control

District Regulation 8 Rule 51 set limitation standards on adhesive products effective January 1995 and assumed to have a 60% control effectiveness.