

CASE STUDY FOR AMERICAN MICRO SYSTEMS



PURAFIL REMOVES FUGITIVE EMISSIONS FOR THE AMERICAN MICRO SYSTEMS



ABOUT AMERICAN MICRO SYSTEMS

American Micro Systems uses **Purafil Select Media** to remove toxic gas emissions for the protection fab personnel. The photolithographic process on silicon wafers involves the use of hazardous gases, including diborane, silane, arsine and phosphine. These gases are highly toxic and can cause destruction to lung tissue if inhaled. Many are also pyrophoric and strong irritants to the eyes and skin.

THE PROBLEM

Photolithographic production materials, such as diborane, silane, arsine and phosphine, provide the dopant ions necessary for deposition onto silicon wafer surfaces. Despite the dangers associated with these materials, large quantities are often handled in the production of microelectronic devices. Fugitive emissions during the photolithographic process, also pose potential health and safety hazards. Even trace amounts of these various gases can result in complaints of nausea, headaches and disorientation.

American Micro Systems, Inc., a subsidiary of Gould Semiconductor in Pocatello, Idaho, manufactures semiconductor chips, which are used to produce diodes, transistors and integrated circuits. Hazardous gases, which are introduced during the photolithographic process, are decomposed to produce dopant ions. These dopants are then deposited onto etched areas of the silicon wafer increasing its electrical conductivity. Gases emitted during the photolithographic process require manufacturers to take the necessary precautions in order to ensure the safety of fab personnel and the surrounding community.

Mr. Troy Murray, P.E., facilities engineer at Gould, was searching for an alternative to the common practice of exhausting process gases into the atmosphere. These gases are released from process equipment or from purge lines when gas bottles are changed. Though water scrubbers have always been used, Mr. Murray research chemical literature to analyze their effectiveness. He decided against installing water scrubbers because most of these process gases are only slightly soluble in water.

PURAFIL PROVIDES THE SOLUTION

Mr. Murray met with a representative from Purafil, who explained the advantages of dry scrubbing media and the protection it offers semiconductor manufacturers against toxic emissions.

Purafil installed a Purafil Front Access System at each of Gould's ten ion implanter exhausts. A separate Purafil gas-phase air filtration system was designed for the block buildings which house bottled gas outside the plant.

Purafil Select Media has proven to be successful in removing toxic gases. American Micro Systems continues to invest in regular media replacements from Purafil.

Purafil Select Media is an activated alumina-based substrate impregnated with potassium permanganate and sodium bicarbonate. Alumina is a highly porous substrate and offers a greater surface area than either zeolite or silica gel. With more surface area available within the media, more gaseous contaminants can be removed by the active ingredient. Purafil media removes gaseous contaminants through chemisorption, an irreversible chemical reaction process. The gases are absorbed by the media and oxidized to form noncorrosive solids which remain on the media pellet.



PURAFIL FRONT ACCESS SYSTEM

PURAFIL®
SELECT MEDIA