

# Contamination control improves product yield

Semiconductor manufacturing occurs in the cleanest environments available. The reason for this is to avoid any particulates in the manufacturing process. Contamination control company **Dycem** discusses how control over clean room will improve manufacturing yield

**W**ith nearly 50% of the total cleanroom technology market in the semiconductor industry [1], semiconductor manufacturing places a high premium on contamination control. This is because particles  $0.3\mu\text{m}$  or larger can short-circuit and damage a microchip resulting in huge financial losses for an industry estimated by Reed Electronics Research to have reached \$240billion in 2003 [2].

## Particulates entering semiconductor manufacturing

Particles like human hair, dust or metal particles, if found in a semiconductor manufacturing area, can cover significant surface areas on microchips and render it useless. Semiconductor manufacturing involves very delicate processes and takes place in Class 1 rated cleanrooms, which means that the cleanrooms must contain no more than one particle of contaminant greater than  $0.5\mu\text{m}$  [3].

## Wafer Fabrication

One of the most critical stages of semiconductor manufacturing is the wafer fabrication process, in which the electronic circuit is imprinted on the wafer material and layers of printed circuitry laid on top of each other. Manufacturers usually comply with detailed control measures, covering management of materials, facilities and processes, in order to prevent particles from getting on the wafer surface or in between layers of wafer material.

## How contamination enters the wafer fabrication process

Studies by 3M have shown that over 80% of contamination is carried into the cleanroom at floor level by the feet of personnel and wheels of equipment.

A research study by Dr. Caroline S. Clibbon shows that Dycem contamination control floor coverings and mats are over 99% effective in preventing contaminants from entering a critical area [3].

Using Dycem adjacent to products and processes can be of immense benefit in controlling airborne contamination. Contaminants are usually lifted above critical operating heights by vortices created by physical movements of personnel during manufacturing activities.

Further tests by M-con Technologies have revealed that contamination control flooring and mats can reduce contamination at levels critical to operational height by 60% [4].



**Stop Contamination in its tracks**

In order to prevent the ingress of particulate contaminants, which exist in the surrounding environment, effective contamination control flooring needs to be installed at entrances and exits of cleanrooms as well as the floors of changing/gowning rooms and areas where human and vehicular traffic have access to critical areas. Polymeric flooring and mats have long been recognised as an effective route to preventing floor and wheel-borne contamination from entering critical environments.

**Satisfied Customers**

Dycem has provided contamination expertise to hundreds of satisfied users within the semiconductor industry. Using contamination control mats and floor coverings as part of an integrated strategy can significantly improve product yields and provide competitive advantage.

**The Dycem range includes:**

- **CLEAN-ZONE** An effective contamination control floor covering suitable for light wheeled traffic and heavier pedestrian flows. Clean-Zone can be laid to any length or width, offering the option of full room coverage. Cleanzone is permanently installed and remains effective for up to five years.
- **WORK-ZONE** The only practical answer to you heavyweight contamination control problems. Work-Zone is the first contamination control floor covering specifically designed to remove contamination from forklifts, pallet trucks and other heavy-wheeled traffic.
- Use Dycem floor covering and mat systems at all entrance and exit ways to critical areas, corridors, changing rooms and airlocks to control particulates or static contamination. Dycem plays a vital part of an integrated contamination control programme. Dycem products are silicon free, Dop free, non-outgassing and non-particulating. All products are simple to install, and remain effective for up to five years.

**REFERENCES:**

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