Exhaust and Foreline Heating

A simple and effective way to prevent condensation

Application

Manufacturers of semiconductors, flat panel displays, LEDs, and photovoltaics have several processes that involve gases that condense and build-up if not properly heated. This results in costly production downtime and chip / product contamination.

After the gases are used for production, they go through a cleaning (scrubbing) process prior to being safely released into the atmosphere. The gases first travel from the process chamber to a vacuum pump via a foreline that is usually a 2" to 12" (51 mm to 305 mm) diameter stainless steel pipe. From there, the gases pass through a smaller diameter 1.5" to 6" (38 mm to 152 mm) exhaust line to an abatement system where they are burned off or collected into water. This area of the process is often called “pump to scrubber”. Both the exhaust and forelines need to be heated to a precise temperature, typically between 212°F to 392°F (100°C to 200°C) depending on the process and gas being used.

The processes that need heated are usually either an etch process (removing material) or a deposition process (adding material). Examples are Etch, CVD, MOCVD, and ALD.

Solution

Heat the exhaust and foreline piping systems with BriskHeat Cloth Heating Jackets. BriskHeat's cloth heating jackets provide precise and uniform heat for all components in the system including the lines, valves, flanges, and unistruts. By heating all of the components, hot spots and cold spots are reduced which drastically increases time between PM (preventative maintenance) cycles. These heaters are all connected as a system and each heater is individually controlled with a Centipede 2® modular PID temperature controller to maximize efficiency and performance.

Cloth heating jackets have built-in insulation for optimal energy efficiency. In addition, they are easy-to-install and remove, are suitable for clean room environments, meet SEMI S2 safe to the touch safety standards, and do not contain silicone which eliminates the risk of unwanted silicone outgassing.

The Centipede 2® is a modular temperature controller system that provides an individual PID temperature controller for each heater in the system. Each heating jacket has a built-in highly accurate platinum 100ohm RTD sensor and is connected to a Centipede 2 module that is local to the jacket. A touchscreen interface is provided to display real-time performance of every heating jacket (up to 128 zones) and offers data logging capabilities.

Alternative Solutions

BriskHeat flexible heating tapes and insulators are an alternative system used to heat exhaust and foreline piping systems

Examples of Processes

- CVD (Chemical Vapor Deposition): PECVD, ALD, WCVD, EPI, TEOS, HDP
- MOCVD: Metal Organic Chemical Vapor Deposition
- ALD: Atomic Layer Deposition
- Diffusion: Ni, SiN, RTO
- Etch: Metal

For examples of customers, see Customer Reference section (page A) in the Application Book.