Technology in the Spotlight : : Materials, Chemicals & Food

Green Industrial Cleaning Solution - Supercritical Carbon Dioxide

Supercritical fluid is at a temperature and pressure greater than or equal to its critical point where distinct liquid and gaseous phases do not exist. This technology describes the production and application of cleaning equipment using supercritical CO_2 to effectively remove particles on the surface of product. The technology provides advance precision cleaning, process cooling and machining lubrication for many different types of manufacturing tools and processes. CO_2 cleaning enables manufacturing tools and processes to operate with high capability and enhanced productivity.

Potential Applications

This technology may be applied across many industries, including:

- Semiconductor wafer manufacturing
- Precision machining
- Medical / dental sterilization
- Hard Disk Drivers
- Liquid Crystal Display
- Fiber Optics, Optical lenses

Customer Benefits

- Reduces or eliminates composite forms of manufacturing waste
- Improves quality and reliability requirements imposed by advanced materials, manufacturing methods and processes
- Allows for flexible automation, modular and clustered assembly operations, eliminating repetitive operational task errors
- Adaptable and flexible to high-mix production environment

Technology Features & Specifications

Supercritical cleaning using CO_2 typically has two distinctive features.

- Density of supercritical CO_2 is much larger than that of air, thereby dramatically increasing the drag on the particle
- Supercritical CO_2 will loosen the adhesion between organic contaminants and the surface where they are located.

The technology is available by a way of pellet blasting, spraying, plasma treatment and centrifugal immersion.

Market Trends and Opportunities

Supercritical CO_2 technology can be found in optoelectronic, semiconductor industry as well as in the process of photoresist coating, developing and etching, photoresist stripping, cleaning, drying, metal deposition, etc., as a revolutionary green technology. The future of supercritical CO_2 technology is very promising, taking into consideration, environment, cost savings and technical advantages. The potential for applications in various other sectors is also very promising. For instance, this technology contributes to futuristic developments of waterless dyeing in textile industry and sterilization of devices in medical industry.

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