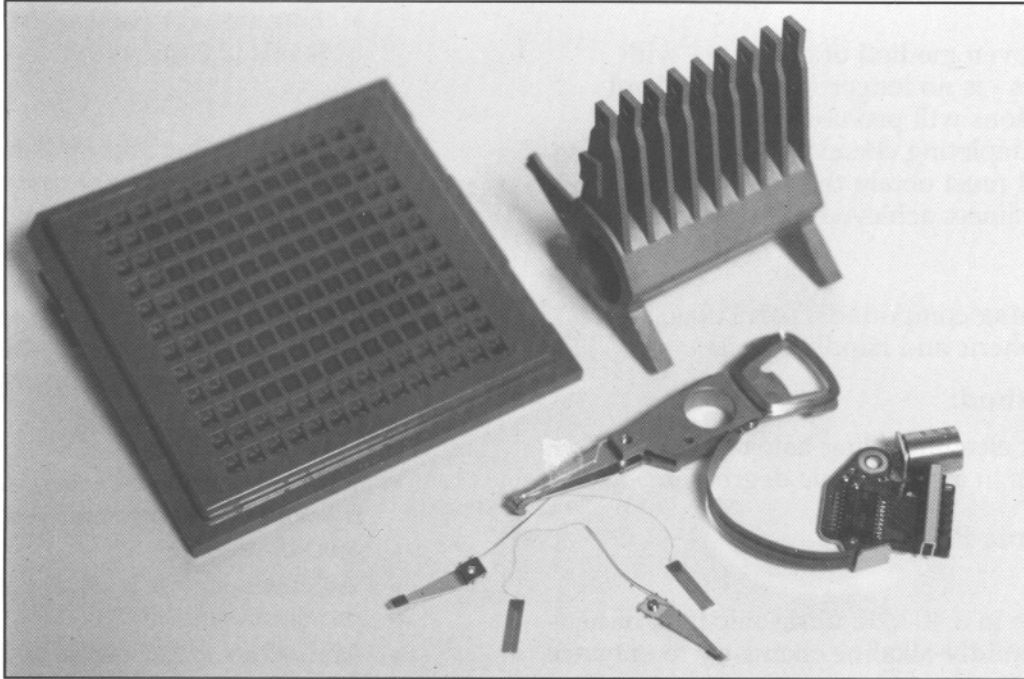


Precision Cleaning of Disk Drive Components

Application Brief



The challenge for many companies that manufacture read-write devices for computers is to eliminate the use of ozone-depleting chemicals but still obtain comparable cleanliness levels of their disk drive components. A high degree of cleanliness is critical to long-term performance and reliability of disk drive components. The demand for high storage capacity in a reduced-size disk drive makes the cleaning process increasingly important.

A typical manufacturing process involves machining to close tolerances on flatness and contours that are critical to read-write computer functions. Cleaning is essential to remove machining compounds, particulate, atmospheric and handling soils from metal and composite materials. Precision cleaning typically is performed in Class 100 or better clean rooms to maintain cleanliness integrity. After cleaning, assembly and encapsulation of the drives is completed and the drive is setup into computers.

Branson has developed a method for precision cleaning of disk drive components using aqueous chemistry, which successfully replaces solvent-based cleaning processes. Ultrasonics, which produces the microscopic gentle scrubbing action of cavitation in the cleaning solution, is recommended for effective and efficient cleaning. It also is recommended that ultrasonics be used in at least one of the rinse stations to enhance the rinsing activity.

Close attention must be given to fixturing and spacing of drive assemblies to maximize their exposure to process fluids and to minimize fluid entrapment or pooling. Deionized water and process piping should be non-contaminating and inert to process chemicals.

Environmental issues such as waste water treatment are addressed in closed-loop systems which filter and recycle the water for maximum benefit.

APPLICATION: Disk Drive Components

Description:

Precision cleaning is required for disk drive components prior to assembly and encapsulation to assure product reliability.

Problem:

The proven method of cleaning - with solvents - is no longer viable as federal regulations will prohibit usage of ozone-depleting chemicals. A new cleaning method must obtain the same high degree of cleanliness achieved with solvents.

Soils:

Machining compounds, particulate, and atmospheric and handling soils.

Previous Method:

Solvent cleaning using halogenated solvents in an ultrasonic degreaser.

New Ultrasonic Process:

CLEAN

1. Immerse in a 40 kHz ultrasonic tank of neutral to mildly-alkaline chemistry to enhance removal and prevent redeposition of soil from the devices.
 - Filtration at micron and submicron levels is required for particulate removal.

RINSE

2. Spray rinse with deionized water. DI water quality is to be a minimum of five megohm.
 - Full coverage spray pattern is achieved with four-side spray impingement.
3. Four-sided hot DI water overflow rinse with 40 kHz ultrasonics. Rinse is fed by the preceding rinse position for water conservation.
 - Filtration for particulate to submicron levels (0.5 micron).

Ultrasonic Process, continued:

RINSE, continued

4. Four-sided hot DI overflow. Influent water quality is to be 15-18 megohm.
 - Filtration for particulate at submicron levels (0.2 micron).

DRY

5. Primary drying accomplished with forced hot air recirculating through a HEPA filter.
6. Final drying accomplished by placing partially dried components in heated vacuum chamber. Chamber pressure is reduced to between 4-10 torr to complete drying cycle by flashing off residual water from internal passages after hot air drying.

Advantages:

- Replaces ozone-depleting solvent chemistry with environmentally-acceptable aqueous solution.
- Achieves higher level of cleanliness than previous method.
- Minimizes water usage in rinse stages through recycling DI water systems.
- Completely automated, no manual intervention.
- Simple, repeatable process.
- Throughput levels consistent with solvent cleaning.



For application assistance, contact your nearest Branson office or the Branson Cleaning Applications Laboratory at (203) 796-0522.



BRANSON ULTRASONICS CORPORATION

41 Eagle Road, Danbury, CT 06813-1961
(203) 796-0400 • FAX (203) 796-0320