

DuPont™ Vertrel®

cleaning agents

Bearing Manufacturer Chooses DuPont™ Vertrel® MCA Plus

Background

Cleaning of ball bearings immediately before and after assembly are critical steps in their manufacture. The reliable performance of the bearing depends on surfaces that are clean and free from particulate. One of the largest producers of ball bearings uses several vapor degreasers to accomplish this cleaning task. The cleaning process removed particulate and Houghton MB cutting oil that is used during machining and as a preservative. A variety of concerns with the existing process prompted the evaluation of alternatives.

Previous Process

This manufacturer previously used a co-solvent process consisting of solvating agent #19 with PFC 5060 as the rinsing agent. Although the cleaning performance of this system was satisfactory, there were concerns about excessive system change-outs and the long cleaning cycle time (1 hour). The solvating agent in the vapor degreaser had to be changed out every three

days in order to maintain the cleaning effectiveness. Additionally, there were concerns about the odor of the solvating agent, the high global warming potential of the PFC 5060, and the need to handle two components.

Alternative Chemistry Selection

Several solvents were evaluated as alternatives to the existing process. All were evaluated in actual cleaning tests in vapor degreasers equipped with ultrasonics. Cycle times were varied to determine the optimal times. After cleaning, the parts were inspected under a microscope for the absence of particles and staining. The solvents under evaluation were DuPont™ Vertrel® MCA Plus, Vertrel® MCA, Vertrel® SMT, and HCFC-225. As a result of this testing, Vertrel® MCA Plus emerged as the superior solvent from a cleaning effectiveness standpoint. Additionally, the Vertrel® cleaning agents were preferred due to their more favorable toxicity profile.

New Process

The conversion to Vertrel® MCA Plus in three vapor degreasers went smoothly. The machines required only minor adjustments to the controls to convert to the new chemistry. Some of the key advantages of the new process are:

- Higher soil-loading capability—this allowed the bearing manufacturer to significantly extend the time required between system change-outs. The target change-out time was extended by 100%.
- Shorter cycle times—the use of a single solvent eliminated the need to work with two separate components and the extra time required to remove solvating agent from the parts.
- Safety—the low emissions of solvent from vapor degreasers ensures that concentrations near the equipment are well below the allowable exposure limit.
- Low GWP—the global warming potential of Vertrel® MCA Plus is only 652 (100 yr ITH).



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