

## News

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## News

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## NETZSCH Laboratory Mills Are a Cost-Effective Testing Solution

Oct 15, 2007

*Today, NETZSCH engineers are working with those customers to tackle another one of their challenges: Testing. Nano World News learns more about NETZSCH's approach for high-quality/low-cost nanoparticles with Mr. Harry Way, NETZSCH's Technical Director.*

For years, NETZSCH Fine Particle Technology LLC (Exton, PA) has supplied some of the most accurate and sophisticated nanoparticle mills in the world, and has met the needs of exacting commercial and research customers in electronics, biotech, pharmaceuticals, alternative energy and other fields.

NETZSCH agitator bead mills provide custom nanoparticles, offering customers an average fineness of 40-100 nms, and often-times even smaller. A key to NETZSCH's success is an approach to producing nanoparticles using wet grinding technology with agitator bead mills. The result has helped NETZSCH solve one of their customers' biggest challenges: a reliable supply of custom nanoparticles that can be made smaller, stronger, lighter, and more resilient – and at consistent quality and low cost.

Today, NETZSCH engineers are working with those customers to tackle another one of their challenges: Testing. Nano World News learns more about NETZSCH's approach for high-quality/low-cost nanoparticles with Mr. Harry Way, NETZSCH's Technical Director.

"As nanotechnology research delves further into intricate applications and extremely small-scale dimensions, testing remains a challenge," Mr. Way told NWN. In fact, Way said, for nanotechnologists in 2007, "Testing is the most critical and costly step in the production of any end product. Whether it is life-saving medication or wood sealants, the formula must be just right. Achieving perfection can take hundreds of trial runs." Way and other engineers at NETZSCH take on such time-sensitive and costly challenges within nanotechnology with a certain type of relish. They have been working diligently to understand the full impact of labor-intensive and costly testing approaches. "Continual testing of any materials is costly, so consider the added strain of working with hard-to-handle, high value particles smaller than 50 nanometers (nm)," Way said. "If you are testing on full-production equipment, batches may be more than 100 liters, costing thousands of dollars per run."

### Small Equipment Makes Big Change

As one might expect, for NETZSCH's nanoparticle customers, the ability to test small batches and scale up is invaluable. Research and testing calls for small-batch equipment with the level of control and precision needed to replicate, measure and modify work. However, high-volume production is necessary for commercialization of small-tech products at the nano and micro level.

NETZSCH kept these needs in mind when creating a full line of scaleable laboratory-sized equipment. "With the lab-sized equipment, NETZSCH can work with clients as they begin the testing phase in small batches," Way said. "When testing is complete, we can ensure their results will be exact as they move to full-scale production."

NETZSCH's lab-sized line includes equipment for wet grinding, mixing and de-aerating that offers batch sizes as small as 75 mL with the *MicroSeries*. The *MicroCer* offers metal-free fine grinding for solvent-based products with zirconium oxide chamber parts, the *MicroPur* offers metal-free fine grinding for water-based products with polyurethane design, and the *MicroFer* offers fine grinding with stainless steel chamber parts. For slightly larger batch sizes, from 0.25 l to 0.5 l, the *MiniSeries* offers the same metal-free solutions.

These machines, along with the *MiniZETA*<sup>™</sup>, employ NETZSCH's proprietary *ZETA*<sup>™</sup> technology. The *ZETA* is a horizontal mill that combines the John System with a rotor-



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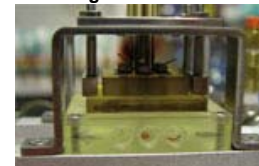
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**Automated Microfluidic-Chip-Based Stand-Alone Instrument for the Synthesis of Radiopharmaceuticals on Human-Dose Scales**

R. Michael van Dam et al.  
Siemens MI Biomarker Research, Culver City, CA, USA  
**Nanotech Proceedings**

slotted pipe separating system. It is designed for high-energy, high-flow, multiple-pass and circulation-operation grinding to achieve sub-micron particle-size distributions with the smallest grinding media.

Lab-sized *ZETA* technology also was designed with cost in mind, as working with such small grinding media can affect testing procedures and ruin entire batches. "Two major concerns come up when dealing with tiny grinding media: handling the media and the separation of the beads from the product," Way said.

The *ZETA* resolves both issues. The grinding chamber can be rotated vertically into different positions for easy emptying, filling and operation. Also, the classifying system designed in the agitator shaft in the *ZETA* provides separation even when using micro beads. This separation screen system prevents beads from remaining in the product or discharging from the machine.

NETZSCH's line of laboratory equipment also includes five other machines aside from the *ZETA* technology: LabStar, MiniVac, Laboratory Batch Mill, Laboratory Planetary Mixer and Laboratory ShearMaster. All NETZSCH lab-sized machines can be scaled up for full-size production.

"We have observed quite a revolution in the use of nanoparticles in everything from flame retardants to pigments," Way said. "These machines offer the ability to really put time, energy and money into the research of developing new products and improving the old. Our clients have experienced cost savings by starting with these small machines and moving to full-scale production only when they have their process literally down to a science." More information about NETZSCH's lab-sized equipment and nanoparticle technology is available at <http://grinding.netzschusa.com/LaboratoryEquipment>.



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