

## flowsonic® Use Case

Date: November 2024  
 Customer, location: Piezo Kinetics, Inc., Bellefonte, PA, United States  
 Application: Spray dryer, steel, 4mm wall thickness  
 2500 mm diameter x 2000 mm st side (cylindrical part)  
 Max. input 120 kgs/hour  
 Product: Piezoelectric ceramic powders  
 Task: Continuous cleaning of a spray tower  
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### Ultrasound unlocks the full potential of a spray tower thanks to continuous cleaning of the wall - the production of ceramic powder sustainably optimized

The installation of Artech's *flowsonic*® ultrasonic system at Piezo Kinetics' spray dryer effectively reduced wall caking, minimized waste, and improved production yields by enabling continuous cleaning during operation. This innovative approach replaced loud, mechanical knockers, enhancing efficiency and reducing downtime. Additionally, the system decreased the need for frequent maintenance, contributing to streamlined operations and increased powder usability.

#### Challenge

At Piezo Kinetics, Inc., producing top-quality piezoelectric ceramic powders involves spray drying including a binder system that is used to keep the solids in suspension. While effective in molding ceramic bodies, this process posed a recurring challenge: powder caking on the inner walls of the spray dryer.

These deposits required frequent cleaning, achieved through heavy, noise-inducing mechanical knockers that left operators with inefficiency and material loss. The results were not just stress for the spray dryer (Fig. 1) and its operators; the operation produced unusable fine dust and large clumps, wasting valuable powder. Maintenance interruptions and downtime became a costly inevitability.



Figure 1: Spray Dryer at Piezo Kinetics

#### Approach

Piezo Kinetics sought a smarter solution, one that produced less noise and increased productivity. Artech outfitted the spray dryer with three custom *flowsonic*® waveguides, seamlessly welded to its steel outer walls. Coupled with ultrasonic converters (Fig. 2) and generators (Fig. 3), the system delivered continuous micro vibrations, keeping the inner walls seamless without interrupting production. The ultrasonic worked like an invisible cleaning crew, preventing material build-up and ensuring optimal performance - all while operating quietly and autonomously.



Figure 2: Ultrasonic converter on the spray dryer



Figure 3: Ultrasonic generators

## Result

With the *flowsonic*® system fully integrated, the transformation was remarkable:

### 1. Prevention of Powder Build-ups:

The ultrasonic excitation effectively prevented powder deposits throughout each run, eliminating the need for noisy, mechanical intervention. The spray dryer's interior remained homogenous and clean of undesired product agglomerates (Fig. 4).

### 2. Increased Production Yield:

Freed from excessive caking, the recovered powder was now largely reusable. Finer particles seamlessly flowed through production processes, while coarse residues were easily screened out, ensuring maximum material utilization.

### 3. Minimal Maintenance Downtime:

Operators no longer had to frequently access the confined spray dryer for maintenance. This not only enhanced worker safety but also significantly reduced operational interruptions.

### 4. Quieter, Streamlined Operations:

The ultrasonic system ensured a more quiet, efficient process, fostering a more pleasant work environment.



Figure 4: Seamless walls inside the spray dryer



Figure 5: No caking of agglomerates on the walls

Through this innovative approach with Artech Ultrasonic Systems, Piezo Kinetics turned a persistent production challenge into a streamlined, efficient workflow. The adoption of the *flowsonic*® ultrasonic system exemplifies how cutting-edge technology can unlock unparalleled benefits, from reduced waste to enhanced productivity.

## Products used

3x FS-1-200-S generator  
3x Converter C35-SD8  
3x HF-cable 5m  
3x Titanium bolts  
3x custom *flowsonic*® waveguides

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## Contact Artech Ultrasonic Systems

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