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## Achieving Tight Particle Size Distribution in Powder Coating Applications

APPLICATION NOTE Powder Coating | August, 2017

**INDUSTRY:** POWDER COATING

**LOCATION:** GLOBAL

**KEY CHALLENGES:** MEET MANUFACTURERS' POWDER COATING SPECS

**SOLUTION:** DEVELOP JET MILLING TOLLING & EQUIPMENT

**BENEFITS:** DEAGGLOMERATE AND TIGHTEN PSD FOR POWDER COATING APPLICATIONS



Since 1946, Jet Pulverizer has been responding to customer demands with high quality, engineered solutions. Jet Milling has proven to be the best dry powder additive grinding solution for powder coating applications due to its tight PSD and easy de-agglomeration.

### The Challenge

According to Kevin Biller of the Powder Coating Research Group the major challenge facing powder coating manufacturers is not the fineness of the material, but rather the particle size distribution (PSD) of the powder.<sup>1</sup> Mr. Biller goes on to state that some suppliers will give a D50 (mass median diameter) number which meets spec, but not the range of the distribution of the material, which varies widely depending on the types of processes used to mill the raw materials. "Fines", namely materials in the lower 10% and "coarse" which represent the top 90% of mass, are problematic if the particle size distribution is flat. Having flat or wide, rather than tight peaked curves, may lead to application problems such as agglomeration which causes powders to fluidize poorly creating conveyance issues which are costly and impact quality.

1. Biller, Kevin. 2014; "It's all in the PSD". Powder Coated Tough. <https://www.powdercoatedtough.com/News/ID/44/Its-All-in-the-PSD>



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## APPLICATION NOTE | POWDER COATINGS

### The Solution

Powder coating suppliers have come to Jet Pulverizer with just such issues. After having milled their materials in hammer mills or ball mills, their material particle size distribution are relatively flat with far too many “coarse” and a long “fines” tail. (See Figure 1) Additives such as alumina, barium titanate, silica, or zinc are added to the blended materials, increasing fluidization, corrosion resistance or to promote powder-charging characteristics. Each of these additives can be milled in jet mills to single digit microns with very tight PSD. (Figure 2) Jet Pulverizer uses a Horiba LA-960 laser diffraction analyzer in order to perform wet or dry particle size distribution analyses.

Further, agglomeration continues to be a large issue in powder coating, where the target particle size has been met but the material has clustered which negatively impacts the manufacturers’ applications. Jet mills have proven to help in this regard, the particle on particle collisions taking place inside its chamber allows for a de-agglomeration and smoothing of particles which help flow issues and texture. (Figure 3)

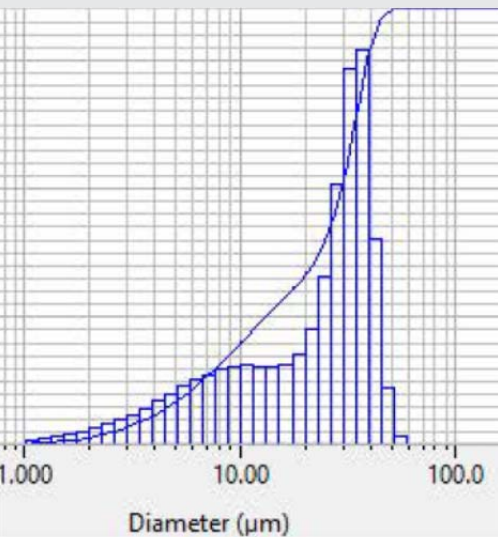


Fig. 1; Prior to Jet Milling, notice long “fines” tail

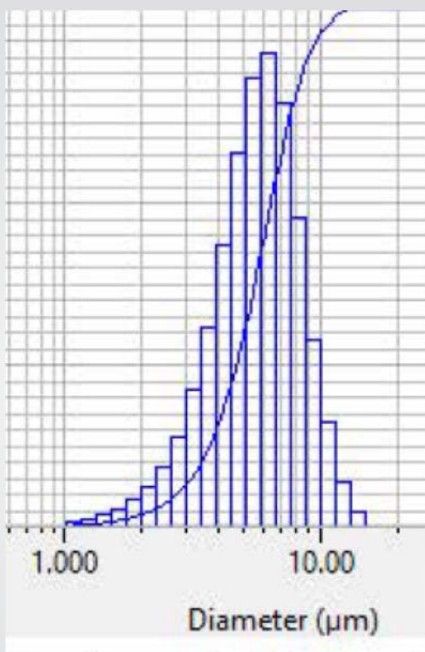


Fig. 2; Post Jet Milling, tight PSD curve

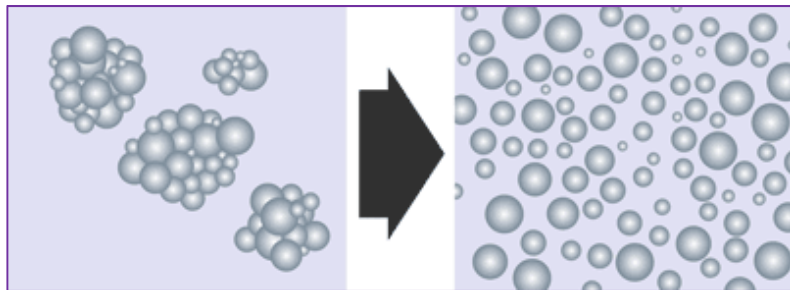


Fig. 3; De-agglomeration in a jet mill.

### The Impact

Besides its tight particle distribution curve and de-agglomeration, “Jet Milling can be used to blend the additives in while particles are de-agglomerating. This can save an extra step for the manufacturer” states Austin Fay, Jet Pulverizer’s President.

“Once trials have been concluded and analyses run, our clients can choose to run production projects here or Jet Pulverizer could design and manufacture a custom mill for their plants,” adds Jeff Conn, VP of OEM.



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