

# Expanding Into New Markets Doesn't Have To Be A Grind

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## **Powder and Bulk Engineering**

January 1989 modified

*Union Process' test center and pilot plant help a chemical company reach a market niche in the glass and ceramics industries.*

## **Test Center**

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Union Process, Inc of Akron, Ohio, manufactures Attritors —used in many industries, including chemicals, plastics, pharmaceuticals, cosmetics, ceramics and candy manufacturing. Union Process also conducts grinding tests at its test center and pilot plant.

In 1986 Margaret Yang, technical director at Union Process got a call from J.R. Hwang, manager of research and development for Hall Chemical company, Wickliffe OH. The company manufactures cobalt, nickel, manganese and cadmium chemicals. It had spotted an opportunity to supply the glass and ceramics industries with a fine chemical powder for use as a pigment.

The market niche was there, Hwang told Margaret Yang of Union Process, but the company faced two problems: to start with its existing vibratory mill could not dry grind the chemical powder to a fine enough particle size.



## Powder Bulk and Engineering

Hall Chemical wanted to be sure that the market volume for the reduced chemical powder would justify purchasing new grinding equipment. A capital investment of \$50,000.

Hwang wanted to know if the Attritor could reduce the powder from 8u to 1u. Yang suggested testing the powder at the Union Process test center. Hwang filled out a test information sheet provided by the test center. The sheet asked for information on the grinding media to be used, the initial and end size of the product, the expected production rate and current processing methods. The test center also requested an MSDS which Hwang provided along with additional information on the powder characteristics. From this information the test center staff determined that the powder could be safely ground. Next, Hwang sent approx. 40 pounds of the powder to the test center. The test center staff used a Fisher sub sieve to determine the powders initial size, which was greater than 8 microns.

Hwang traveled to witness the tests which were performed on the lab batch Attritor. An Attritor mill uses a rotating vertical shaft with arms to agitate a mixture of the media and material. It works fast and produces a narrow particle size. Based on their knowledge of the chemical powder, the test center staff chose 3/16" SS balls and the media. The first test was run at a speed of 350rpm, a second test at 450rpm achieved the size of 1u.

Pleased with the result, Hwang asked that scale-up tests be performed on a production Attritor at a later date. Over the course of several scale-up tests in the SD30, the test center changed the media volume from 25 to 30 gallons. Increased the rpm from 110 to 150 and tried four different process rates— 1.5, 2.5, 4.5 and 6.5 lb/min. These were made to obtain the desired particle size

distribution. Each time a change was made, Yang and her staff analyzed the results, then sent the reduced chemical powder to Hall Chemical's research and development lab. There, Hwang and his staff double-checked the reduced powder size result and ran future tests on the reduced powder. In this way, both Union Process and Hall Chemical could be certain that the reduced powder would meet the needs of Hall Chemical's customers.



## Hall Chemical uses pilot plant as interim production facility

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The test center solved Hall Chemical's first problem by proving that an Attritor could reduce the powder to the required size. But Hall Chemical still wanted to test-market the powder before purchasing the Union Process pilot plant program would make this possible by acting as a temporary production facility. Hall Chemical shipped 30-gallon steel drums of the powder the Union Process, where a production Attritor ground the powder to required size. Once completed, the powder is packed in plastic lined 100 lb fiber drums.

## Hall Chemical is ready to buy an Attritor of their own

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The pilot program has given Hall Chemical time to build sales volume. In 1987 Union Process produced 79,550 lbs. "The market is big enough for justification to purchase a production Attritor for in-house processing," says Hwang.

## Facts about Union Process test center and pilot plant

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The Union Process test center and pilot plant re located in Akron OH. The test center occupied 5,500 square feet. The pilot plant takes up 2,000 square feet. The two facilities share a staff of 10 technicians. The center conducts two or three tests per day. The pilot plant generally works on two long term projects per day.

Unless circumstances require complex processes, initial testing is required. A nominal fee is required. All testing data is kept confidential. An SDS is required for all materials tested. The test center to analyze the particle size before and after processing, the staff uses a Malvern 3000, grind gauges, Sieves and BET unit. The Ph is checked in some cases along with viscosity.

In addition to lab batch Attritors the test center is equipped with a circulation Attritor, and continuous Attritor.

After the tests are completed the test center staff gives the customer a lab report that includes information on the machine used to test and analyze the material, the particle size before and after testing, the grinding media used any other information pertinent to the test. Processing recommendations and estimation production rates are also included. At this stage, the customer may decide to use the pilot plant for scale-up or temporary production.

The production Attritor used in the Hall Chemical operation is just one of several in the pilot plant. The units are for a variety of process application including wet, dry in batch, recirculation and continuous modes.



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