

CASE HISTORY

Degussa-Hüls tries pulse- combustion spray dryer

*Equipment
narrows particle
size distribution
and improves other
product
characteristics.*

Germany's Degussa-Hüls AG is one of the world's largest specialty chemical companies. It operates several independent businesses that make super-absorbents, coating raw materials, colorants, pharmaceutical intermediates, polymers

and intermediates, silicas, pigments, catalysts, and other industrial goods.

With such a wide range of products, Degussa-Hüls relies on its corporate process technology group to investigate ways to improve production



Now installed at a pilot plant near Frankfurt, this pulse-combustion spray dryer enables Degussa-Hüls to test how different drying parameters affect product properties.

techniques and product properties. In this way, the company hopes to meet or even anticipate customer needs. One example of the group's work involves spray drying.

In 1998, the process technology group at Degussa-Hüls learned about a spray drying technique called pulse-combustion drying. In a pulse-combustion spray dryer, the gas and liquid environments are reversed from a traditional spray dryer. Instead of accelerating the liquid by high-pressure atomization, the pulse-combustion unit accelerates the gas. It does so using a pulse-combustion engine—similar in operation to a jet engine—that creates a hot gas stream. As the

liquid enters the hot gas stream (at low pressure and velocity), a high-velocity pulse wave instantly atomizes it. This produces finer particles and a narrower particle size distribution than that of a traditional spray dryer, said Dr.-Ing. Stefan Schulze, who is in charge of the process technology group's pilot plant near Frankfurt. He attended the first tests conducted with the pulse-combustion spray dryer.

“We tested various established and new products from Degussa-Hüls, especially those where very small particle sizes and high surface areas are desired,” Schulze said. “The main goal was to find the relation between drying parameters and product properties.”

Designer drying

Detailed results of the tests are confidential, Schulze said, but he and his colleagues were satisfied with the performance of the dryer. In June 1998, the company installed a Model P-0.1 pulse-combustion dryer at the pilot plant at Hanau-Wolfgang. Supplied by Pulse Combustion Systems of San Rafael, CA USA, the dryer has an evaporative capacity of 22 kilograms per hour and operates about 2 days a week. “The dryer is used for product and process development,” Schulze said. “It is part of our various drying technologies installed in our pilot plant. Products are changing all the time.”

Because the drying technology was new to Degussa-Hüls, technical support was important. “We got perfect support in terms of bug fixing,” Schulze said. “We also got perfect support in terms of information about further improvements of the pulse drying technology.”

Schulze said that the dryer gives “product properties that differ clearly from spray-dried products, especially in terms of particle size distributions.” He also said that the particles are finer, which might allow Degussa-Hüls to avoid further steps of processing and handling. “The greatest benefit is the production of finer particles compared with regular spray dryers,” he said. But it also “offers new possibilities in designing physical product properties by a drying technology.”

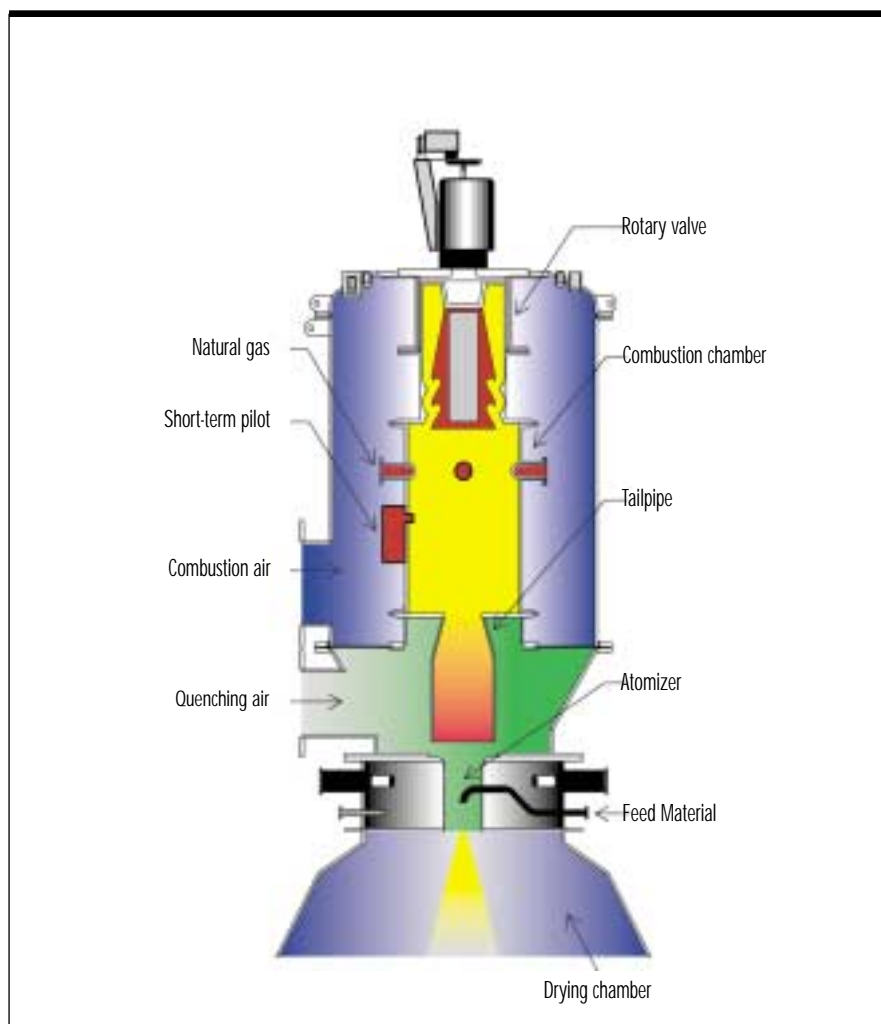
PBE International

Spray drying system: ***Pulse Combustion Systems LLC, San Rafael, CA USA.***

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A diagram of the pulse-combustion spray dryer's burner and atomizer.