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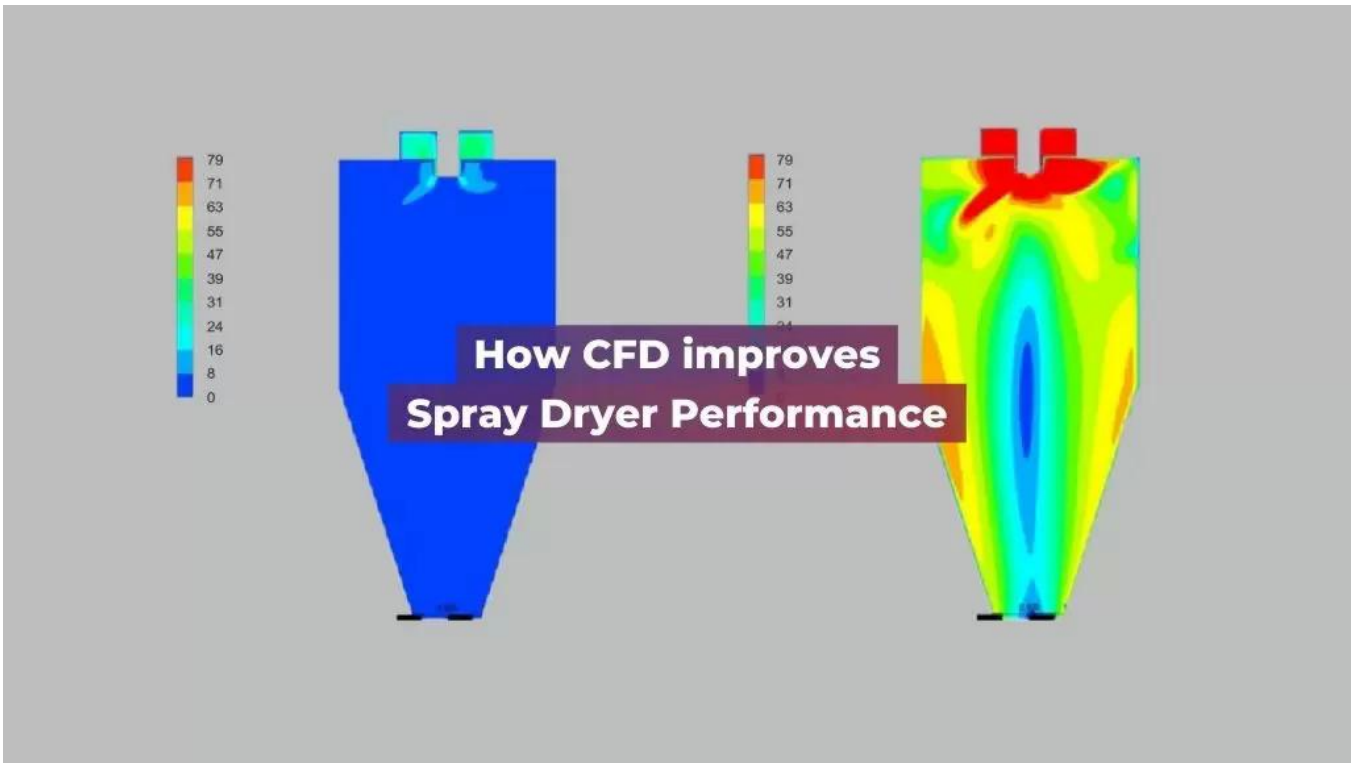
How CFD improves Spray Dryer Performance



When the stakes are high, knowing what is going to happen in advance could save lots of time and effort put in wrong places. If you had tools that could predict how your throughput is processed before you even put in to the machine, it could save you a lot of costs. That is what the CFD technology does in case of spray drying.

Computational Fluid Dynamics (CFD) entails application of mathematics, physics and computer softwares to simulate how a fluid flows and how it affects other objects around it. CFD originated in the early 20th century and was mainly used to measure he flow of air around cars and aircraft. Later, it proved to be useful in sectors such as spray drying. In this blog, we take a closer look at how CFD is used in spray drying process.

CFD deals with the mass transfer, heat transfer and the momentum transfer of fluids in consideration. With the help of CFD tools information such as the flow pattern in the chamber, particle-air interaction, temperature profile, particle trajectory etc. can be gathered and leveraged to improve efficiency of drying system, economically.

Computational Fluid Dynamics (CFD) is the science of predicting fluid flow behaviour, momentum transfer, heat transfer, mass transfer and many other process associated with it. The information is gathered by solving mathematical equation which govern these process using numerical process.

In context of spray drying technology, CFD helps to answer many questions which are critical to its performance and results.

Particle behavior inside Spray Dryer Chamber
CFD models are useful in determining the Velocity Field. The flow characteristics in the chamber can be identified to understand the velocity does hot air and particle. CFD Analysis provides knowledge of the exact velocity of the particle heading towards wall, its moisture content, temperature etc. which can be then used to improve the process.

Temperature of elements Spray Dryer Chamber
With CFD model, we can come to know the Temperature of various elements in the chamber. For instance, the temperature of hot gas across the chamber, duct, cyclone and entire equipment can be known using CFD. Using the know-how on temperature aids several decisions such as the best suitable insulation, optimum material thickness to resist temperature changes and more. Problem associated with thermal expansion can be identified in the analysis and fixed with appropriate solutions such as suitable metallic bellow.

Forces Exerted on the particle in Spray Dryer
CFD Analysis is well proven to know the forces and their optimum magnitude on the particle. For instance, in the cyclone separator centrifugal force acting on the particle which can separate the particle from gas stream, stresses acting on the metallic bellow, storage tanks

etc. can be accurately understood by conducting CFD analysis.

CFD analysis forms an integral part of standard operating procedures at Shachi engineering. we have establishd advance simulation and analysis using Computational Fluid Dynamics (CFD) techniques. Our team has many years of expertise in designing of spray dryer with optimum performance and successful delivery of 500+ plants with promised features. To know more about how our spray driers could help your business grow, get in touch with us.

Get in touch to know more

For more details, please visit https://www.indiafinder.in/detail/shachi-engineering-pvt-ltd-17624