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Understanding Rotary Atomization

Rotary atomization, also known as spinning disc technology, uses a rotating disc to "atomize" a solution (coating) using centrifugal force (momentum). The centrifugal force applied to the solution from the rotating disc causes ligaments to form along the outer edge of the disc. As the ligaments stretch off the edge, they break into droplets which are very consistent and uniform in size and shape. These droplets form a 360° spray pattern around the axis of the disc. The discs are strategically located above and below a wire belt conveyor that carries product through the spray zones totally encapsulating the product with the coating material as if the product were being "spray painted". See the attached picture.

Using rotary atomization over spray nozzles?

Spray nozzles use pneumatics to force liquid under pressure through a very small diameter orifice, creating unstable sheets of liquid that break up into a defined range of droplet sizes. Due to the patterns formed by each nozzle, it is difficult to arrange them to get even coverage across a conveyor belt and totally encapsulate the product. Rotary atomization uses centrifugal forces so air is not added to the coating solution and the discs in our system are fed with a large diameter opening minimizing filtering requirements.

What is the relationship of disc speed (rpm) to droplet size?

At low disc speed (rpm), large drops are produced. The large droplets will cause inconsistent coverage and pickup weights of the coating solution. At very high disc speed (rpm), the coating solution will not achieve enough centrifugal force and will "slide" off the disc, not forming the ligaments that produce consistent droplets.

Through many years of testing various disc designs driven at variable motor speeds from 100 rpm to 3600 rpm, we have determined the motor speed that produces the best ligament formation, therefore producing droplets that create the most controllable spray pattern. By rotating the discs at a constant rpm, you will produce a consistent spray pattern time and time again.

Wilevco's patented disc design and feed system will handle and spray effectively a range of volume from under 1 gallon per minute to 8 plus gallons per minute per bank of discs. This gives our Spray Applicator immense flexibility in achieving a wide range of application rates (coating weight pickup). Other disc designs have a common fault that overfeeding them not only produces massive wasteful drops, but also produces tiny satellite drops, which can drift long distances. These other disc designs also reach a point of over-saturation where the solution runs off the bottom of the disc (referred to as sheeting).

Please contact Wilevco by telephone, 978-667-0400 or visit our website:
www.wilevco.com for more information.