

NOZZLE KNOWLEDGE SERIES

ARTICLE 7: AIR ATOMISATION

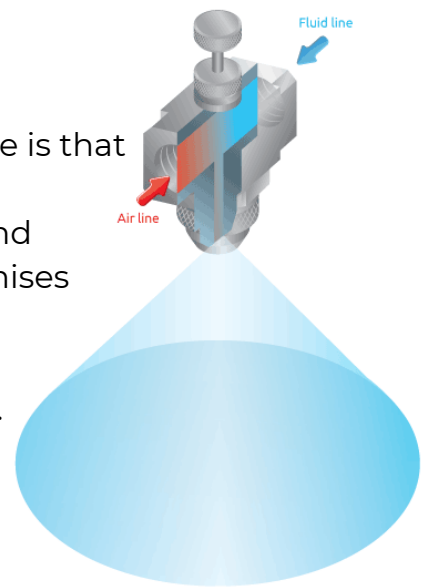
This is the seventh of eight articles from our nozzle knowledge series.

Adding air into a nozzle can have various effects.

The basic working principle of an air atomising nozzle is that there is no longer a single feed into the nozzle. Air is introduced alongside the liquid due to be sprayed and this creates a fast moving air flow that entrains, atomises and shapes the spray.

The basic spray properties are dramatically changed.

So, what effects does this have?



DROPLET SIZE

Air atomisers will tend to produce smaller droplets than other spray nozzles. With very high pressures from hydraulic nozzles, it is possible to get somewhere close to them. But air atomisers are an efficient way to achieve very small drop sizes at relatively low fluid pressures.

The drop size is no longer dictated by the fluid pressure.

The primary factor is the amount of air and air pressure that's put in.

Air pressure is the primary factor in atomisation and droplet size.

SPRAY PATTERN

With air atomising nozzles, variable patterns are created depending on the air fluid mix. Most hydraulic nozzles need the spray pattern to be stable. It varies a little bit with pressure in some nozzles.

A great variation of spray angles and patterns can be generated from a single air atomising nozzle, depending on the air fluid mix.

Some designs even have a separate air feed for the shaping of the spray and dictation of the spray angle. The air feed is independent from the atomising air feed which is used to control the droplet size.

Overall, there is a great degree of control due to the second variable that plays with the air.



IMPACT AND REACH

The velocity of the drops is dramatically increased because they are entrained in the fast moving air flow and will maintain a velocity quite a lot further from the nozzle.

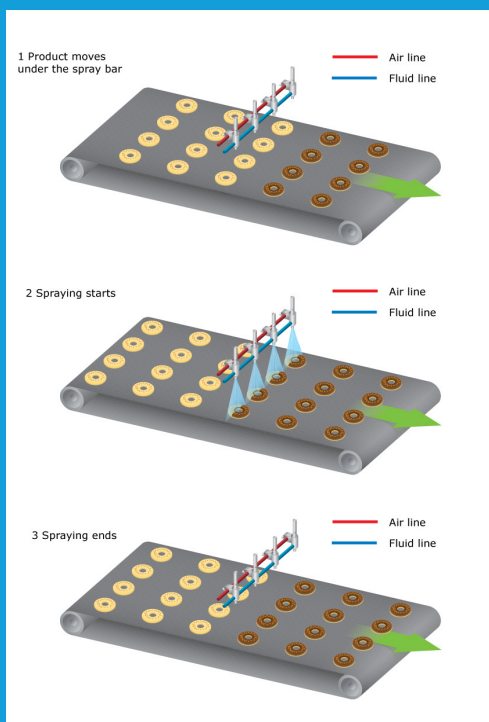
But because they're so finely atomised, there isn't much of an effect on impact.

Air atomisers wouldn't usually be used in any kind of application that required impact. Air doesn't have a positive effect on impact per se, because any of the gains made are lost by the atomisation effect.

However, it does have a noticeable effect on reach.

When comparing a misting nozzle with an air atomising nozzle, the misting nozzle rapidly loses its coherence. It only forms a coherent spray pattern very close to the nozzle.

The air atomising nozzle holds its spray pattern a lot longer before it descends into a fog. This is ideal for applications such as dust control that need the spray projected across large areas.



For coating applications that have air currents moving around the factory and a finely atomised coating spray being sprayed, it is possible that the hydraulic nozzle, even very close to the target, could get wafted off target.

Air atomisers have that entrainment within the air to help keep things on target.



LIQUID DISTRIBUTION

Separation of fluid density based on drop size, tends to be avoided because it is being mixed up with the air and finely atomised into the air.

With hydraulic nozzles, centrifugal effects and other similar factors, will often naturally separate out some of the big droplets and smaller droplets. This results in spray pattern variation. Depending on the nozzle design, this can be a bigger or greater variation.

But air atomisers create a more even distribution because weight of the drops and centrifugal type forces do not have such an effect.

The pattern is also more even.

If you have any questions, please don't hesitate to contact one of our knowledgeable experts.



 info@spray-nozzle.co.uk

 www.spray-nozzle.co.uk

 01273 400092