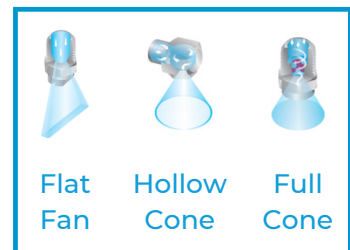


## NOZZLE KNOWLEDGE SERIES

### ARTICLE 5: ACTUAL VS. THEORETICAL SPRAY PATTERN

This is the fifth of eight articles from our Nozzle Knowledge series.

The spray angle of a nozzle dictates the width of the pattern and, in theory, basic trigonometry can be used to calculate the distribution of the fluid.



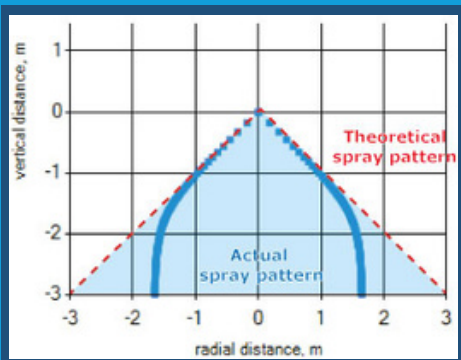
In reality, however, this doesn't work due to factors such as gravity that can affect the spray.

So, whilst the theoretical pattern may be true very close to the nozzle, it isn't going to hold further away from the nozzle.

What factors affect theoretical spray patterns?

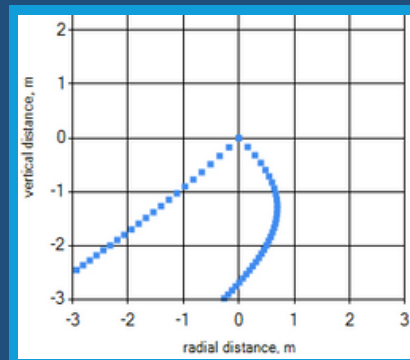
#### GRAVITY

Gravity starts to draw in the spray pattern and reduce the fluid distribution.



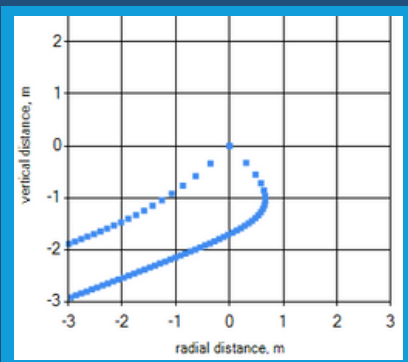
#### WIND & GAS FLOW

Wind and gas flow will start to move the theoretical spray pattern away from where it is supposed to be.



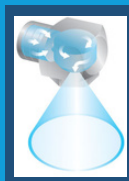
## WIND & GAS FLOW

The effect of wind and gas flow will be enhanced the smaller the drop size is; the smaller the drop size, the bigger this effect is going to be.



## PRESSURE

Some nozzles have a variation in their spray angle depending on what pressure they're being sprayed at.



This is particularly true for tangential whirl hollow cone nozzles. Their spray angle will vary quite considerably with the pressure of which they are spraying.

For other nozzles this is less important.

## FLUID PROPERTIES

The most important fluid property is viscosity, and this tends to reduce the spray angle of the nozzle.

Spray nozzle spray angles are calibrated on water. This means that if a more viscous fluid is being sprayed, the spray angle will be reduced.

The specific gravity of the fluid tends to reduce the effects of the gravity drawing in the spray pattern because the liquid being sprayed is denser.

In many respects, spraying heavier and denser liquids will overpower some of the effects and get closer to the theoretical spray pattern.

**Here at SNP, we have software that can help work out where the variations will occur between the theoretical trigonometry of what the derived spray pattern will be and the actual spray pattern. Please don't hesitate to get in touch.**