

Mechanism of Dust Control

Airborne particles affect everyone every day and play a role in our Health and Safety. In most cases it affects our person whereby dust, smoke or gases could cause adverse health issues. Impaired visibility in the workplace could also increase the risk of safe operation of machinery. This is particularly true in the mining industry where personnel might be subjected to dense airborne dust particles during ore conveying or processing.

Dust particles also have a negative effect on the lifespan of conveying systems and machinery, causing premature failures of components and entire systems. Amenities and the environment is also affected and the cost of housekeeping increases with the level of emissions.

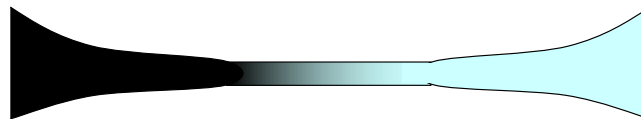
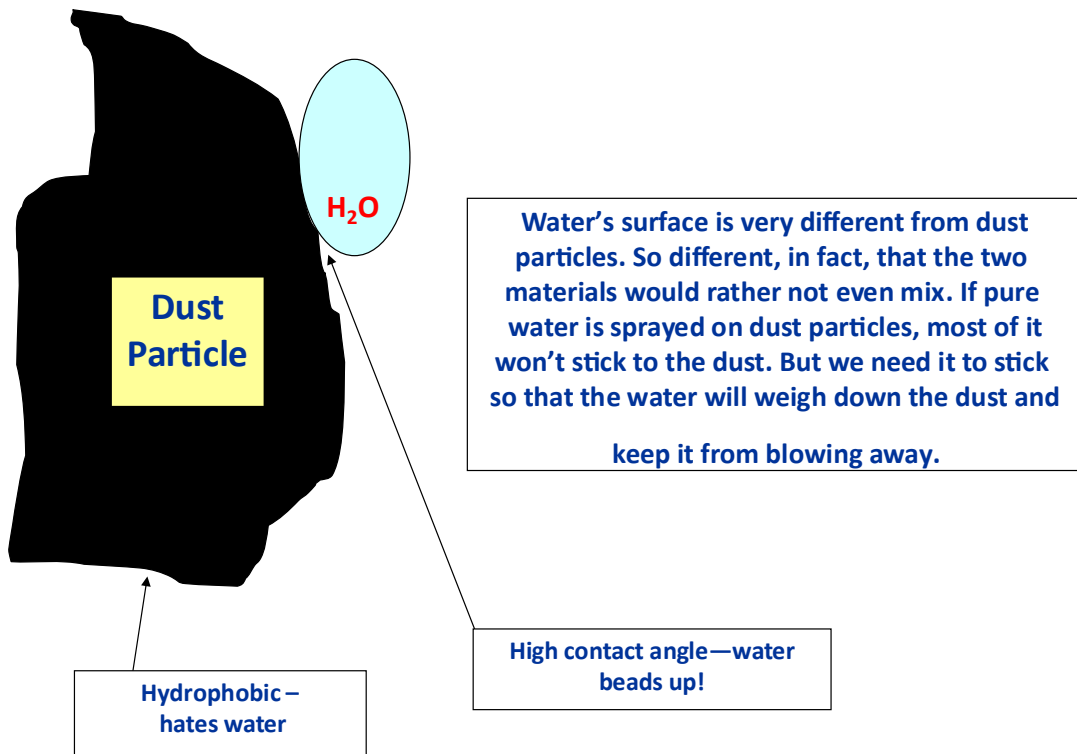
Benmarc has a long history of focusing on airborne particle mitigation for well over 40 years, offering proven solutions and have successfully engineered, designed and fabricated dust suppression systems in South Africa for more than 25 years.

The primary mechanism of wet dust suppression is based on gravity thus preventing dust from becoming airborne. Small dust particles are too light to be influenced by the gravitational forces, and the addition of weight in the form of a water droplet is the only viable solution. However, water in its natural form is not suitable for this due to the phenomenon called “surface tension”. This drastically reduces the water droplets from binding with dust particles and therefore the particles become and remain airborne.

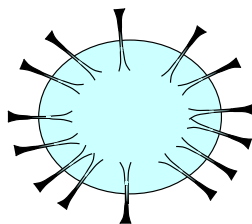
The use of “misting” or “fogging” dust suppression systems are not effective in that the droplets introduced to the material stream are too light, the force of the application too low, coupled with the natural surface tension of water and the air stream around the material flow, the mist or fog would not bind but be carried away with the dust.

To combat the issue of surface tension, chemical surfactants have been developed along with application methods by Benmarc. Altering the characteristics of water to assist in bonding dust particles, effective suppression is achieved and consumption of water is reduced.

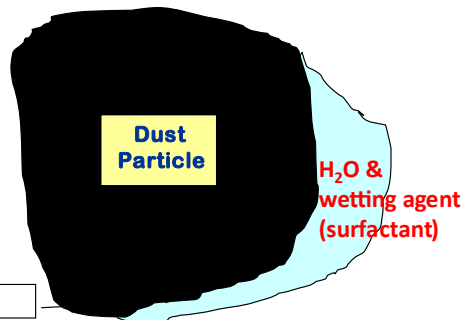
Benmarc offers tailored systems to address each operation’s needs and challenges.



Chemically we can build molecules that are hydrophobic at one end and hydrophilic (water – loving) on the other. These molecules are generally called “surfactants”



When these water droplets hit the dust surface, part of the surfactant sticks to the dust particle, and the other part of the surfactant drags the water along:



That's why water with the right surfactant can be hundreds of times more effective than pure water.