



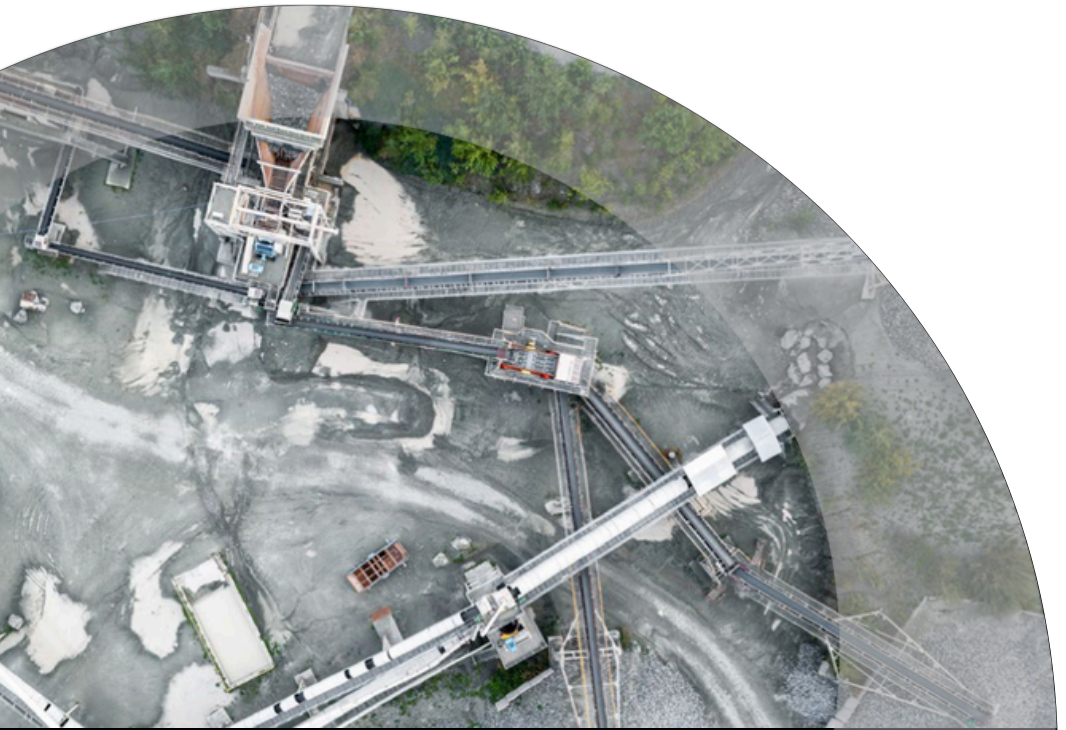
Dust control in Mining and Metals

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The World Health Organization refers to dust as “solid particles ranging in size from below 1µm to around 100µm, which may be or become airborne, depending on their origin, physical characteristics and ambient conditions”. The most hazardous dust particles are those less than 10 µm. Dust comes from a variety of sources which includes indoors and outdoors! Dust is generally made up from microscopic particles of minerals or organics, or a combination thereof.

Dust suppression can be defined as the prevention or reduction (by mechanical or chemical means) of the extent to which fine particles become airborne or suspended in air.

Particulate material rendered airborne can damage crops, spread disease and speed up the natural forces of erosion. Unchecked, it can add to pollution and adversely affect our entire environment.



The reasons for suppressing dust are:

- **Loss of valuable material** – Up to 5% of finished products can be lost due to wind erosion from stockpiles alone.
- **Environmental problems** – Dust can contaminate the atmosphere, surrounding areas. It can also enter the food chain by polluting potable water sources and soil.
- **Health hazard** – Dust is responsible for certain diseases including silicosis and pneumoconiosis (black lung disease).
- **Reduced visibility** – Atmospheric pollution can cause hazardous working conditions for vehicle drivers and plant operators.
- **Explosion/oxidation** – Very fine (10 to 20 micrometers) combustible particles constitute an explosion risk. (i.e. “hot spots” with coal)
- **Machine maintenance** – Dust particles can contaminate machinery such as bearings, air filters and various engine parts.
- **Reduced capital investment** – Generation of dust means investment in equipment e.g. spray bars, pumps, etc. Dry dedusting systems, beside the CAPEX costs are huge consumers of energy (fan systems).

Water is the universal solvent and most widely used dust suppressant, primarily due to its wide availability and cost.

It works by wetting particles, increasing their weight, making them heavy enough so that they fall to the ground. Water is, however, a relatively poor dust suppressant. Moreover, the increase of moisture brought in the raw material to be treated may represent an additional cost in heating process operations i.e. energetical costs for downstream operations (evaporation in furnaces).

Dust control programs offer a variety of chemical agents that address fugitive dust and stabilize material stockpiles, landfills, or tailings surfaces, reducing customers' overall operating and maintenance costs.

Veolia dust control with static systems

Stockpiles – storage

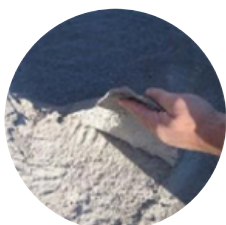
The reasons for suppressing dust and/or sealing the stockpile surface include the protection of valuable minerals from wind erosion, reduce the risk of spontaneous combustion and stockpile heating and lessening or eliminating the environmental problem of dust blow off. Veolia has developed crusting agents which coat the raw materials' surface forming an adherent film, which penetrates down into the stockpile. The film must be of enough strength to resist the effects of weathering but must also be flexible to avoid cracking of the crust.

VEOLIA CRUSTING AGENTS – PILES AND STORAGE

DusTreat* DC9169	Very effective crusting agent for stockpiles high wind erosion and rainfall resistance.
Aqualead* DC 152	Effective crusting agent for stockpiles with a good water resistance.
DusTreat DC9178	Crusting product for hydrophobic materials (coal,...)



Dust treatment of piles



Crusting film on a pile

Application is generally achieved by mobile plant, by a tank fitted with a mist cannon, hydrant or adapted nozzle to control the spray profile and dosage rate.

Veolia Key Performance Indicators are:

- Dust measurement (visibility, regulatory compliance)
- Limited treatment operations
- Crust presence and quality (penetrometer)
- Moisture and temperature insidele
- Water consumption

Veolia dust control with dynamic systems

Transfers, dropfalls and unpaved roads

Large quantities of dust generated from transfer points (conveyors, discharges...) can cause build up and blockages of access tunnels and walkways, giving rise to health and safety problems on two counts; airborne dust and restricted walkways.

Dust control on transfer points is usually carried using a series of mist sprays over the transfer point, spraying a Veolia binding agent.

VEOLIA BINDING AGENTS – TRANSFER

DusTreat DC9112E	Organic active binder for dynamic dust control on various substrates
DusTreat DC9114	Binder for substrates where organics is not desired
DusTreat DC9131E	Very effective binder for sinters, coal, coke, various ores...
DusTreat DC9080	Very effectiveorganic binder for unpavedroads

Veolia wetting agents have also been specially formulated to include a constituent, which provides a residual effect after the point of application resulting in the dust particles being kept wetter for longer. This can be particularly necessary when a water curtain shall be established around a drop of raw material.



Raw material transfer



Custom made spray bar with dedicated nozzles for a conveyor



Water curtain during raw material fall

Use of Veolia wetting agents: for hydrophobic raw materials, specific wetting agents such as DusTreat DC9140E or Aqualead DC153 can be used for curtaining applications or in combination with a binder.

Veolia Key Performance Indicators are:

- Dust measurement (visibility, regulatory compliance)
- Distance and/or duration of the treatment effectiveness
- Number of applications
- Water consumption
- Moisture
- Material loss

Roadways – permanent and haul paths

Unpaved industrial roads and mine ramp and haul roads produce excessive dust causing many health and safety hazards for employees and residents using the roads. Veolia sought to treat unpaved roads with environmentally responsible dust suppressants.

The Veolia binding agent is mainly used although the support of a wetting agent may be necessary when the substrate is hardly wettable. In the simplest of applications, the Veolia product is added into the top of the water tank before it is filled with water. Classical noses or spaying nozzles shall be used for the application on the roadways.

Veolia Key Performance Indicators are:

- Dust measurement (visibility, regulatory compliance)
- Treatment frequency; less diesel required for tractor/dust suppression unit
- Reduced manpower



Dust treatment for dusty roads

Main advantages and savings

Veolia technology can be of great benefit for dust control:

- Minimization of loss of load due to wind erosion and dust blow off
- Water savings during dust treatment
- Moisture control & Energy savings – less water content in the raw material to be evaporated in the heating process
- No atmospheric contamination in compliance with Environmental Agency directives
- Improved working environment – no dust related diseases / lost days due to illness
- Improved visibility at loading sites, haul roads and discharge points
- Reduced risk of explosion – Associated with very fine, airborne particles
- Improved plant availability – Less downtime (i.e. reduction in dust build up on bearings, filters etc).
- Reduced capital investment – Chemical addition can reduce the amount of equipment needed to mechanically suppress dust (i.e. bowsers, spray bars etc).

As a global expert in the water sectors, Veolia helps industries to preserve, optimize and secure resources. With the most experienced field staff, state of the art production facilities and world-class laboratories, Veolia is uniquely positioned to provide the solutions and expert services required for industrial processes and the environment.

