



## PATENTED DUST SUPPRESSION SYSTEM PRINCIPLE OF OPERATING



There are various dust removal techniques that can be applied to crushing plants. The most used technique is dust extraction by means of a large-capacity exhaust fan which allows recovering suspended particles through a set of bag filters made of a special fabric. This quite costly operation entails adapting the installation by almost hermetically sealing all the moving parts, such as belts, screens, crushers, loading and unloading duct and, in most cases, resorting to plugging the machines and housing them in closed rooms.

A more economic alternative is water sprinkling at the dust emission points. The systems used are generally very simple but very approximate in distribution. This provokes frequent stoppages of the selection meshes: in order to avoid such drawback, the operator is forced to reduce water capacity and the effectiveness of dust suppression is decreased.

We underline the fact that, in any case, great water quantities are necessary to get a reasonable result and this may produce an excessive humidification of the aggregate.

Our system is based on the sprinkling principle but with one innovative detail: production and delivery – by means of compressed air – of a foam made up of a mixture of water and an additive of biodegradable vegetable origin.

Generating a large amount of micro foam bubbles, the surface area in contact with the dust particles is considerably increased in comparison with the contact capacity of normal drops of water, and a great deal less water is used.

This foam – a mixture of air, water and additive of vegetable origin – envelops the processed aggregate thus preventing the dust particles from propagating into the atmosphere and without changing the original properties of the material treated.

The result is the same but the water quantity is decidedly inferior.

Apart from the advantages of effective dust removal and contained water consumption, our dust suppression system is fully automatically controlled by a PLC in order to reduce water and additive consumption to a minimum and to modulate foam delivery to the various operating points.

Through a material detection sensor and, if necessary, a movement sensor, you can make the device operate fully independently, so that it interrupts delivery based on the effective need, thus avoiding the operator having to intervene each time the conditions change.

A further advantage is given by the fact that every single crushing machine is individually controlled by its proper device. This allows an optimal and targeted adjustment of the whole plant.

## EXAMPLE OF AUTOMATIC APPLICATION ON A SINGLE MACHINE

- a) The command and proportioning unit will be placed to less then 50 ms from the foam distribution point.

The armour will be fed:

- With water by polyethylene pipeline diam. 32 NP10s (at the customer's charge).
- With compressed air by polyethylene pipeline diam. 32 NP10s (at the customer's charge).
- With a power supply of about 1 kW of 220V or 380V.

Inside the armour there are:

- A water pressure regulator;
- An air pressure regulator;
- A proportioning batcher;
- Two flux-meters;
- Valves by pneumatic command;
- Devices for the signalling of:
  - Lack of air pressure;
  - Lack of water pressure;
  - An insufficient chemical level.

The control panel includes a general interrupter and a series of selectors that allow feeding of the different foam production unities.

The chemical product is poured in the reservoir of about 200 Litres integrated under the unit.

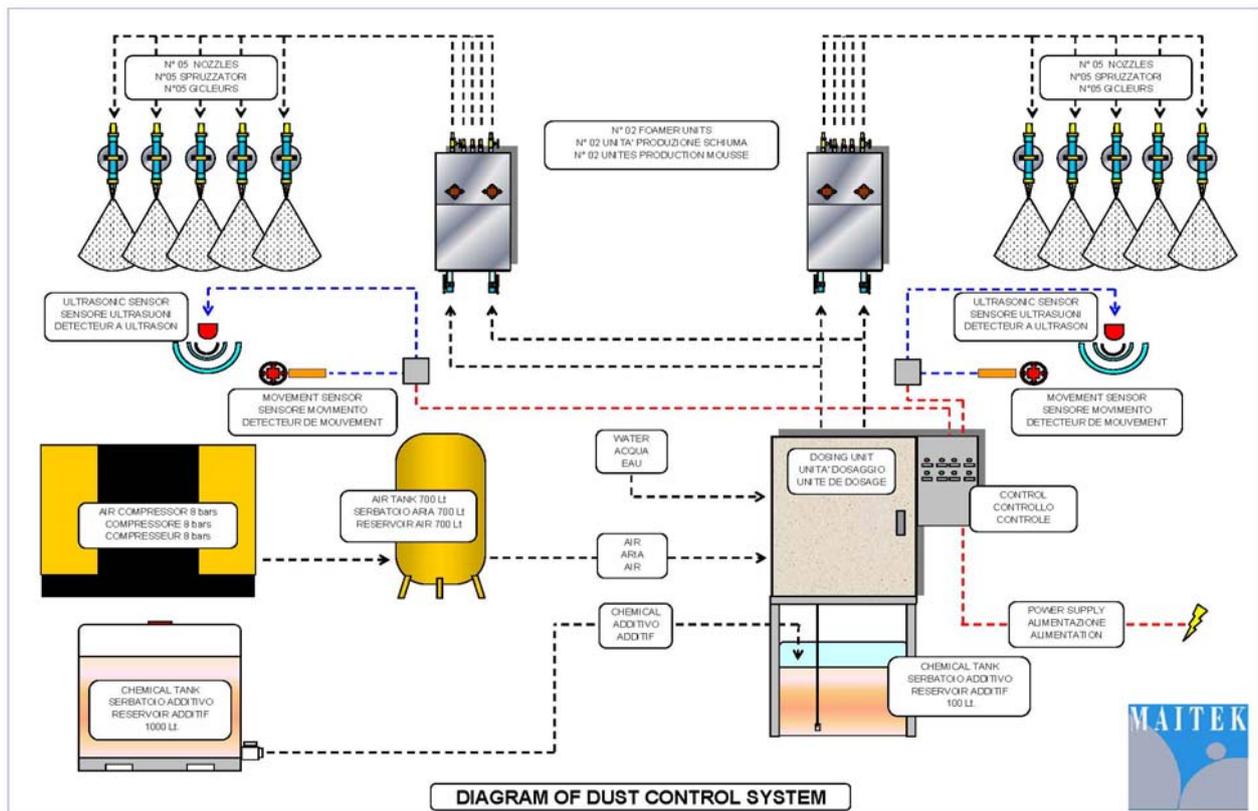
- b) The automatic foam production unit will be placed near the mill keeping in mind that we will be available about 8 meters pipeline for every foam nozzles.

A ultrasounds material presence sensor, is mounted on the conveyor belt under the mill.

For a best control of the device, a movement sensor is mounted for signalling the possible arrest of the conveyor belt.

In case of material absence in the mill exit or in case of conveyor belt arrest, the foam distribution of foam production unities is stopped.

- c) The foam distribution points will be situated on the feeding chute of the mill and eventually on the vibrating feeder. During the debugging tests, we will establish the number of nozzles to be placed (5 nozzles are delivered with pipes and accessories).



## FOAM SPRAYING



The biodegradability of the additive of vegetable origin, supplied directly by the manufacturer through our company, is a further guarantee of quality because it fully complies with the requirements of the environmental regulations.

We supply a wide range of chemicals for various applications such as: dust suppression on crushing plants, steel plants, cement factories, mining industries and also for the treatment of very dusty store areas and tracks.

In addition, constant upgrading of the equipment used allows obtaining the best result with minimum product consumption, contributing to achieving maximum efficiency and optimised running costs. These features have widely been demonstrated in the field and are particularly appreciated by the users.

## WATER FOGGING

We also have a system consisting in the fogging of mere water. This system consists in applying to the points of dust emission, such as exchange points between the conveyor belts, hoppers, jaw and impact crushers, a spray of water with special nozzles that produce a mist made of microscopic droplets. Each point of application is connected to a network of nylon tubing with pressurized water from 60 to 110 bars. The water consumption is very low and the installation is quick and easy. Upstream of the pressurization pump some filters having a fine mesh ensure the functionality of the system and avoid any clogging of the nozzles.



For the treatment on the transit or working areas we can supply fog cannons for a range up to 50 meters which are provided with an automatic or remote-controlled rotation system.

Intended for dust removal in the mining industry and in crushing of aggregates coming from quarries, demolitions and recycling, our **DUST SUPPRESSION SYSTEM** is supplied for applications on complete plants as well as on individual machines, subject to prior on-site inspection to define the application most suitable for the specific plant.

On request we supply complete plants installed in box/containers of various sizes, insulated for the use in extreme climatic conditions. The box/container is equipped with the control unit, pump, water and chemical tank, air reservoir, compressor, electric board, lightning and conditioning system. You have only to arrange the electrical and water connection from the outside. It is quick and easy to install on the site.

On request, we conduct application tests with the aid of a compact, fully stand-alone mobile unit, which allows gathering useful information for constructing the dust removal system.

In addition, we carries out dust emission measurements on the crushing systems using homologated instruments, which in just a few minutes provide an extract of the values recorded.

The accuracy and effectiveness of the tests conducted on site allow identifying the application most suited to the type of plant analysed, as the devices already operating on various construction sites testify.



**MAITEK DUST SUPPRESSION SYSTEM** bears witness to the great potential in the quarry and mining sector. A fundamental sector of the Italian economy, it finds ever more reason to exist in the responsible use of our resources in order to protect our heritage and not compromise future development.

### **AUTOMATIC CLEANING FUNCTION**

Especially during the winter period, in case of freezing, we recommend to get the pipelines free from any type of liquid. At the end of work or in case of lack of material, the electro-valves on board of foam production units are automatically closed and, after a pre-arranged time, the cycle of pipelines cleaning is activated by the input of compressed air.

### **MOISTURE PRESENCE IN THE MATERIAL**

Considering the feeding material with a moisture rate of 0%, we will have from a minimum of 0,4 to a maximum of 0,7% of moisture.

### **CHEMICAL PRESENCE IN THE MATERIAL:**

from 13 PPM to 23 PPM (parts per million).

### **CONSUMPTIONS CONCERNING EVERY SINGLE NOZZLE:**

Compressed air consumption at 4,5 bar:	about 330 litres/min
Water consumption at 4,5 bar:	about from 0,7 to 1,4 litres/min
Chemical consumption:	about from 0,2% to 0,5% on the water consumption



before treatment



after treatment



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