

LOW VOLUME vs HIGH VOLUME

VENTURI AIR

1 hectare treated with 3 kg. of chemical.
The concentration of the chemical is chosen according to the quantity of water per hectare to be used.

1 hectare treated with Lt. 1000 water and 3 kg. of chemical.

PNEUMATIC SPRAYER
200 lt. TANK



AIR BLAST SPRAYER
1000 lt. TANK

Chemical concentration: 5 times

Chemical concentration: 1 time or normal

PNEUMATIC SPRAYER
1000 lt. TANK



Water needed:
1000 lt.
1 filling

TREATMENT OF 5 HECTARES
with 15 kg of chemical



AIR BLAST SPRAYER
1000 lt. TANK

Water needed:
5000 lt.
5 re-filling

Chemical concentration: 5 times

Chemical concentration: 1 time or normal

CHEMICAL UTILIZATION

TOTAL. As there is no dripping, all the chemical will be used. Theoretically, the mixture could have 25% less chemical. Through the distribution heads, the air flow can be directed and adapted for various shapes and requirements of different plants, while the chemical distribution has a differential proportion and as per the real needs existing among the different parts of the same plants. The coverages are targeted, specific and in the respect of the environmental needs.

PARTIAL. More than the 25% of the chemicals falls to the soil unused due to runoff and dripping. The machines work at fixed distribution sectors, so the parts of the plants at low foliage density are treated with the same chemical quantity than those at high foliage density. The chemical is not used rationally and cheaply, and above all the treatment does not respect the anti-pollution rules.

FOLIAGE COVERAGE

TOTAL. The liquid is divided in fog-sized droplets which remain in suspension in the air. All the parts of the plant get touched by the air and consequently the chemical is uniformly distributed to all the surface, the more hidden areas included: **where the air arrives, so does the chemical.**

PARTIAL. Although assisted with the air spray from the fan, the droplets size and the distribution mode at high pressure prevent to reach the more hidden areas.

Due to their size, the droplets are stuck to the plant by the adhesion strength and cover the area of vegetation like a "uniform and homogeneous" protective film.

WORK TIME

REDUCED. The higher range cut sensitively the dead times due to the re-filling trips. The larger is the area to treat the more considerable is this advantage, that have an impact on a more efficient timeliness action: sometimes this is the essential condition to avoid the damages from the parasitical attacks.

NORMAL. The larger is the area to treat, the higher is the negative impact of the re-filling times. That can be reduced by increasing the tank capacity (if possible), but this might inevitably require additional costs and logistic issues. Consequently it is very difficult to timely intervene in case of great parasitical attacks.

SERVICING

NONE. At the beginning of each season, the CIMA pneumatic sprayers needs only an effortless and easy greasing. No other maintenance is required. There are no nozzles. The centrifugal pump requires no maintenance. The hydraulic circuit works at very low pressure and is not subject to defects or breakages. The gearbox's belt has a special automatic belt-tensioner that avoids slipping or anomalous wears for several years. The efficacy and quality of the spraying does not suffer from alterations or changes and are stable.

REQUIRES SPECIAL ATTENTION. The pump features, the usage of the nozzles and the high working pressure cause stress and wear to all the hydraulic circuit, with consequences that can be only partially controlled and prevented.

Breakdowns are unexpected and always happen when the sprayer is of urgent need. The metering discs wear changes the declared performance of the machine and requires continuous nozzles check.

the pneumatic LOW VOLUME

VENTURI AIR



**From 1974 easy,
effective, unrivalled!**

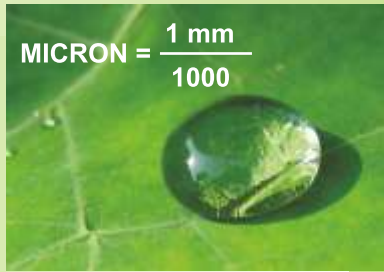


THE PNEUMATIC LOW VOLUME VENTURI AIR *by CIMA*

☆ It is well-known that water is the needed carrier to effectively distribute the agricultural chemicals and to obtain a complete and targeted coverage.

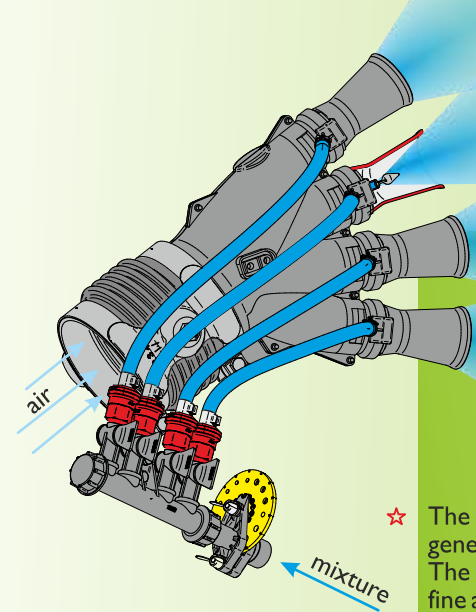
Reducing the liquid to small droplets is the only method to obtain a uniform distribution of small quantities of chemicals over wide areas of vegetation.

The size of the spray particles is measured in microns. One MICRON is one millimeter divided one thousand times (,001 millimeter = ,00006 inch).



☆ The 'traditional' sprayers use diaphragm or piston pump to obtain a high water pressure to distribute through one or more small diameter hole/s. The use of a fan permits to 'hold up' the water droplets by assisting the distribution of the chemicals over the vegetation.

This system is conventionally called "HIGH VOLUME".

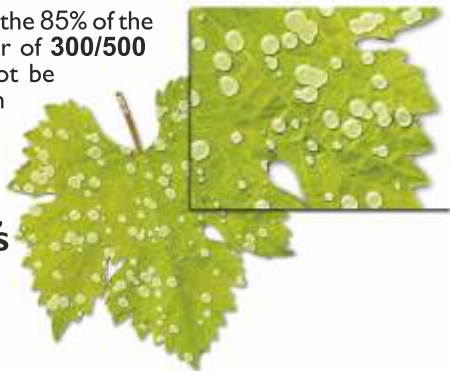


☆ The **CIMA pneumatic sprayers** use a system based on the "Venturi tube"; a centrifugal fan generates an intense air flow that passes over the Venturi tube and exits through an adequate throat. The water is introduced, without pressure, into the throat of the Venturi and is sheared into extremely fine and uniform particles. The application of this principle is the essential and binding condition for the construction of pneumatic sprayers.

LET'S COMPARE THE 2 METHODS !

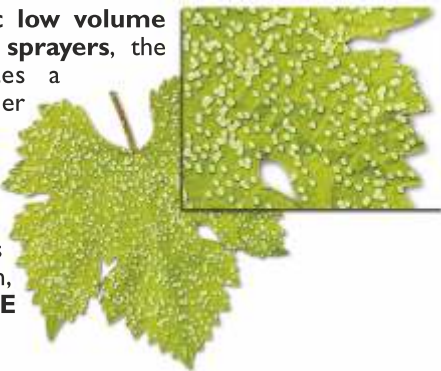
☆ With the "HighVolume", the 85% of the droplets have a diameter of **300/500 micron**. This size cannot be reduced, not even increasing the working pressure.

The distribution results rough and uneven, therefore of **LESS EFFICACY**.



☆ With the **pneumatic low volume CIMA Venturi Air sprayers**, the distribution generates a water fog with a smaller diameter for the 90% of droplets (usually, of the size of **100/150 micron**).

The distribution results precise and uniform, therefore of **MORE EFFICACY**.



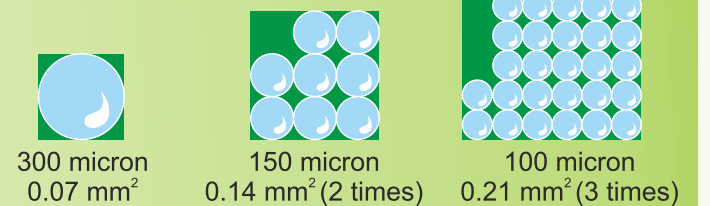
☆ The difference of the particle size is extremely important. At equal volume of the water used, it allows the pneumatic sprayers to do a distribution significantly larger than the 'traditional' sprayers. In other words, **CIMA pneumatic sprayers** cover the same area of vegetation treated by the 'high volume' sprayers but with much less water used, that is with a "LOW VOLUME" of water.

☆ Imagine to cover a given area with water droplets: it is obvious that smaller droplets will cover a bigger surface inside the given area.

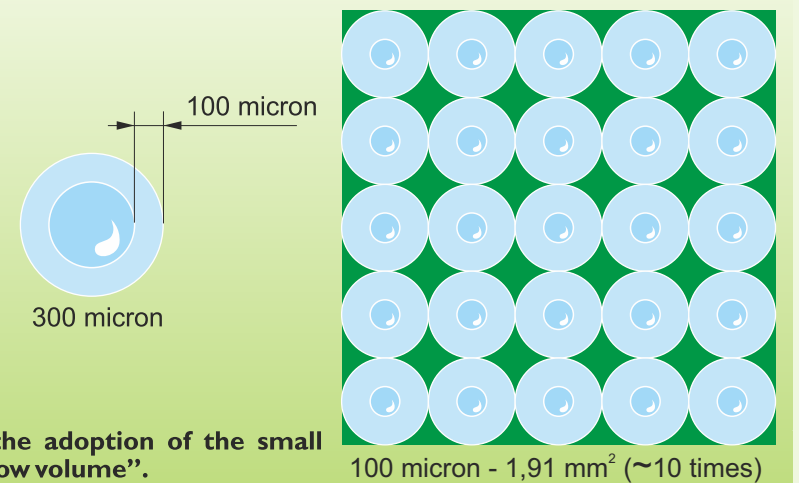
From the volume of a 300 micron droplet we obtain 27 droplets of 100 micron.

Even considering that the droplet diameter is the same of its imprint, the covered area moves from 0,07 mm² to 0,21 mm², tripling.

DROPLETS COVERAGE ON AN AREA

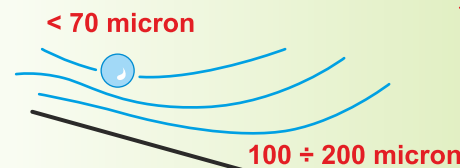


☆ However, if we consider the droplets flattening and the larger efficacy area of action coming from the volatility phenomena of the chemicals, and therefore the diffusion and saturation of the peripheral layer (the so-called "Fleming halo" whose thickness is estimated in about 100 micron), the covered area moves from 0.196 mm² to about 1,91 mm², that means ~10 times of increase roughly.



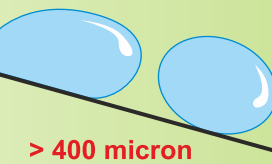
This is one of the main reason for the adoption of the small droplets, synonymous of "pneumatic low volume".

DROPLETS BEHAVIOUR ON AN AREA



☆ Furthermore, it is important to consider the droplets dynamic behaviour. Due to the surface tension and to the bigger volume, the bigger droplet (more than 400 micron) have a less adhesion and cause losses because of the great accumulation, of the deposit uneven, of the runoff onto the leaves and of the dripping onto the ground. Droplets too small (less than 70 micron) are very sensitive to the wind, the high temperature might cause their evaporation making them very small or even drying the solute chemical particle.

On the contrary, the **100/200 micron** droplets have a **better distribution** and, carried by the air spray, penetrate into the vegetable interstices and create a **more uniform coverage without dripping**.



☆ Regardless of the type of sprayer used, **THE QUANTITY OF CHEMICAL** to distribute per hectare **REMAINS UNCHANGED**, based on the crop to treat.

EQUAL AREA

	SPRAYER USED	SPRAYING SYSTEM	CHEMICAL USED	WATER USED	CHEMICAL CONCENTRATION
1 HECTARE	AIR BLAST SPRAYER	HIGH VOLUME	kg 3	1000 litres	1 TIME or NORMAL = 300 g x 100 litres
	PNEUMATIC SPRAYER	LOW VOLUME		333 litres	3 TIMES = 900 g x 100 litres
	PNEUMATIC SPRAYER	LOW VOLUME		200 litres	5 TIMES = 1500 g x 100 litres
	PNEUMATIC SPRAYER	LOW VOLUME		125 litres	8 TIMES = 2400 g x 100 litres