

Good air in the workshop

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Helping at the same time not to pollute the planet and enabling huge energy savings...

The machining processes based on chip removal (turning, milling, drilling etc.) are usually carried out with the help of cutting coolants. The latter cool down the tool and work-piece, contain the heating thus protecting the cutting edges, improving the dimensional precisions but also favouring the finishing of the surfaces. They are therefore a constant in all the workshops.

Basically water soluble coolants or straight oil are used – the first ones are more widely used, but straight oil is preferred with intensive machining processes at high speed and with big removal of swarf, or where high-resistant materials are machined or even when a particularly high quality of machining is required.

These last working conditions can be found at OMZ SpA (Crema CR), company specialised in the manufacturing of high quality and precise automatic turning for the fields of oleo dynamic, electro mechanic, automotive and general mechanic. The production of the company is situated on a very high quality level, characterised by the highest precision allowed by the today's most advanced machines, the certifications UNI EN ISO 9001-2000, ISO TS 16949-2002 and by the qualification of "supplier of class A" acknowledged by important customers.

Precisely for reasons of quality, the machining processes in this company are always carried out with straight oil and not with water soluble coolants. Mrs. Marina Zanotti, General Manager of the company, says: *"We opted for straight oil several years ago, since – compared to emulsion – the results are better in terms of quality of the product and of productivity. With straight oil we can work at much higher cutting speed and feed, obtaining indeed a gain in productivity. Moreover, emulsion always contains a considerable percentage of water and, in the long run, it always ends up damaging machine parts. On the other hand, straight oil, if well chosen, protects them. We have high-level machine tools, with very high hourly costs and our wish is that they operate at the best conditions. We are re-paid with more productivity and quality of product."*



OMZ is one of the main Italian and European manufacturers of turned components of high quality and precision.



A machine tool working with the air cleaner deliberately turned off: you can see clearly the emission of whitish oil mist. In these conditions, with tens of machines tools up and running in the workshop, the working environment would quickly become unhealthy.



The unwelcome phenomenon has been eliminated with the installation of AR Filtrazioni air cleaners.

With this principle, OMZ faces the machining of all metallic materials, from brass to light alloys, from cast iron to harder and more resistant alloy steel, obtaining very good results that are at the core of their excellent market position and of the high esteem they enjoy.

The other side of the coin

Straight oil is therefore a precious help in the most intensive machining processes. They have however a downside: the development of smoke and oil mist. These unwelcome by-products create inconveniences the more serious, the more intensive and demanding the machining processes are.

At OMZ, as said, the utmost productivity is pursued and they thence work with the highest standards (cutting speed, cutting depth and feed).

The machine tools end up generating great quantities of very unpleasant smoke, which is also very dangerous for the staff.



Another image of the workshop of OMZ. The air cleaners of AR Filtrazioni can be seen. Oil mist and smoke have completely disappeared.

The natural airing of the working environment (also in summer and even with open doors and windows) is absolutely insufficient in order to guarantee a clean atmosphere.

Marina Zanotti carries on: *"Years ago, before solving the problem with specific filter systems, we moved in the production areas through actual oil fog. An unacceptable situation. In order to improve these conditions we installed on each machine tool air filter units and we noticed a certain degree of improvement of the situation. That was the right path, but we still had lots to do. The units tested removed only part of the oil mist, required lots of maintenance and were not completely reliable. We understood that it was necessary to do more. It is under these conditions that we met AR Filtrazioni (Azzano San Paolo, Bergamo), manufacturer of air cleaners for machine tools and industrial environments."*

The supplier as a partner

Busy with a thousand problems, businessmen and workshop managers are more and more looking for suppliers/partners bringing solutions.

AR Filtrazioni's motto "Total satisfaction of the customer, by converting the machine tools into ecological and non-polluting ones" states clearly their aim.

The apparently easy goal of air filtration on machine tools, in fact complex for the numerous factors at stake, receives a complete solution by AR Filtrazioni.

A. Riceputi states: *"We are not considered by our customers simply as their suppliers of air cleaners; we are requested to give the solution to problems of filtration and purification of the air. Who addresses us, hands us over their problem and awaits from us a complete, turn-key solution. And we do that"*.

It is Mrs. Zanotti to attest that: *"As AR Filtrazioni's customer we can completely confirm what has been said. I would like to add that AR serves us, advises us and assists us with a promptness nowadays rare. We really feel "pampered" by this supplier, which is now more than a supplier a real partner."*

AR air cleaners

The managing director Marina Zanotti continues: *"The proposal of AR Filtrazioni, made by Angelo Riceputi, persuaded us and we installed the first air cleaners of their ARNO series. The difference with the previous units stood out immediately. Oil mist and smoke disappeared completely and the tests on the samples taken in the workshop to verify the degree of cleanliness of the air gave as a result "no pollutants"*.

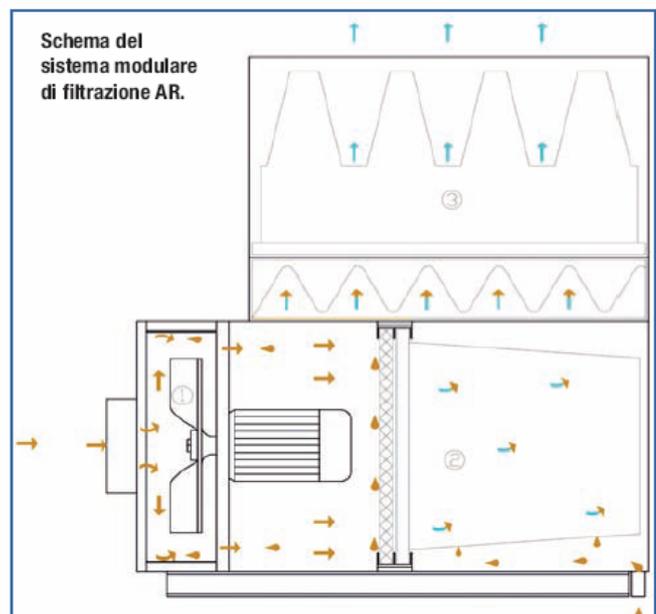
The problem related to the elimination of smoke and oil mist has this way been solved".

AR system is simple but effective: the illustration n. 5 shows it schematically. The air is sucked from the working area of the machine tool by a fan that centrifuges it and, because of the different specific weight, the air and the particles of oil separate. The latter settle on the wall along which they run, gathering on the bottom where they are pumped back into the tank of the machine.

The air goes through a metallic filter and then through a second filter stage, where the residual pollutants are removed. For a even more driven filtration, the air can be taken through a further third stage, after which the air is pumped back into the working environment "absolutely" clean (according to EN 1822), that is with a residual concentration of pollutants below the level of detectability.

Several are the peculiar features of these air cleaners: first of all the multiplicity of the filter stages. The first stage is followed by more stages of separation made of synthetic fiber with progressive density. The various stages as well as the types of synthetic fiber and their density can be combined in several ways, according to the working-conditions and -shifts, the type of machine tool and of the coolant used.

Layout of the modular system of AR units.





An AR air cleaner of the ARNO series installed on an automatic lathe

ARNO Series air cleaner with a pre-filtration system. The latter carries out a pre-filtration at the inlet increasing the total efficiency of the filtration; it is used for especially demanding working conditions.



There is therefore the possibility to create from time to time the best filter sequence with regard to a specific application: like a "made to measure dress", the air cleaner is set up exactly to face the expected requirements and delivers really good results.

Another very important aspect is the low maintenance required: the wide filter surface and the special type of synthetic fibres and progressive filter-media raise enormously the capacity of collecting pollutants of various kinds. The maintenance time-intervals (washing or replacement of the filter elements) are therefore of exceptional length, guaranteeing also low maintenance costs.

These air cleaners give a "decentralized" solution (that is for each individual machine tool) to the problem of elimination of oil mist and other pollutants, solution that, after a careful examination, seems to be rational and also economical in terms of energy consumption. As a matter of fact, the above described pollutants could also be removed by a centralised system, able to renew continuously the entire volume of air of the working environment. Apart from the dimensions that such a system will have, the necessary piping system and the related overall size of the installation, this solution would be very expensive also as far as energy consumption is concerned: during winter heated/conditioned (even if polluted) air would be expelled from the workshop; this air would have to be replaced by cold/hot air taken from outside. We would then have a huge expenditure of energy.

With the "local" system adopted by AR Filtrazioni, on the other hand, it is the same air of the working environment to be filtered and purified and pumped back into the same environment, clean and healthy but without any loss of heat. Moreover, AR units are compact, easily installed on the machine tools, also at high heights, and basically do not require any piping system, except for a flexible tube for the connection to the working area of the machine tool itself.

At last, their upgradeability. Very often the machines tools are installed to carry out certain manufacturing processes and equipped with an air cleaner specifically thought for them. It can happen that later on the same machine tool is enhanced or used for a different production, which requires a more efficient filtration. With traditional filters, it would be necessary to replace the whole filter system. AR air cleaners – thanks to their modularity – can instead be changed as much as one likes. They can thus "grow" with the machine tool and can be gradually adapted to different productions remaining always perfectly suited for the application and efficient.



Installation of a new AR plant on a machine tool at OMZ

Managing the filtration

It is now evident that air filtration is a problem of great importance and that, with regard to high-productivity modern machine tools for chip removal, it is not a collateral problem but rather a vital aspect related to their use. After all, the most recent norms on health and safety at work impose narrow limits of pollutants present in the air of working environments. Beyond the norms (that must obviously be respected), there is also a precise attitude of the personnel that, in various and not any longer rare cases, protests strongly and turns against when the environmental conditions are not according to the law.

It is therefore proper that the managers of the machine shops, but also the machine tool manufacturers, should learn to consider the air filter not only as optional auxiliary equipment but rather like a vital element of the machines and their management.

From this point of view, OMZ is an exemplary case: each machine tool has its own air cleaner and the frequent inspections, carried out by the several bodies in charge of these problems, regularly point



Mrs. Marina Zanotti, general manager and co-owner of OMZ SpA, and Mr. Angelo Riceputi, owner of AR Filtrazioni.

AR Filtrazioni is a young company. In 2000, they design, manufacture and put on the market a new generation of systems for the filtration of air for the machine tools. The serious problem of oil mist (not so long ago still underestimated), generated by machine tools which work at high speed with cutting coolants, such as emulsion or straight oil, has found in the air cleaners of this company a solution technically correct and functionally exemplary.

The thousands of units already installed have given for years excellent results, of which an example can be found in the article published beside.

AR Filtrazioni does not "sell filters" but rather, on the basis of the data provided by the customer, analyses the problem and works out a focused solution, which is then offered to the customer and, if accepted, realized. The task of AR Filtrazioni does not however end here: the company always proposes an agreement for the management of the spare filters, management that entails periodical controls of the filter efficiency and the necessary maintenance interventions. This "turn-key" service has been met with favour by the end users and represents also a pleasant novelty in the world of the Italian metalworking field.

AR Filtrazioni, already well appreciated internationally, is going to exhibit at EMO in Hannover with its own stand and with a service of technical guidance in the choice of the air cleaners.

out pollution level below the levels of detectability. But the company based in Crema has done better and more – they have entrusted to AR Filtrazioni the whole "management" of the units. All the air cleaners installed in their workshop (tens of machines) are equipped with a gauge to monitor the filter conditions and are subject to a maintenance program and control taken care of by AR Filtrazioni. This way they receive automatically all the necessary care.

Angelo Riceputi, owner of AR Filtrazioni, says: "This way OMZ does not have to worry about the air cleaners – we take care of them directly and are also responsible for them. We organize the calendar of the maintenance operations and of the management of the fleet of machines, so that we can always supervise the situation. AR Filtrazioni manages directly the maintenance of more than a thousand of plants working in a wide variety of different conditions. We assist all of them. Though considerable, this commitment is at the core of our success and of our ever-growing will of innovation. A happy customer is the best satisfaction."