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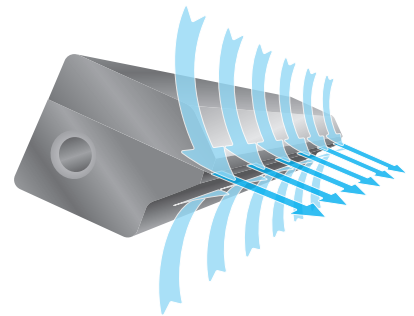
Using compressed air instead of blowers

The use of air flows to dry, cool or clean product lines is a common application in many factories. Sometimes blower systems are used to get the air moving with the desired force and volume. There is, however, an alternative and that is using the factory's compressed air line. In fact, 70% of all compressed air used is for blow off or cooling. Sometimes using compressed air for continual operation is discarded as too expensive. It is true that blowers can in many circumstances have a lower energy cost than compressed air systems. But it is also true that the apparent economies of blowers can be a false economy in many situations. This article explores when and why it might be worth using a compressed air system over a traditional blower system.

Compressed air products and how they work

It's worth looking at the compressed air enhancement products available and how they work. Most will deploy the Coanda effect to greatly enhance the force of the air being used. Compressed air is made to flow through a shaped nozzle and the topology of the nozzle will draw in the surrounding air. What this means is that the overall air set in motion is many times greater than the volume of compressed air consumed. In this way the compressed air usage is made much more efficient.

Various types of compressed air enhancement nozzles exist. The most common, perhaps, is the air knife. This delivers a consistent flow of air along its length making it perfect for use on conveyor systems. Other nozzles designed to give more focused high impact air flows for air blow off applications (air edgers) or low impact gentle air flows for drying (air amplifiers) also are commonly available. The operating principles of all are similar.



Dirty/wet environments

The alternative to compressed air systems is to use a blower. Blowers will be powered by motors. This means that there is an electric motor that needs to operate continuously in the factory environment. If the factory is nice and clean, then this is generally not a problem. If, however, the factory is dirty or wet or humid then operating electrical equipment becomes more problematic. More thought needs to be given to protecting the equipment from environmentally caused faults.

Compressed air systems have the advantage of being very simple. The air compressor that supplies them can be situated in another less environmentally hostile part of the factory, so all that is present in the difficult operating conditions is the air enhancement nozzle and the air line. There is no motor to go wrong, no filters to become clogged, no additional heat source to worry about. At the point of operation, it is an incredibly simple system. This significantly reduces maintenance and risk of failure.

Humid environments – compressed air is dry

Blowers simply move the ambient air around them. Compressed air systems introduce air that has been through a compressor and, also probably, a filter. As such the air used is drier and cleaner than the ambient air in many factories. If the system is being used for drying or cooling this can be a big advantage. In hot, humid environments a blower system will be moving hot and moist air over the target which is not ideal. Compressed air systems will introduce cool and dry air into the mix thus improving cooling and/or water carry off capacity.

Space

Compressed air systems will take up far less space than blower systems. The compressor that supplies the system will generally be in place already and will be serving many other functions within the factory. Typically, this will be in another part of the factory where it can be conveniently positioned. All that needs to be installed at the target site is the air nozzle/air knife itself and the supply line. Blowers, on the other hand, will need to be installed near to the target, i.e. near the production line. This may be problematic in a cramped factory.

Non-continuous applications

One big advantage of compressed air systems is that they can be cycled on and off very rapidly. The compressed air is always present in the line, waiting to be released. So, when controlled with a suitable fast acting valve, the air force can be almost instantaneously turned on and off. Blowers, on the other hand, will have a much longer response time.

On many conveyors drying, cooling or air blow off applications the target object may be intermittent. So, we can imagine a conveyor line with gaps between the products that need drying. With blowers the response time is too long to turn off the drying system between targets. With some compressed air systems, if linked to suitable sensors, the air will only be used when needed, i.e. when the target is passing through. This can save considerable energy.

Noise levels

In most cases air knife and air nozzle compressed air systems will operate with lower noise levels than comparable blower systems. For every kg of force produced, the compressed air-based system will produce fewer decibels. This is particularly true when modern quiet running air knife or nozzle systems are used. If operators are working near to the air system, then noise levels can be of critical importance.

Initial cost

The capex of a compressed air system is minimal when compared to a blower. Whilst the energy cost of a blower system may well be lower (i.e. the cost of powering them is lower than the cost per m³ of compressed air consumed) the setup costs are a much higher. In a typical situation the compressor will already be present and working so the costs involved are simply the cost of the air knife / air nozzles and the pipework and mounting fixtures.

Conclusions - compressed air systems have the financial edge

There is a general truism in industry that blower systems will be less expensive and more energy efficient than compressed air systems. On the face of it this is true - pound for pound of air force used blowers will always win this efficiency battle. But this fact may obscure the true costs associated with blowers.

When one factors in increased maintenance, risk of down time, space, noise levels, setup costs and the enforced continual use of blowers (i.e. not easy to cycle off when not needed), in many cases the compressed air system will have the financial edge in the long run.

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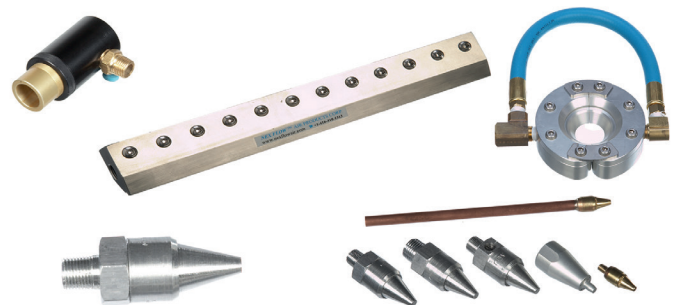
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