

## Ambient oil vapour & oil-free air: Getting oil-free air – without an oil-free compressor



**Industries such as food manufacturing can generate oil-free compressed air economically, using a conventional compressor with a catalytic converter - a process which converts hydrocarbon contaminants in the compressed air into water and CO<sub>2</sub>.**

Compressed air is a critical process for many industry sectors – not least food manufacturing, where processes such as conveying, filling and packaging rely on a clean air supply.

Used in this and similar industries, compressed air must adhere to the standard ISO 8573-1 which measures compressed air to oil-free “class 0”.

However, there are several potential sources of contamination in the production of compressed air that can undermine this. One of these is the atmospheric air itself. When air is drawn into the compressor, any contaminants such as water vapour, atmospheric dirt, oil vapour and micro organisms will become far more concentrated. These must be removed or reduced to ensure that the compressed air is of suitable quality.

Even if air appears clean and odour-free, it is always likely to contain contaminants. Vaporised oil from the burning of fuels is ever present, along with other hydrocarbons such

as those from paints and solvents. Even if the level in the ambient air is low, it will become concentrated when the air is compressed. It is a similar story for atmospheric water vapour and other contaminants. So, even oil free compressors require additional purification to remove contaminants including oil, from the compressed air it produces.



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Aside from the air itself, there are three other sources of contaminants: the compressor; the air receiver; and the distribution piping. In the compressor, oil vapour can find its way into the compressed air supply. The air receiver and distribution piping may harbour rust particulates and condensate.

All of these could potentially contaminate the compressed air – and, as a consequence, affect the food manufacturing process.

### Meeting the challenge

Contaminated compressed air can be very costly in food manufacturing – ranging from production delays to full-scale product recalls. Clean oil free air helps to avoid these problems.

Historically, the industry has used a number of solutions to try and ensure that contaminants do not reach the food. In the case of oil, this is traditionally achieved using oil-free compressors.

These, as the name implies, use no oil lubricant within the compression process. This removes one potential source of oil contamination, which helps to cut overall risk.

However, oil-free compressors can be expensive to purchase and maintain. The way they are designed means that the guarantee of oil-free air comes at a price. Food manufacturers often think they have no other choice – but there are other ways to achieve the standard.

Oil can exist in a compressed air system as condensate, aerosol or vapour depending on the temperature and pressure of the air. Each form of oil is usually removed in a different way.

**Contaminated compressed air can cause havoc in food manufacturing – ranging from production delays to full-scale product recalls. Clean air helps to avoid these problems.**



The condensate, normally an oil/ water mixture is removed via condensate drains and disposed of via an oil/water separator and foul drain. The condensate must be treated before disposal.

Oil aerosols can be removed using coalescing filters. These encourage the aerosols to combine into liquid oil drops that fall to the bottom of such a filter unit and can be drained off. Oil vapour is typically removed with some form of carbon filter containing activated charcoal.

While the techniques to remove the oil exist, they add cost to the process as they add another layer or piece of equipment to the process. An alternative approach is to use a catalytic converter to deal with all forms of oil contamination.

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### Conversion therapy

BOGE manufactures a variety of catalytic converters, branded as “bluekat”. The process uses a chemical reaction to remove the oil and hydrocarbons in compressed air. They can be used to produce “class 0” oil-free compressed air, complying with ISO 8573-1 and they do it without the need for an oil-free compressor.

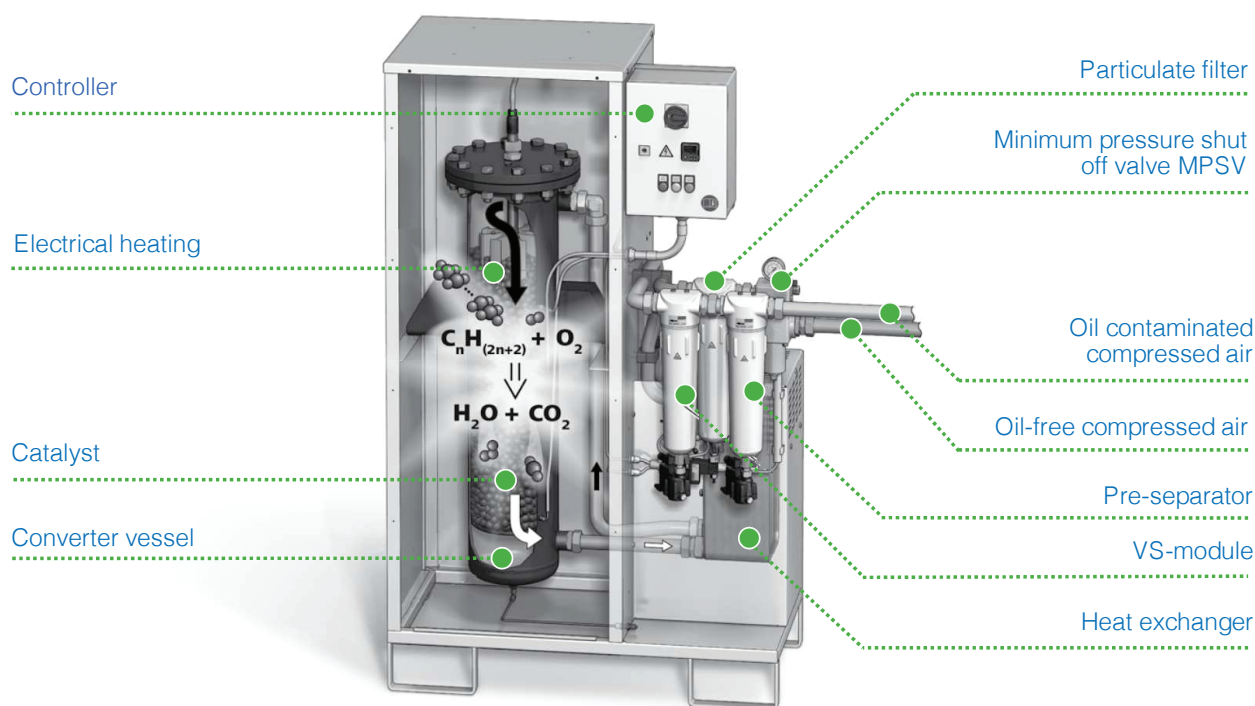
This approach is more affordable than buying and operating oil-free compressors or conventional treatment systems. At the same time, it provides a reliably pure compressed air supply regardless of the intake air quality and avoids the need to dispose of contaminated condensate.

Tested and certified by TÜV SÜD, offering a flow rate of up to 56.70 m<sup>3</sup>/min with no loss of pressure, BOGE bluekat

is available as either a “stand alone” unit which can be connected to any compressed air source, or integrated within the compressor itself.

The underlying principle sounds as if it may have been borrowed from the aerospace industry: compressed air is drawn into the compressor and pre-heated to 200°C. It then flows into the bluekat where a catalytic material oxidises any hydrocarbons into carbon dioxide and water.

This approach undermines a prevailing industry myth which says that only oil-free compressors can produce oil-free compressed air. In fact, a number of manufacturers are already using this approach to their advantage.



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### Oil-free...from oil-flooded

A manufacturer of bottle caps in Country Wicklow, Ireland recently needed to scale up its compressed air supply. This was to ensure that its plastic packaging was not contaminated during production.

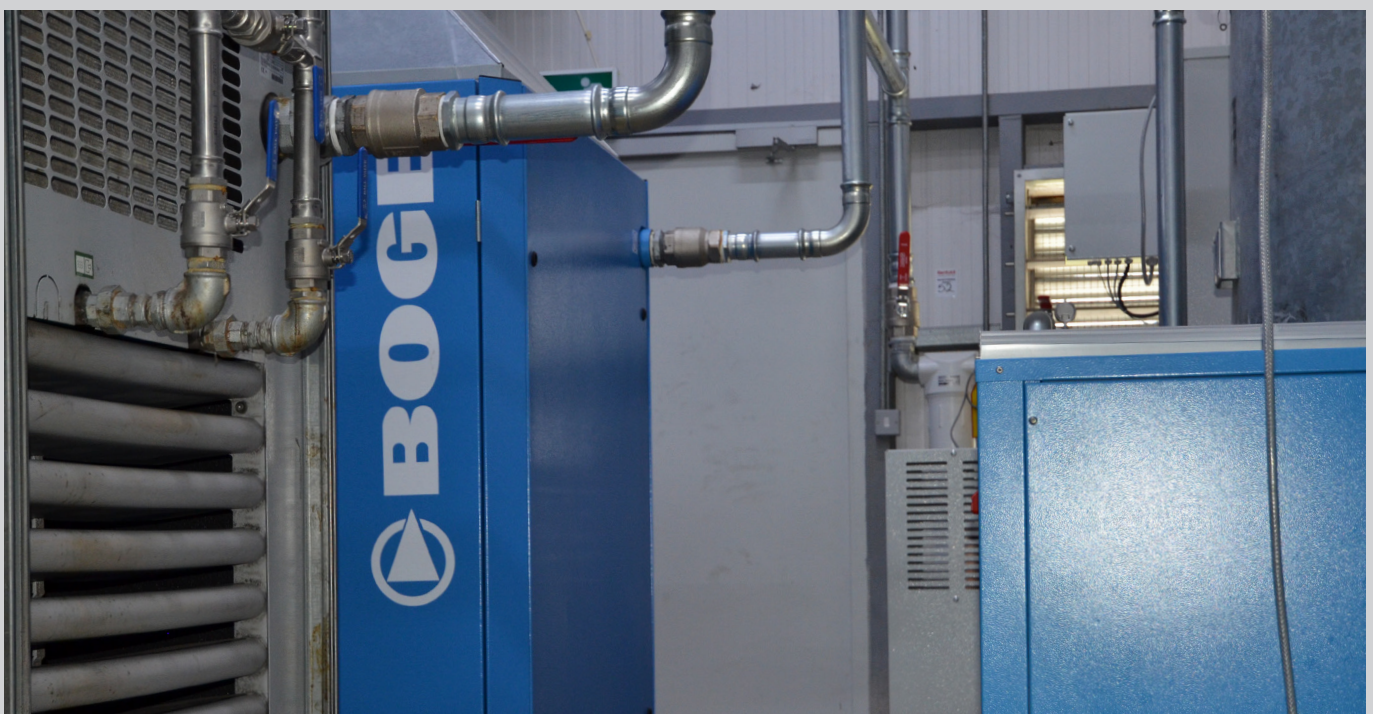
The company relies on compressed air for a number of processes, including injection moulding and raw material conveying. With expanding production volumes, the company had increasingly been relying on a standby compressor. The system struggled to cope which sometimes meant that machines had to be switched off.

As well as requiring higher compressed air capacity, the manufacturer needed oil-free air. However, switching from oil-flooded to oil-free compressors would have involved a huge investment especially if this were extended across the company's other sites.

Instead, the company with help from BOGE's local distributor, ILS Engineering, worked back from the necessary air quality. The answer was to install a new oil-flooded compressor, plus a BOGE bluekat catalytic converter which converts the oil hydrocarbons into carbon dioxide and water.

The new compressor, a BOGE SLF 125, has energy-saving features including direct connection between the air end and motor. It also has variable speed control, to enable optimal adjustment. A refrigerant drier, complete with filtration, extracts water and other contaminants from the air. In addition, installing a BOGE Duotherm recovers heat from oil and transfers it into the building's hot water system.

The complete installation took two days. The old duty compressor has been retained as a standby, while the old standby will also be available for use.



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Far from spending more money, the company saved a fortune. Firstly, it reaped an annual energy saving of €44,000; secondly, the new system was around €500,000 cheaper than its original plan – of switching to oil-free compressors. It also benefited from better air quality to well below the industry-specified limit, greater productivity thanks to increased power and no downtime during installation.

Paul Kelly, Service Manager at ILS Engineering, concludes: “Many companies in this market are told they need oil-free compressors, but we’ve shown this isn’t always true.”

### Conclusions

Airborne contaminants can be a hidden danger for industries that rely on compressed air. For operations that require “class 0” oil-free compressed air such as the food industry and its direct suppliers, catalytic converters are an effective, affordable solution. While oil-free compressors have specialised use within industry, accessing oil-free air without such a high level of investment is a huge benefit for many users.

To find out more about BOGE compressors and specialist gas generators, please contact us or visit our website:

[www.boge.com](http://www.boge.com)

