

Glass container factory uses less air



Flow meters measure the production and consumption of compressed air. They provide a wealth of data to maintain efficiency in the machines and compressors, and quickly detect any compressed air leakages. Pascal van Putten reports on the benefits they have brought to a Dutch container glassmaking factory.

No less than 40.000 Nm³/hr of air is produced at a large Dutch glass container factory. A total of 20 VPInstruments flow meters measure the production and consumption of compressed air.

They provide data to maintain efficiency in the machines and compressors, and quickly detect any compressed air leakages. The factory manufactures 1.3 billion bottles per year for global brands and small breweries.

Compressed air is needed to drive the bottle-blowing machines and to blow the liquid glass into the mould. The company aims to reduce its energy consumption by 50%. Compressed air is an area on which it has focused, which makes sense because compressed air accounts for 30% of the total electrical power consumption. As a comparison, in all of industry this figure is on average 10%.

Compressed air system design

There are two compressed air systems. One

at 5.5 bar to drive the bottle machines and one that delivers 3 bar to blow the bottles. To drive the compressed air systems its large compressor room houses no less than ten compressors.

There are four centrifugal compressors: two for the high-pressure and two for the lower-pressure system. There are also six rotary screw compressors for the high-pressure system. They all deliver oil-free air and operate 24/7, 365 days a year.

Each type of bottle means a different level of air consumption. A compressor management system ensures the optimum combination of compressors.

Comparison

On each compressor, as well as on several main lines to the bottle-blowing machines, there are flow meters which monitor the production and consumption of air. All measurement data is logged in a real time monitoring system, VPVision.

This monitoring system is connected to a central EMS that also keeps track of gas,

power and water consumption. The data provides energy-saving measures.

The compressors' efficiency is determined by comparing the amount of compressed air produced with the power consumption. As soon as a compressor shows a performance drop, the cause can be looked at. For example, this could be an internal leak or a clogged inlet filter. By using the same method, the consumption of compressed air for the bottle-blowing machines is analysed. The flow meters also play a role in creating employee awareness about responsible energy use.

The customer stated: "The great thing about flow meters is that they respond immediately to any changes in the machine settings, so we have linked them to the VPVision monitoring system we bought from VPInstruments, that displays real-time data over a web interface."

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Accuracy or trend

VPFlowScope insertion meters are easy to install without having to shut the compressed air system down. There needs to be a straight length of pipe before and after their position for them to take accurate measurements. It is often a challenge to find the right location in existing factories. The factory in this case has a complex compressed air system with lots of corners and elbows in the pipework. By help of VPInstruments, the best position for the flow meters were allocated for accurate measurements. For some cases no right location could be found, and a slightly greater level of inaccuracy was accepted since the flow meters still provide useful trend monitoring data.

Energy reduction

The flow meters have already led to substantial annual savings and improvements. For instance, the customer was able to map out the compressed air consumption in the glass furnaces. It emerged that savings could be made in cooling the sides of the furnaces. It has switched from compressed air cooling to

ventilator cooling, saving energy.

The glass industry and compressed air

In all four primary glass industry segments (flat, container, speciality and fibre glass), energy makes up a large portion of total glass production. A reduction of energy costs, immediately results in decreased production costs and thus an increase in profit. Compressed air is an indispensable utility in the glass industry, required to drive production machinery and more importantly needed for the glass blowing process itself.

Since compressed air is the most inefficient and expensive form of energy in a factory, compressed air use should be limited to the maximum. Compressed air

savings measures in glass factories easily have a ROI shorter than one year.

All typical compressed air savings measures apply for the glass industry, including permanent monitoring, leakage management, lowering pressure and proper maintenance. Compressed air is also used for cooling processes. In some cases, the IS machine internal cooling can be modified to run on low pressure air instead of high pressure air ⁽¹⁾. ■

(1) Further reading: <https://www.airbestpractices.com/industries/food/proper-compressed-air-glass-container-machines>

VPInstruments, Delft, The Netherlands
www.vpinstruments.com

