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Generally treated as a support function, compressed air is widely used in production facilities for the operation of process machinery and the actuation and control of pneumatic valves, cylinders and controllers. However, the quality and availability of compressed air may have a significant effect on the plant's core production. CompAir, a manufacturer of compressed air and gas systems, uses the Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70 for measuring pressure dewpoints in their AirAudit, part of their AirWorx™ service. The audit measures a number of parameters associated with the performance of compressed air systems, aiming at improving their energy efficiency.

CompAir uses DM70 to ensure

Efficient Compressed Air Production

The Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70 offers stable and fast measurements in industrial dewpoint applications, including compressed air applications.

CompAir is a leading global manufacturer of compressed air and gas systems, with production facilities in the UK, Germany, the US, Canada and China. CompAir's compressors, equipment and services are used worldwide, providing high-quality economic, clean and reliable compressed air and gas for numerous applications. The company's product range includes rotary screw, oil-free, vane, piston and portable compressors, ancillary products and services for users in general industry, offshore, oil-free, construction, and high pressure marine to gas compression. Their AirWorx division which was formed in 2001 specializes in the assessment of compressed air systems and the recommendation of energy conservation enhancements, including the possibility of outsourcing complete compressed air needs. CompAir's AirWorx™ service facilitates savings in costs and capital investment in plants, as well as helping to meet energy reduction targets. AirWorx™ is a service where the customer can purchase the compressed air needed from CompAir with no need for capital investment.

Compressed air seen as mere support function

Seen as a support activity, compressed air seldom warrants the attention it really deserves. Industry is currently using 8-10 % of its electricity consumption to

compress air and in general some 30 % of the compressed air generated is wasted. The energy saving potential is significant but operational savings are 'locked up' in compressed air systems as improvements often do not meet corporate project payback criteria.

From the user's point of view, compressed air is only another utility comparable to electricity, water or gas. These are, however, mostly generated offsite and supplied to the end user as required. Since the nature of compressed air does not allow for it to be transported very far, most users historically own and run their own compressed air systems. These systems have often developed over decades and the "present applications" are usually significantly different from what the system was designed for. In addition, due to maintenance budget constraints, these systems are often neglected resulting in poor system performance, with users failing to understand the incremental costs driven by the inefficient compressed air supply.

In a recent study for the EU entitled "Compressed air systems in the European Union – Energy, Emissions, Savings Potential and Policy Actions", the author's introduction states that "savings in the range of 5 to 50% are possible. A large technical and economic potential for energy savings is not being realized under current market and decision mechanisms." CompAir's idea is to take the capital cost out of this equation and simply realize the operational savings by outsourcing the production of compressed air through an AirWorx supply agreement.

The AirWorx approach is a partnership agreement which must benefit both parties to be successful. This benefit comes from the improvement in system performance and from allowing both parties to focus on their core businesses. Instead of a single model or standard package of services, CompAir uses a modular approach and works together with the customer to find the best solution.

Compressed air is widely used in production facilities for the operation of process machinery and the actuation and control of pneumatic valves, cylinders and controllers.

The AirWorx™ AirAudit

In order to allow both parties to understand the present performance of the supply side as well as the distribution network, a comprehensive audit is performed on the compressed air system. This helps establish the current costs of compressed air at the plant as well as becoming the benchmark against which to measure future improvements. This audit covers all relevant parameters in the existing system: power consumption, flow, pressure throughout the network, quality, humidity and wastage, along with anything else relevant. Accurate results are essential as this data is used as the basis for any compressed air project.

Dewpoint measurement in demanding conditions

For measuring pressure dewpoints as part of the AirAudit, CompAir are using the Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70. For this service, an instrument was needed that could handle both very dry air with dewpoints down to -70 °C and systems with condensate. Generally the expected dewpoint for compressed air systems with compressed air drying is between +5 and -40 °C but as dryers do not always function properly the sensor needs to be able to handle wet conditions as well. The sensors that we previously used needed re-calibrating once they got wet, but the DM70 has operated well despite condensation. For CompAir with a global presence it was also valuable to have a partner with a global presence so that support could be found locally if/when required. The DM70 is reliable and offers user-friendly features, such as several language options. In these respects Vaisala was able to offer exactly what CompAir were looking for.

Considerable savings through dewpoint monitoring

Producing dry, oil-free and dust-free compressed air at a low cost is the aim in a compressed air system. Filter systems are used to remove oil and dust, and dryers are needed to adjust humidity. The specific process which is using the compressed air determines exactly how dry the air should be. Regardless of the drying or filter system, clean dry compressed air comes at a premium price and measurements are essential to ensure that you are getting what you pay for. In measuring actual compressed air system pressure dewpoints, CompAir have found that where desiccant dryers are used to provide sub-zero dewpoints, more than 50% of systems do not work due to lack of maintenance. Because the sites did not have a measurement system installed, they had no idea of the problem.

Once the compressed air system is measured and understood it makes sense to provide system operational data on an ongoing basis. For this reason CompAir are installing permanent remote monitoring systems as part of the AirWorx™ equipment installation. This includes Vaisala Dewpoint Transmitters where appropriate. The data collected is used to provide overall control of the system and maintenance information, and to ensure that the system is operating at optimum performance levels. Key performance indicators such as kW/m³/min can be tracked over time to ensure that the entire system is performing within planned limits. In continuous measurements and permanent installations, a number of instruments are used, according to specific needs. Whatever the application, accurate measurements form the basis for improving the system and reaching cost savings. ●