

GKD Architectural Mesh Omega
Louis Vuitton Shoe Factory, Italy
 (architect: Jean-Marc Sandrolini,
 photo: Jean Philippe Caulliez)



Container compressor station at GKD – Gebr. Kufferath AG

Compressed air from the roof: metal weaver saves 20 % energy

The applications of the metal meshes produced by GKD – Gebr. Kufferath AG range from microfilters for inkjet printers to automotive filtration, and from process belt mesh for dryers and ovens to challenging architectural projects. The company is based in Düren, Germany, and is the world’s leading technical weaver. A compressor station on the factory roof was an innovative solution to the growing demand in production for compressed air – and also delivered significant energy savings.

Customer

GKD – Gebr. Kufferath AG
 Metallweberstraße 46 · 52353 Düren · Germany · www.gkd.de/en/
 The company is the world’s leading technical weaver.

Objective: Future-proof and efficient supply of compressed air.

The design to be implemented included a central compressed air station with three L 75 RS regulated speed screw compressors, each generating 13.5 m³/min of compressed air.

Turnkey container solution on the factory roof

A further plus point of the CompAir L series is the modular design, which delivers very compact dimensions. There was no suitable space in the factory itself, but there was space on the roof of a centrally located factory building.

The weaving process is not just about processing yarn. Metals can also be weaved – using technology with a long tradition that has been developed to perfection by GKD – Gebr. Kufferath AG. Nowhere is that clearer than on a tour through the factory at the company’s headquarters in Düren.

The company, founded in 1925, is the world’s leading technical weaver. Across

a number of different production areas, weaving machines produce mesh for everything from technical strainers to filters for processing (conveyor) belts and architecture. The smallest wires used in the process have a diameter of 18-thousandths of a millimetre – four times thinner than a human hair. But wires with a diameter of 7 mm are also processed at the factory, and the applications range from



Almost all the machines and equipment for metal mesh production at GKD require compressed air as energy and/or as transport medium.

microfilters for inkjet printers to filters for exhaust gas recirculation in combustion engines and challenging architectural projects. The size of the machines and the end products is correspondingly varied.

Compressed air is used (almost) everywhere

The facilities at GDK in Düren are typically upgraded by specialist engineers or to suit GDK's requirements and operate around the clock. After all, any market leader who regularly designs technically demanding systems can only rarely rely on standard machinery. As every machine has (electro-)pneumatic drivers and actuators, all the machines are connected to the central factory air supply network.

As the company is growing continuously and developing entirely new applications, the demand for compressed air and the compressed air network itself have grown with the factory over recent years. The technical limits of the compressed air system were reached roughly two years ago. Dieter Maaßen, Head of Building Management & Maintenance: "The operational reliability of the compressed air supply left a lot to be desired, as the existing compressors were too old and therefore required a considerable amount of maintenance. The pipe cross-sections were too narrow and the structure of the network was not ideal, as multiple stations fed into the compressed air network from different locations."



Andreas Decker, GDK Process Manager;
Paul Oliver Peuster, HPS Sales Manager;
Dieter Maaßen, GDK Head of Building Management & Maintenance; Dipl.-Ing. (FH)
André Schumacher, HPS Project Manager (from left to right).



Three 75 kW regulated speed compressors generate the compressed air that the GDK factory needs.

Objective: A future-proof and efficient compressed air supply

The plan then developed to replace the compressed air station completely.

Andreas Decker, GDK Process Manager: "The objective was a future-proof and efficient compressed air supply." A range of different offers were submitted during the bidding process, but it was a design from another company based in Düren, HPS – Hydraulik & Pneumatik Service GmbH, that beat the competition.

The final design was for a central compressed air station with three regulated speed screw compressors, each generating 13.5 m³/min of compressed air. Paul Oliver Peuster, HPS Sales Manager: "The required volume can be provided by one or two machines – the third has been installed for redundancy and to provide capacity in the future." The three L 75 RS oil-injected compressors from the CompAir range excel thanks to low servicing costs and excellent efficiency.

The compressor stage with its innovative screw geometry is manufactured in the modern CompAir factory in Simmern/Hunsrück. It has the unique advantage of effective compression at low speeds, which reduces energy costs and makes for

very attractive life-cycle costs. The energy-saving electric motors also contribute to low operating costs. The regulated speed drive system (converter) adjusts the generated volume of air to the actual consumption profile. The innovative DELCOS XL touch screen controller means that all operating parameters can be monitored efficiently and demand and supply can be constantly adapted for all three compressors. On the factory side, a base load selector is installed in the master compressor, connected to the slaves via a bus line. An additional higher-level compressor controller is therefore not required.

If more compressed air is required than one compressor can supply, the next compressor in series automatically switches on. The compressors then run at the same, optimised speed.

Turnkey container solution on the factory roof

A further plus point of the CompAir L series is the modular design, which delivers very compact dimensions. This advantage was decisive for the GDK compressed air station, as HPS and GDK charted new territory in the search for the best installation point.



The container compressed air station is optimally located at a central point on the roof of a production building.

There was no suitable space in the factory itself, but there was space on the roof of a centrally located factory building. After a structural engineer had given the go-ahead, HPS designed a container station to house not only the three compressors, but also the (similarly redundant) treatment system with refrigeration dryers, filter combinations and condensate management, as well as the power distribution cabinet. The container was completely pre-assembled, delivered ready for use and placed onto the roof using a mobile crane.

However, that was only a part – though a significant part – of the modernisation works. Dipl.-Ing. (FH) André Schumacher, as field technical adviser at HPS and responsible for maintenance work at GKD: “Around 300 metres of pipework were replaced, two intermediate tanks (receivers) were installed and leaks were located and fixed in the existing piping.” A new supply solution was also installed for one of the larger compressed air consumers:

“The surrounding mesh on one machine that welds metal mesh has to be cooled to limit the heat input, so we installed a special cold air dryer for that purpose.”



The storage tank was also installed on the roof.

Energy savings across the board

As a result of modernisation, the pressure level was lowered gradually by around 1.5 bar, which delivered an energy saving of 15% on its own. The waste heat created when the compressed air is generated is also recovered via the oil system of the compressors and used to support the factory’s heating system. The savings so far have been impressive. Dieter Maaßen: “In total, we will now consume around 100,000 fewer litres of fuel oil per year.”



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Heat recovery is also bringing savings.

Dieter Maaßen, Head of GKD Building Management & Maintenance





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Transparency is also promoting energy savings. A continuous volumetric flow meter with data transfer to the existing Ethernet system has been installed in the compressed air outflow pipe of the container.

GKD also constantly monitors the power consumption of the entire compressed air station. It is therefore possible at all times to determine the efficiency of the compressed air generation (compressed air key figure). The measurement data can be easily evaluated by the maintenance and finance departments, laying a firm foundation for further optimisation and cost control.

Problem-free commissioning despite sensitive consumers

The compressed air container with its connection to the compressed air network and power supply was installed and assembled within two days. The new compressed air station was commissioned during ongoing operations without variation in pressure. Actual switchover from the old supply system to the new compressed air station was completed within an hour.

HPS already had experience of container compressed air stations from other installations. The project engineers were

also in a good position to understand the requirements and particular circumstances, as they had already designed and delivered various hydraulic and pneumatic systems for the metal weaver in the past.

Approx. 20 % energy savings

Dieter Maaßen: "The new compressed air supply system is running beautifully. It is reliable, and if demand increases again in the future, we have room to manoeuvre. And the energy savings are really impressive. We need around 20% less electrical energy to generate the same volume of compressed air. Heat recovery is also bringing savings."

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