

## Comprehensive energy management in Bergneustadt, Germany

Whether heating a building or supplying compressed air, every kilowatt counts at ISE in Bergneustadt.

With its headquarters in Bergneustadt, Germany, and operating from 15 sites on 4 continents, ISE was formed as result of a management buyout in 1997 of the global automotive component supplier ITT. As an OEM for the industry's most prestigious car manufacturers, ISE manufactures a wide range of components which includes module mountings, chassis components and roll cages.

A meticulously planned energy-saving program has been introduced in the Bergneustadt works under the guidance of Meinolf Koch, Technical Services Director for ISE. This wide-reaching initiative reports directly to the management. It encompasses every aspect of the business and it is this attention to detail that enables savings numbering not cents, but thousands of Euros, year after year. As part of the ongoing program, employees are made aware of energy related issues in various training courses and participate in energy meeting groups. The annual budget for these groups is detailed within the energy saving scheme and is compared with a target end-of-year figure. Regular meetings ensure permanent transparency and maintain awareness of this very important subject. Information tables and detailed training courses keep employees abreast of every aspect of energy saving and efficiency. An efficient monitoring system ensures that any deviations from set parameters, for example air leaks, can be quickly detected and rectified within as short a time as possible.

### Active involvement

As an integral part of the business, it was clear to Meinolf Koch from the very outset in 1983 that

something had to be done with regards to the compressed air system in order to achieve his ambitious energy savings targets. This would not have been possible with the existing compressed air supply systems which were spread throughout the Bergneustadt site and comprised 16 outdated compressors with assorted air treatment equipment. One of these compressed air installations had been fitted with a "local" heat recovery system which, although a partial success, had not satisfactorily fulfilled the saving potential. It became clear that significant energy savings could be achieved only through well planned and carefully considered modernisation of the compressed air supply.

In 1991, 18 percent of the site's energy consumption was used to produce compressed air, but after years of concerted effort and introduction of numerous energy savings measures, this figure now stands at only 11.5 percent. Meinolf Koch attributes this reduction mainly to improved compressed air quality, lower network pressure (thus lowering pressure drops) and elimination of air leaks. Progress of the individual energy saving programs is displayed clearly on information boards throughout the company in such a way that everyone can see the results for themselves. This appeals to the employees' competitive nature and inspires them to become actively involved in com-



## ISE – Impressive Savings Everywhere

### *The air collector between the driers and the distribution system*

pressed air optimisation measures. The next area for improvement was the air distribution network. The old pipes were replaced by modern, perfectly dimensioned steel pipes in the compressed air centre and with clean welded plastic piping throughout the remaining plant. This not only led to a dramatic reduction in air leakage losses, but also reduced the air main pressure-drop from 1.2 to 0.1 bar.

In addition, the following compressed air optimisation measures were taken:

- Comprehensive and permanent measurement of compressed air volume,
- Optimisation of load / idling phases on all compressors,
- Equipment using compressed air is automatically shutdown when not in use to avoid energy wastage,
- Optimal use of compressor heat – and last but not least,
- Employee awareness (via information boards etc.), education and training.

Noticeable results were already being achieved with this package of measures, but then came the biggest change. The individual air

*Drastically reduced compressed air costs? Nothing could be simpler if you have a complete system overview and keep an eye on the details.*



**The new centralised compressed air system**

system approach was abandoned in favour of an integrated, centralised compressed air system solution.

**Greater than the sum of its parts**

To ensure that the new system would precisely meet ISE's air requirements, Meinolf Koch, in close cooperation with experts from KAESER KOMPRESSOREN, carried out a detailed analysis of the company's actual air consumption. The determining factors were air demand, switching frequency, the number of components requiring compressed air, leakages and air reserves to allow for aging tools and system growth.

Taking both energy consumption and cost into consideration, the air is treated in accordance with ISO 8573-1 to the required quality. Centrally located refrigeration dryers are more than sufficient for treating the works air, whilst local 'decentralised' treatment systems provide even higher quality compressed air for special applications. Maximum system pressure is set to only 0.4 bar above that of the air-consuming equipment in order to

ensure lowest possible operating pressure.

An advanced centralised compressed air installation comprising seven KAESER DSD 241 rotary screw compressors now provides the Bergneustadt site with its compressed air supply. The compressors operate via a centralised compressed air collector system and seven refrigeration dryers. After the air leaves the dryers it passes into a second collector system before being fed into the distributor system from where the individual workshops receive their compressed air supply. An air flow and pressure sensor are allocated to each of the air-consuming equipment areas so that any parameter deviations can be immediately detected.

This means that leakage rates, for example, can be clearly determined, as each area's air system can be closely monitored: the new compressed air piping network in the injection moulding section showed zero pressure drop even 3 hours after the system was shut down.

The compressor installation itself is a model of cleanliness and efficiency. From the special dust-free floor to the specially tailored intake-air pre-warming and filter system, every last detail is designed with compressed air supply efficiency and reliability in mind.

Naturally, it goes without saying that the waste heat from the compressor isn't left to escape into thin air – each and every calorie is put to good use. The boiler room is equipped with a thermo-hydraulic deflector that directs the (second-

ary) cooling water warmed by the compressors' cooling air to the heating circulation system, consequently leading to a significantly reduced oil / gas bill for the hybrid heating boilers. The ISE energy management program has also paid considerable attention to detail in the boiler room. Not even the rising heat radiated from the boiler is wasted, as it is pushed downwards to the floor by ventilators in the ceiling and warms the intake air to improve the boiler's burning efficiency. The fuel savings of some 3,000 Euro per year far outweigh the amount of electricity that is consumed by the ventilators.

The compressed air supply is "conducted" by a fire and water proof control system, which is installed adjacent to the air installation. All compressors and dryers are controlled by a customer specific PC program that finely tunes system operation for maximum efficiency and reliability. Here too, attention to even the smallest of details has made a significant difference and illustrates the depth of planning and expertise involved in designing this integrated compressed air system.

Instead of adjusting the refrigeration dryer performance and potentially increasing energy consumption, the control system feeds in undried air from the initial air collector stage if the works air pressure dew point falls below the preset value. Energy hungry peak load and costly idling phases are avoided through consistent partial load operation.

**Meinolf Koch checks the compressed air system in the control centre**



## It pays to modernise

The new compressed air supply at ISE's headquarters in Bergneustadt is a perfect example of how systematic planning and implementation can lead to enormous savings. Success is achieved through adopting an integrated system approach rather than by simply exchanging and replacing individual components. Every air take-off point at the Bergneustadt works is equipped with a pressure gauge so that air users are instantly able to check that the required pressure for an application is actually available. Effective system and power control enables rapid detection of potentially expensive discrepancies and allows immediate corrective actions to be taken.

Consistent planning of the ISE compressed air supply has led to considerable cash savings totalling almost Euro 150,000 per year. The results speak for themselves and

have not come about by chance. As Meinolf Koch explains, "80 out of 100 businesses could achieve the 50% energy savings put forward in the EU SAVE II study with regard to compressed air production costs. This could be accomplished in the blink of an eye if compressed air systems were viewed as a whole rather than as individual compressed air components".

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***The compressed  
air distribution  
unit***