

Introduction of new regulations concerning medical compressed air supplies motivated Erlangen University Clinic to undertake thorough modernisation of its compressed air system. Specifically tailored to meet the compressed air users' needs, the new system combines maximum reliability with significantly reduced operating costs.

Less is more

The "Friedrich Alexander University of Erlangen-Nuremberg" medical faculty has a worldwide reputation for excellence, due in large part to the University Clinic. This has been achieved not only through high teaching standards and dedicated students, but also by all those people behind the scenes who make the 'ship' run smoothly.

One such person is Wolfgang Emrich who can access his PC to view the operational status of the compressed air supply and connect to individual air system components.

Old air supply was inefficient

One of the less obvious benefits of the new air system, but nonetheless welcome, is the fact that Wolfgang Emrich no longer has to spend sleepless nights monitoring the compressed air system. Instigated by the Technical Services Department and finally spurred on by the introduction of new regulations on the 1st January 2000 regarding the quality of medical compressed air

supplies as per DIN/EN 737, the University Clinic embarked on an ambitious program to modernise its compressed air system, which was proving unreliable and inefficient.

To fully understand the situation back then, it would be useful to consider the lay-out of the Erlangen University Clinic.

Located in the eastern part of the palace gardens and inaugurated in 1824, the hospital has grown into a vast medical complex over the last 180 years. It now comprises 22 clinics (totalling approximately 1400 beds), 13 self-contained departments, and 14 institutes covering all aspects of modern medicine and, amongst others, the world's most modern operating facilities.

In much the same way that the hospital complex grew, the compressed air supply for the buildings, which in many cases are located quite some distance from each other, developed into several separate entities. 16 compressor units of various type and origin were oper-

ated as 7 independent compressed air supply systems. The old compressed air supply was highly inefficient and had many shortfalls including lack of system transparency and, in particular, inadequate system back-up, which can seriously impact emergency medical departments, as reliable breathing air is required at all times.

Excessive idling = impressive savings potential

Working in close cooperation with the University Clinic's Technical Services Department, KAESER were invited by the University Building Authority to assess the old air system and to find ways of improving it.

The first step was to carry out a detailed 'Air Demand Analysis' (ADA), a comprehensive compressed air auditing tool developed by KAESER, which gathers precise details concerning actual air demand and system efficiency. The results showed that the separately oper-

Compressed air is a vital source of energy in any hospital and is used in a wide range of applications. Planned in close co-operation with the customer, the KAESER KOMPRESSOREN installation at Erlangen University Clinic in Germany is a showpiece of compressed air system design.

Compressed air is ubiquitous in any hospital

Clean compressed air for health and research



ated air systems were wasting a considerable amount of energy through excessive idling phases and through lack of a master compressed air management system. Moreover, the ADA showed that combined use of the compressed air system resources would lead to considerable savings.

To quantify the potential savings, the ADA data was then evaluated using KAESER's unique Energy Saving System (KESS). The software analysed the data and converted it into several system solution possibilities.

Integrated operation with low pressure

One of the many advantages of KAESER compressed air systems lies in the fact that the Coburg based manufacturer doesn't just sell compressors, but provides complete compressed air system solutions. To provide customers with the most reliable and cost-efficient compressed air systems on the market, KAESER have long perfected the art of integrating modern compressor design with advanced information technology. The SIGMA AIR MANAGER (SAM), for example, operates within a very narrow pressure bandwidth which, in many cases, enables maximum system pressure to be significantly reduced. To Wolfgang Emrich's initial asto-

nishment, this was also the case in Erlangen. In order to guarantee the necessary 5 or 8 bar compressed air pressure at the various take-off points, he had to set each of the 7 independent compressor installations to operate with a maximum working pressure of 13 bar. Therefore he was somewhat sceptical at first when the KAESER experts explained that with an integrated system approach the maximum system pressure could be reduced to 11 bar, even when taking the more than 2km of air distribution piping into consideration. Comprising 3 compressor installations instead of the previous 7, it was finally decided that the new compressed air system would be controlled by a SAM 16/8 operating within a pressure bandwidth of only 0.3 bar.

"It not only works, but it works perfectly" explained Wolfgang Emrich "and at an operating pressure of only 10.85 bar despite the long air distribution network. The entire pipe network has a total storage capacity equivalent to ten 2000 litre air receivers".

Crossing underneath busy streets and branching off at various points, all clinic sections are connected underground. The 76 mm diameter compressed air pipe work is laid next to, and under, the hospital complex's thickly insulated heating and hot water pipes. The pipe



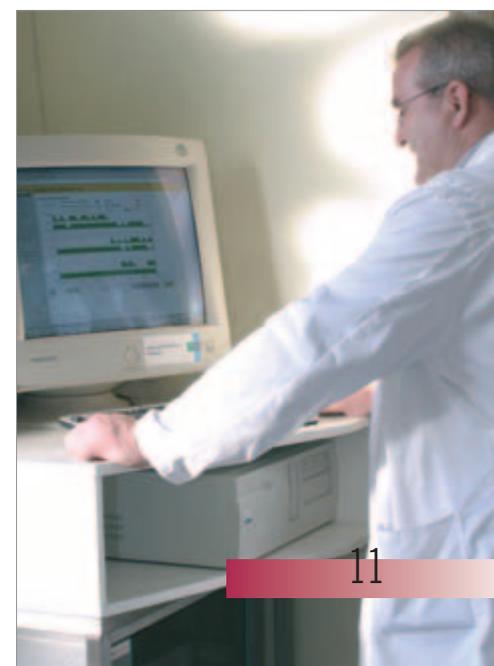
Compressed air provides a soft pillow for premature babies

network will be complete when the air pipes between the new medical science building and the dental clinic are connected. When finished, this then complete ring main will provide increased redundancy and ensure maximum air supply reliability.

Complete system transparency

A major advantage of the new compressed air supply is its specifically tailored design which features clear component layout, defined network structure and meticulously planned system installations. Contributing still further to optimal system operation is the SIGMA AIR MANAGER's compressed air auditing tool "SIGMA AIR CONTROL". This valuable tool provides Wolfgang Emrich with immediate access to any of the compressor/air treatment units, whilst the KAESER system works seamlessly together with the Siemens Building Technologies control system which is responsible for the entire hospital complex. Any deviations from set parameters are immediately detected, pinpointed and, in many cases, instantly clarified via the SIGMA AIR CONTROL's remote access facility.

Wolfgang Emrich certainly enjoys the benefits of his new compressed air system





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Maximum reliability and less energy consumption

If the main priority was reliability of the compressed air supply, then compressed air production costs certainly weren't very far behind. From this perspective, Wolfgang Emrich has nothing but praise for the new system once again. Energy consumption dropped dramatically by approximately 35%, as did costs and the impact on the environment, after the new compressed air system was commissioned. Furthermore, the savings in servicing and maintenance costs were far from negligible as a result of halving the number of compressors.

Pure, clean air

The compressed air supply is equipped with KAESER DAP Clean

Air Systems to guarantee the necessary level of hygiene. They operate efficiently, continuously and fully automatically from 20% to

100% of their nominal load and maintain constant compressed air quality. Throughout several individually monitored stages, they remove all contaminants from the intake air such as dust and solid particles (up to 0.01 micron), oil residue (up to 0.01 mg/m³), water and chemical contaminants such as CO₂, NO₂ and SO₂. As the levels of remaining oil residue in the compressed air are undetectable, the air can justifiably be described as 'oil-free' and is 100,000 times cleaner than 'normal' ambient air – and that's particularly important for sensitive clinical applications.