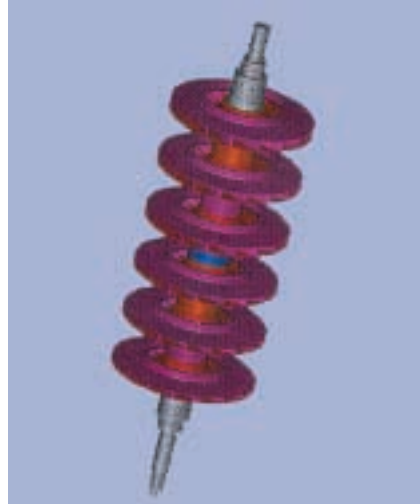


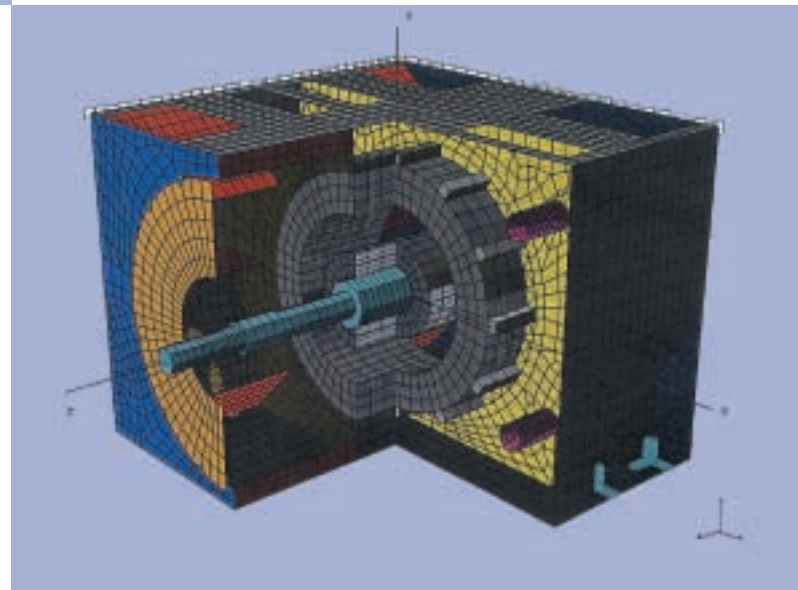
The interaction between the old compressors and their modern drives was able to be simulated in all conceivable operating situations using three-dimensional finite element models



### Energy-saving, low maintenance, and high availability

When compared to steam turbines, which Brunner Mond previously used, electric drives especially distinguish themselves as a result of the low maintenance and high reliability. This is complemented by the significantly lower noise values and lower temperatures. More precise process control and less stressing on the mechanical load, which guarantees a long compressor lifetime, are just some of the advantages of variable speed control. Furthermore, variable-speed drive systems significantly reduce the energy requirements, as the system only draws as much power as is precisely necessary at any particular operating point. This is especially true for pumps, fans, and compressors where the energy consumption increases to the power of three with the speed.

SIMOVERT MV medium-voltage drive converters themselves are compact, service friendly, require little maintenance, and have high availability due to the HV-IGBT power semiconductors which are used. The drive converter is optimally protected, among



other things by functions such as short-circuit current limiting or tripping when the converter current exceeds a specific value. The sinusoidal motor current reduces the motor losses and minimizes the torque fluctuations which further reduce the stressing on the motor mechanical transmission elements and especially the driven load.

The advantages associated with a gearless coupling include a better overall efficiency, less wear as well as a higher availability, as potential gearbox problems are eliminated.

On the motor side, the reliability and long lifetime of the motors increased the availability of the complete plant and smooth operation of the compressors due to the optimum balance quality over the complete speed range.

The turnkey container solution ensured minimum loss of production capacity. It facilitated extremely short installation and commissioning times. The space-saving container solution eliminated having to make any structural modifications to the production hall.

Subject to change without prior notice | Order No. E20001-A10-P500-X-7600 | Printed in Germany | Disposstelle 21506 | 21D6296 | MK.LD.XX.LDAL.52.2.01 | SB 03021.5



## Siemens drives rejuvenate 50-year-old compressors

# brunner mond



## SIEMENS

Siemens AG  
Automation and Drives  
Large Drives  
Vogelweierstrasse 1-15  
D-90441 Nuremberg

[www.siemens.de/grossantriebe](http://www.siemens.de/grossantriebe)

# Variable-speed drives for 50-year-old compressors

Brunner Mond Group plc. is one of the leading European producers of alkaline chemicals. The company, with its head office in Northwich, Northwest England, has a total of four facilities in Europe and Africa where it predominately produces soda ash. Soda ash is a basic material used in the glass industry and is required in the production of washing detergents as well as industrial minerals.

As part of a modernization project, this chemical company changed over its compressor drives from coal-fired steam turbines to variable-speed electric motors. The 50-year-old compressors were to be kept and coupled with state-of-the-art drive technology to create an energy-saving, low-maintenance system with high availability. A decisive issue was that the complete system had to be optimally harmonized so that the state-of-the-art drive technology, as far as the smooth running characteristics are concerned, would run perfectly with the 50-year-old compressors. On the engineering side, Brunner Mond did not want to have to make any modifications to the building structure, and downtimes had to be kept to a minimum.



Space-saving installation – the container with the drive components



## Perfect harmony using special high-speed motors, a gearless coupling, and state-of-the-art medium-voltage drive converters

The specifications were able to be fulfilled by using a combination of special high-speed motors, gearless couplings, and medium-voltage converters equipped with HV-IGBT power semiconductors.

The motors are customized induction motors with laminated squirrel-cage rotor with an operating range from 3800 to 6400 RPM. In the new Brunner Mond drive solution, the motors and compressors are mechanically connected through gearless couplings.

Siemens carried out a torsional and oscillation analysis of the complete mechanical drive transmission in order to ensure that the new motors were perfectly harmonized with the 50-year-old compressors regarding smooth running quality. All conceivable operating situations and scenarios were simulated on the computer using a three-dimensional finite element model of the old compressor and the new motor. From the data which was retrieved, a mechanical transmission line was optimized for maximum smooth running characteristics up to a maximum speed of 6400 RPM. This was essentially achieved using a motor design harmonized to the specific application.

SIMOVERT MV medium-voltage drive converters control the motor speed. These are the first drive converters of their output class which use HV-IGBT power semiconductors. In this case, consideration was only given to the water-cooled version. The ambient air is too aggressive for the air-cooled version, which is frequently the case in the chemical industry.

Siemens integrated the SIMOVERT MV medium-voltage drive converter together with the transformer, cooling system, and control into a fully climate-controlled container. This was then supplied, as a turnkey solution, connected, and tested at the

site. Special cranes placed the containers down at its foundation. The system was ready to be commissioned after the converter had been connected to the line supply and motor, the raw water cooling system connected up, and the drive system connected to the higher-level control room via PROFIBUS-DP. In addition to the mounting and installation, system integration, and commissioning, Siemens also trained the operating personnel and assumed responsibility for the after-sales service.

