NORD Global

EDITORIAL

The German Engineering sector still profits from the boost of orders placed after the 2009 crisis. The first half of 2011 was characterised by considerably rising capital investment and high growth in exports whereas the growth slowed down towards the end of the year. Nonetheless, German Engineering companies expect a slightly reduced but still solid growth of up to 4% in 2012, according to figures published by inter-trade organisation VDMA. In this year, one of the key growth factors for the Engineering sector will be China again. By now, almost 14% of all German machines are exported to China.

The outlook is promising because not only in China but all over the world important future-oriented topics such as energy efficiency, environmental protection and manufacturing automation ask for new, innovative drive solutions. Together with the Automotive and Electrical industries, we expect German Engineering to become a major driving factor for industrial economic activity.

NORD DRIVESYSTEMS is optimally prepared to meet these challenges with the new products showcased on SPS/IPC/DRIVES such as the GLOBAL NORD MOTOR, the innovative wash-down gears or the extended SK 500E frequency inverter series. By now, we are busy preparing our presence on the Hannover Messe 2012, where you may expect many interesting NORD DRIVESYSTEMS products once again.

We are looking forward to welcoming you in Hall 15, Booth H21.

Your NORD Global editorial team

NORD DRIVESYSTEMS

诺德（天津）传动设备有限公司开业大典

Grand opening of NORD (Tianjin) Power Transmission Co. Ltd.

For many years, China has been a synonym for economic growth. During the years, the industry has changed. Step by step, the mass production of low-value goods turns into an economy concentrating on modern engineering and the evolvement of a high-tech sector. In this thriving environment, NORD DRIVESYSTEMS decided in 2001 to enter the Chinese market by setting up an assembly shop in Beijing. Shortly afterwards, the first NORD factory was opened in Suzhou, and a motor production line was added in 2008.

Driven by a turnover growth of more than 40%, this successful development led to the opening of a second factory in Tianjin. More than 200 impressed Chinese and international guests had the pleasure of watching an intoxicating, typical Chinese opening ceremony. Apart from many successful speeches and traditional dragon dance, the visitors were enthusiastic about the new assembly hall with its top notch paint shop.

The new factory in Tianjin's Wuqing District has a capacity of up to 200 gear units a day. Products from NORD DRIVESYSTEMS are now available even faster in North China. An integrated service point also ensures much shorter response times and a more comprehensive availability of spare parts.

By opening a new factory, NORD China laid the cornerstone for continued ambitious growth in a dynamic environment. The newly opened factory impressively underlined the claim to be the Chinese market leader with regard to quality and service. For this reason, the slogan "NORD DRIVESYSTEMS – Partners in Motion" will also be relevant for China in the future.

By the way: China is the official partner country of Hannover Messe 2012.

For the German and international industry, China, being the most populous country in the world with a population of 1.34 billion citizens, represents an enormous market. Given a dynamic economic growth with an annual rate of more than 10%, the People's Republic is an important investor.

In the years to come, China will have high investment needs in many sectors including traffic infrastructure, energy generation, mining security, environmental protection and health care, as well as the classic export industries. In addition to traditional industries, the Hannover Messe also focuses on green technology solutions. In the context of the Hannover Messe, the first IndustrialGreenTec leading trade fair will take place, for example.

GREEN INTELLIGENCE CHINA PARTNER COUNTRY 2012

Building bridges to Scandinavia

A region with tailwind – NORD DRIVESYSTEMS subsidiaries in Scandinavia

The planned Fehmarn Belt bridge connecting Germany and Denmark is to look like this; construction start has been scheduled for this year.

To reach Scandinavia, you always had to pass through Schleswig-Holstein. Either via ferry from one of the Baltic Sea ports, or by car via Denmark and the Öresund Bridge, one of the largest technical structures in Europe. In the near future, the scheduled crossing of the Fehmarnbelt between Germany and Denmark (start in 2012) will make the region grow together even more. In this way, it will assume a central function between Western Europe and the Baltic Region.

NORD DRIVESYSTEMS is partner of the Region HanseBelt, an initiative of leading enterprises in the region between the Hanseatic city of Hamburg and the Fehmarnbelt. "In the medium and long term, enterprises between Hamburg and Fehmarn, but also NORD subsidiaries in Scandinavia, will profit from the objective of getting involved with an even closer networking between Scandinavian economy and science in numerous projects. In the medium and long term, we identify a large potential for growth in Scandinavia's key industries", says Jörg Niermann, Head of Marketing for NORD DRIVESYSTEMS.

NORD Gear Danmark A/S, Aabenraa, Denmark

NORD DRIVESYSTEMS AB headquarters, Upplands Väsby, Sweden

The Danish GDP again and again holds one of the first ranks in Europe, and the Danish economy is regarded as very flexible and competitive. Major industrial sectors are: foodstuffs and metal-processing industries, printing and publishing houses, engineering and the production of electronic articles and transportation machines. Danish furniture is also a real export hit. Steel industry, shipbuilding, breweries, textile and clothing industry, cement factories and the production of chemicals and pharmaceutics are also important sectors.

Denmark also pursues another ambitious goal with regard to energy supply: As of 2050, the entire power demand is to be covered by renewable energy.

NORD Gear Danmark A/S was founded in Aabenraa, some 30 km north of Flensburg in 1988. There, they are particularly proud that a leading energy provider in Scandinavia headquartered in Denmark, DONG ENERGY, opts for energy-efficient drive solutions offered by NORD DRIVESYSTEMS.

The cutting edge ethanol fuel plant operated by DONG uses only NORD bevel gears to provide motion. The "Financial Times" nominated DONG ENERGY for an "Environment Award" as the most innovative enterprise worldwide in the Environment category. This prize is awarded to a company which orientates its entire company policy to sustainability.

Even today, the Swedish industry is shaped by the natural resources of the country. Lumber, steel, iron ore and hydro power were the historic growth factors whose centres were mostly located in North Sweden. Apart from a booming service sector, agricultural and food packaging industries have settled in the South, among them one of the market leaders, the multinational TETRA PAK group.

NORD DRIVESYSTEMS AB was founded as a sales agency by Getriebebau NORD (50%), Lars-Erik Edholm and Tore Jansson in Sollentuna near Stockholm in 1979. Due to the rapid growth of the young enterprise, a move to larger facilities located in Upplands Väsby, Sollentuna became necessary in 1985. In 1994, Getriebebau NORD acquired the shares of Edholm and Jansson. Brisk sales and the customers' demands for short delivery times finally led to an extension of the facilities by 1,800 m² in 1995.

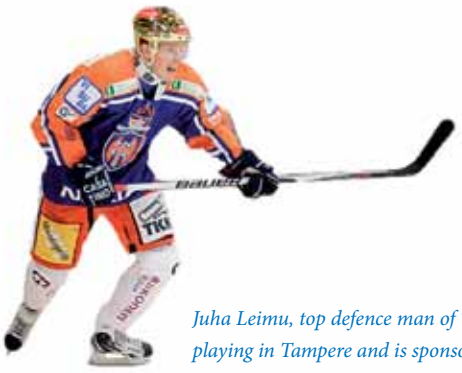
After the successful introduction of the NORD unicase housing gear units in Sweden, customers were also enthusiastic about the NORD frequency inverters. One of the first large-scale customers was truck manufacturer VOLVO. The enterprise has been relying on NORD frequency inverters for assembly line conveyors for truck chassis manufacturing since 1990. Today, NORD drives are used by almost every industrial sector in Sweden.

HanseBelt

Region with tailwind

The Swedish subsidiary, established as early as in 1979, was one of the first distribution companies with an assembly line that Getriebebau NORD founded outside of Germany (following those in France and the US). The steady growth and continued demand by customers resulted in the foundation of other Scandinavian distribution companies in Denmark, Norway and Finland.

Connecting Denmark and Sweden since July 2001: the 7.845 km long Öresund Bridge.



Juha Leimu, top defence man of Tappara hockey club, is playing in Tampere and is sponsored by NORD Gear Oy.

NORD Gear Oy, Tampere, Finland

You would have to invent Finland if it did not already exist. This is because the country is not only known to be the home of the sauna, Jean Sibelius or Father Christmas, but also as a ultra-modern industry and service society. Major industry sectors are the metal, electrical, lumber and paper industries that make up more than half the industrial output and also the export. A benefit for Finnish enterprises is the excellent educational level and the open mindedness of the Fins for new technologies. Not to mention that the Fins are world class sportsmen and have won the 2011 IIHF Ice Hockey World Championship.

Like with ice hockey, the team members of NORD Gear Oy in Tampere, about 170 km north of Helsinki, are real pros that are among the best in the field of drive solutions. The enterprise founded in 1998 soon gained renown as a reliable partner for the entire Finnish manufacturing industry. Apart from Finland's key industries, NORD Gear Oy drive solutions are also favoured by other Finnish engineering companies.

The team in Tampere maintains a close cooperation with the Swedish neighbours. The NORD drive solutions shipped by the NORD assembly shop of the Swedish subsidiary reach Finnish customers generally within one day, regardless of whether this occurs via seaborne or overland shipping.

The central assembly shop of the NORD subsidiary in Upplands Väsby north of Stockholm assembles drive solutions for Sweden, Norway and Finland and ships them to the subsidiaries or directly to the customers.

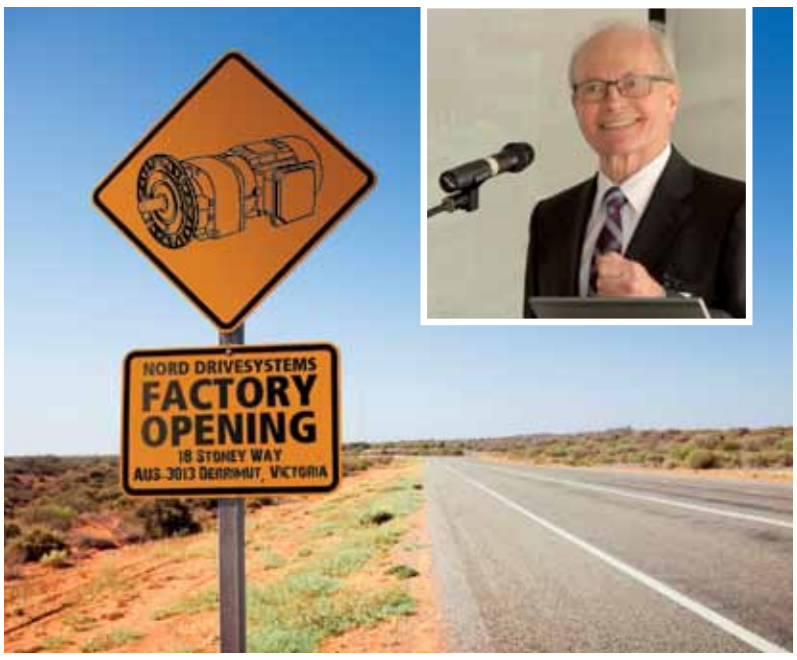
NORD GEAR NORGE A/S, Drøbak, Norway

Although Norway has held two referendums to decide not to enter the European Union, there are close relations to the EU and its member states. One proof is that Norway is a member state of the expanded European Economic Area and the Schengen Agreement. Norway possesses abundant resources of oil , gas, minerals, hydro power and, last but not least, fish. With regard to per capita income, Norway is the world's largest producer of oil and gas outside the Middle East, and the second largest fish exporting nation worldwide.

The NORD Gear Norge A/S subsidiary was founded in Oslo in 1998 and primarily addresses final customers of drive solutions. Today, the company is located some 40 km south of Oslo in the small town of Drøbak. As Norway's offshore competence has a worldwide renown, a great number of the required drive solutions are frequency inverters and industrial gears for applications on drilling platforms and their production. But all other key industry sectors in the country more and more opt on the reliability of NORD drive solutions.

Like Finland, Norway also receives products from the central assembly shop in Sweden. Due to the long common border, delivery times are even shorter because the drives can be transported overland instead of by sea.

Grand opening ceremony for NORD Australia



G. A. Küchenmeister, the founder of NORD, is delighted about the new subsidiary in Australia.

Bargteheide – On October 6, 2011, NORD founder G. A. Küchenmeister and Mark Alexander, Managing Director of NORD DRIVESYSTEMS Australia inaugurate the new subsidiary. The enterprise started in 2010 with an assembly facility in Melbourne's Derrimut suburb with production of gears and electric motors. In early 2011, further investment followed with an extension of the paint shop and drying room.

The plant has state-of-the-art facilities for geared motor manufacturing, and the production and quality assurance processes comply with the standards of the German parent company. The Melbourne site also functions as a service centre. NORD Drivesystems Australia maintains sales branches in two further port cities, Sydney and Brisbane. Regional sales managers serve all the states and territories in Australia, and also in New Zealand.

The enterprise is one of 35 subsidiaries of the Northern Germany based NORD DRIVESYSTEMS GROUP that ensure fast worldwide availability and global service. NORD has been present on the Australian Continent since the mid-1990s and also offers motors complying to the Australian energy efficiency specification MEPS High Efficiency, and frequency inverters with C-Tick certification. By establishing independent production sites and expanding the sales and service range, NORD meets the rising demand for intelligent and powerful drive technology on the Fifth Continent.

By the way: NORD was founded in 1965 as a gear manufacturing enterprise by G. A. Küchenmeister and G. Schlicht. Later, control technology and electric motors completed the product range, making NORD one of the few manufacturers that cover the complete range of drive technology. A unique feature of NORD is the flexible approach to individual applications and its ability to very quickly develop professional solutions in cooperation with customers.

There was much to see in the ultra-modern assembly and service facilities of NORD Australia.

PRESS REVIEWS

GLOBAL NORD MOTOR

Modular motors, for use throughout the world, provide great flexibility, short delivery times and proven technology with typical NORD reliability.

Lebensmitteltechnik [Food Technology] 9/2011

Italy's only private brewery builds Europe's most modern brew house. The drive solutions for the various production stages come from NORD DRIVESYSTEMS. Each drive unit was tailored to the requirements of the individual application, from the grinding mill, which gently grinds the malt at the start of the brewing process, to the screw conveyor, which is used to remove the spent grain.

Computer & Automation 8/2011

NORD DRIVESYSTEMS SK 500E series cabinet inverters are now available with a new technology unit for integration into Profinet environments. Another variant for SK 200E series decentralised inverters of the will follow in the fourth quarter of 2011. The unit supports real-time data transmission and features an integrated Ethernet switch, an integrated web server and a Profinet status display.

technica 10/2011

Handy scheme for new motor efficiency requirements. From 16 June 2011, motors to be offered for certain areas must at least achieve the energy efficiency level IE2. In addition to face-to-face consultation for customers worldwide, NORD DRIVESYSTEMS provides the decision tree offering fast orientation and instructive resource information at www.nord.com.

handling 9/2011

NORD DRIVESYSTEMS has presented a new series of performance optimised bevel helical gear units. When the gear unit is a wash-down variant, the cleaning fluid can always drain off, regardless of the installation orientation. The gear units are especially suitable for use for conveyors and applications in the food industry, lifting gear applications, warehouse systems and overhead conveyors. As the outer dimensions remain unchanged, the user can simply replace existing gear units with the new models.

MM Das Industriemagazin 39/2011

On occasion of the 3rd Drive Technology Day of the VDMA trade association for drive technology, Robert Weber from NORD DRIVESYSTEMS said with regard to the topic of explosion protection in engineering : "With our components, we can produce more than 20 million variants of customer-specific products. For this reason, we must carefully consider, for which products an ATEX certification is feasible and should be obtained."

To view all press releases in full length, go to www.nord.com > Documentation > Press articles.

As energy saving regulations are similar all over the world, affected users demand a technologically uniform solution. NORD offers the GLOBAL NORD MOTOR, a drive meeting global efficiency class requirements and also complying with various regional regulations. For our customers, this translates to great flexibility and proven technology with typical NORD reliability for every application. Given certain prerequisites (see Table 1), the GLOBAL NORD MOTOR based on the European IE2 motor can be operated in many countries. All other country-specific requirements are met with specially developed motors (see Table 2).

Table 1

Countries with statutory regulations covering efficiency (e.g. IE2, High Efficiency, Grade 2)								
Mains voltage/V (Device voltage/V)	230	230	240 (230)	600 (575)	220 / 440	230	220 / 440	220
Frequency/Hz	50	50	60	60	60	50	60	50

The GLOBAL NORD MOTOR covers the following range of international voltage requirements:								
Δ/Y IE2 CUS HE[1]	230/400 V 50 Hz	230/400 V 50 Hz	460 V [2] 60 Hz	460 V [2] 60 Hz	440 V [3] 60 Hz	230/400 V 50 Hz	440 V [3] 60 Hz	220/380 V 50 Hz

Technical description: GLOBAL NORD MOTOR Δ/Y IE2 CUS HE		
Wide voltage range	220-242 V / 380-420 V or 380-420 V / 660-725 V	254-277 V / 440-480 V or 440-480 V / ---
Frequency	50 Hz	60 Hz
Power	4-pole: 0.55 kW (0.75 hp) ... 22 kW (30 hp)	
Energy saving data	IE classification with numerical value of efficiency when powered from the mains	
Additional details on the name plate and other marks	• Conformity and certification logos from - Europe: CE mark - USA: UR mark (from UL) - USA: ee mark (from DoE, Department of Energy) - Canada: CSA mark - Canada: CSAe mark - China: CCC mark (0,55 ... 1.1 kW)	• Energy label - China (Grade 2) - South Korea - Brazil
Please note the extra price for the GLOBAL NORD MOTOR according to Global Price Information, pages M5 and M10.		

Table 2

Motor Δ/Y 230/400 IE2	230/400 V 50 Hz	230/400 V 50 Hz				230/400 V 50 Hz		220/380 V 50 Hz
Motor YY/Y 230/460 HE[1] CUS	400 V 50 Hz	400 V 50 Hz	230/460 V [2] 60 Hz	460 V [2] 60 Hz				
Motor Δ/Y 332/575 HE[1] CUS				575 V [2] 60 Hz				
Motor Δ/Y 230/400 IE2 CUS	230/400 V 50 Hz	230/400 V 50 Hz	460 V [2] 60 Hz			230/400 V 50 Hz		220/380 V 50 Hz
KR[3] Motor Δ/Y 220/380-440							220/ 380–440 V 60 Hz	
AR[4] Motor Δ/Y 220/380-440					220/ 380–440 V 60 Hz			

Country-specific solutions from NORD's MODULAR MOTOR RANGE								
	EUROPE	SWITZERLAND	USA	CANADA	BRAZIL	AUSTRALIA/ NEW ZEALAND	SOUTH KOREA	CHINA

[1] High efficiency, corresponds to IE2, [2] geared motor as exception, otherwise IE3 is mandatory, [3] South Korea, [4] Brazil

E189357
UL approval as "Recognized Component" with UL file number

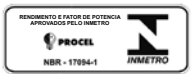
CC056A
USA: Compliance with energy saving regulations

CSA approval for USA and Canada

Canada: Compliance with energy saving regulations


China
Energy saving label (Grade 2)


South Korea:
Energy saving label



Brazil:
Energy saving mark

Heat energy from the Sun

Driving force for the next generation of solar thermal energy supply

To equip the spacious mirror plant of the Gemasolar site, SENER produced thousands of drive modules.

For most people, photovoltaic modules are the undisputed synonym for solar energy. But only few people are familiar with a different energy generation technology using solar power that has reached a level of marketability: solar thermal power plants. The installations directed to a central tower have long been demonstration plants to be found in R&D facilities only, but are now rapidly turning into full scale industry applications. A technological leader is the Gemasolar power plant in South Spain. In this pioneering plant, thousands of drive units ensure that a large field of mirrors, known as heliostats, arranged around the tower reflects as much solar radiation as possible onto a receiver located at the top of the tower to transfer the heat to a fluid circulating here.

The Gemasolar power plant basically comprises a central tower with an absorber surface at its top, a fluid circuit with storage tanks, heat exchangers for electricity generation by way of a connected turbine, and a field of mirror elements concentrating the sun's radiation to the absorber. The plane mirrors can be rotated and tilted in order to catch as much sun radiation as possible and deflect it to the absorber surface of the tower, from sunrise to sundown, as long as the sun is their field of vision. NORD DRIVESYSTEMS supplies 5300 NORDBLOC.1 geared motors as major components that perform a central and important function of this plant. In each of the 2650 Gemasolar heliostats, two geared motors each ensure highly precise sun tracking in two axes.

Stored heat energy

The large heliostat field of the Gemasol plant covers 185 hectares and is located halfway between the Andalusian cities Sevilla and Cordoba - one of the sunniest regions in Europe. The Gemasolar operator, Torresol, a joint venture of the Spanish engineering giant SENER Ingeniería y Sistemas, and Masdar, a state-owned power supplier headquartered in Abu Dhabi, built the first commercial solar thermal power plant with central tower and heat storage system based on molten salt. Liquefied salts pumped from a storage tank to the top of the tower and flowing through the absorber area collect the heat of the concentrated solar radiation. When the molten mass has passed the absorber, its temperature is usually higher than 500 °C. The hot molten mass flows through a heat exchanger, producing water steam that drives a generator. The electrical power is fed into the grid. But the most striking feature of Gemasolar is the innovative storage of the molten salt circuit. When there is more heat energy than the turbine can convert, the surplus is stored by diverting part of the molten salt upstream of the heat exchanger. The hot medium stored in a separate tank can be fed back to the energy generation process to enable normal operation of the plant at a later time when there is less or no sun radiation at all. In this way, the system can run and generate electrical power up to 15 hours in case of cloudy weather or at night using stored heat. With an annual operating time of 6500 hours, the power plant is much more productive than conventional power plants generating electrical power from renewable energy sources - which are much more dependent upon optimal weather conditions.

Always the sun in view

Solar thermal power plants are often referred to as "concentrated solar power (CSP)" plants. The term is derived from the function: Sunlight is concentrated on a certain spot in order to generate electrical power from the generated heat. In the Gemasolar power plant, 2650 plane mirrors deflect the sunlight to an absorber area on the central tower of the plant. Given the size, weight and shape of the mirror units, powerful, robust and resistant drive solutions are required for sun tracking. By its nature, there are extremely high ambient temperatures in the plant. As a consequence, the technology used must be designed to withstand such conditions. In addition, each of the heliostats featuring a plane surface of some 120 m² represent a large sail area for strong winds and storms can occur from time to time. But proper functioning of the heliostats and the entire power plant is ensured as far as possible. The geared motors used in the mirror field play a decisive role here. Torresol's heliostats are equipped with size 5 NORDBLOC.1 geared motors. Compared to the same size of previous generations of unicase housings, the new systems withstand much higher loads. For motor mounting, there are several particularly user-friendly mounting options, a cost-effective mounting directly on the motor, or the attachment of a very short space and weight saving IEC adapter. Venting is possible in all installation positions. The aluminium housings have a highly resistant, natural corrosion protection, making a paint coat unnecessary in many cases. The FEM optimised housings are not only more stable but also weigh much less than previous models. The design of the unicase housings allows the use of larger bearings into housings up to size 6, giving the units a higher resistance to transverse forces or prolonging service life under unchanging conditions. For even more demanding applications such as high temperatures and rough ambient conditions, we also offer all types as ATEX variants.

Summary

Solar thermal power plants with a central absorber tower, until quite recently operated exclusively as research plants and are an important innovation in the renewable energies sector. The future-oriented Spanish Gemasolar power plant is the first of such power plants featuring a storage option for the heat transfer medium. The further development demonstrates the great potential of this technology. At a rated power of 19 MW, Gemasolar is designed for an annual electrical power production of 110 GWh – sufficient to supply 30,000 households and to reduce the annual CO_2 discharge by approx.

Tow robust geared motors each make sure the heliostat is precisely aligned in two axes.

40,000 tons. To ensure the precise and reliable functioning of the adjustable heliostats deflecting the sunlight in the plant , the gigantic field comprising 2,650 mirrors is equipped with 5,300 robust geared motors made by NORD DRIVESYSTEMS. The drive units in aluminium housings and FEM-optimised NORDBLOC.1 design warrant highly precise movement and are particularly durable.

BEST NEWCOMER

NORD was awarded an "indirect" prize as sponsor of the Solar Energy Racer (SER) with which the technology enterprise Bühler participated in the World Solar Challenge 2011 in Australia. The SER ranked third in the category "Production Class" and was given the Best Newcomer Award. This category is for all vehicles exclusively equipped with components freely available on the market.

BÜHLER SUPPLIER AWARD 2011 FOR NORD DRIVESYSTEMS

Year after year, Bühler, the worldwide active Swiss technology company, awards a prize for the best of best of their suppliers. NORD was awarded the prize in the category "Premium Supplier" as one of five from 265 key suppliers. The prize is awarded for extraordinary commitment and performance in relation to:

- On-time delivery
- Quality and technology
- Cooperation
- Cost efficiency
- Environment

Bühler is the specialist for machines, systems and services for processing basic foods and manufacturing high grade materials. The core technologies are in the areas of mechanical and thermal processing technology and also comprise conveying, cleaning, grading, grinding, blending and shaping for the processing of grain and other raw materials. Bühler processing technology is also used in manufacturing and refining technical materials, and for die casting. Customers all over the world, e.g in the food, chemical or automotive industries, operate machines developed by this enterprise. Industry sectors where NORD DRIVESYSTEMS as a specialist for drive solutions has an excellent reputation. We are proud and congratulate our employees on this particular award.

BÜHLER

Italy's only private brewery builds Europe's most modern brew house.

NORD DRIVESYSTEMS developed the drives for the entire brewing process.

The tanks and vats in the Forst specialty beer brewery have been in continuous operation for 40 years, during which they had produced 25 million hectolitres of beer. However, because brewing technology has progressed – especially with regard to energy aspects – the management decided to construct a completely new brew house. This was to operate especially efficiently, comply with the latest safety requirements and produce the lowest possible emissions. To achieve this, the brewery commissioned leading German companies to develop the brewing technology and the special drive engineering.

With a diameter of 8.6 metres, the lauter tun forms the heart of the brew house.

Very soon, the brewery was able to reduce its consumption of primary energy by 30%. With a diameter of 8.6 metres and a process time of only 2.5 hours, the lauter tun forms the heart of the complex system. Five large format vats, including the technology and piping systems, a newly designed water supply and a malting plant with twelve silos as well as three separate storage vats – the engineers and technicians had just 16 months to construct the main components for the 154-year-old Forst brewery in Algund, South Tirol from scratch. The new brew house is located at the perimeter of the extensive brewery premises and can easily be seen from the outside road. The 4,800 m^2 glass façade allows a view of the modern plant, which is considered to be a showpiece project for modern European brewing. During construction the actual brewing process had to continue as usual. Even during conversion to the new plant, there had to be no interruption to production.

Perfectly matched drives

"The tight schedule for such a complex and technically sophisticated plant was our greatest challenge", explains Werner Würth, development engineer at Ziemann Ludwigsburg GmbH. The general contractor specialising in brewing plants was responsible for the planning and construction of all the technical systems. In order to produce the five brewing vessels and the machinery in as short a time as possible away from the actual construction site, they were first pre-fabricated in the Ziemann factory in Bürgstadt /Main and were then sent by road on their 550 kilometre journey to South Tirol. The gear motors for the various vessels come from NORD DRIVESYSTEMS. Each drive unit was tailored to the requirements of the individual application, from the grinding mill, which gently grinds the malt at the start of the brewing process, to the screw conveyor, which is used to remove the spent grain.

In the first stage of the process the malt is added to the mash tuns. There it is mixed with spring water from the nearby mountains and then heated to various temperatures. The mixture is heated by means of thermally optimised conducting surfaces on the floor and the frames of the tuns. The agitator inside the vessel is driven by a NORD SK 9086.1AZSH 160 L/4 frequency-controlled parallel bevel gear motor, which is equipped with a temperature sensor as standard. After being held at the correct temperature in the mash tun, the liquid is then pumped into the lauter tun. With a size of 8.6 metres and a weight of almost 21.5 tons, this forms the heart of the beer production process.

The lautering, or purification process separates the liquid components of the mash, the so-called 'wort' and the brewing grains, i.e. the solid components. As the spent grain settles on the floor of the vat, it forms a natural filter layer, which is evenly loosened by means of blades in order to ensure an optimum flow of the wort. Purification in the tun takes place in various stages: first of all the spent grain is continuously loosened and cut up while the wort is flowing through it, before the start of malt removal and the emptying of the vessel after completion of the lautering process. Both processes are handled by a NORD drive unit, which is based on a hollow splined shaft.

A single motor controls the lautering process: It is used to loosen and slice the spent grain but also to remove it, namely to empty the tun after the process is completed.

"The drive unit was specially designed for the lautering process of this brewery", says Würth. It consists of a combination of an industrial gear unit and an SK 12307A-9072.1EAFH-180MX/4 TF F IG bevel gear unit. A special sealing system on the industrial gear unit ensures that there is always an adequate lubricant film on the shaft. Due to the design, the lifting cage does not require additional oil reservoirs, which eliminates the problem of sealing.

One of the features of the drive unit is the control of the required speed range. The speeds of the machinery in the lauter tun are varied by means of frequency control. The various speeds are necessary for optimum processing of the content. In order to process the material as gently as possible, a low speed is necessary while the spent grain is being loosened, but a high speed is required during removal of the spent grain so that the vessel can be emptied as quickly as possible. The drive unit has a maximum torque of 96,000 Nm. "It can continuously regulate the circumferential speed from one to one hundred metres per minute – with a constant torque", explains Jörg Niermann from NORD DRIVESYSTEMS.

Precise to the millimetre, event at full load

At the same time, the lifting device raises and lowers the shaft and the machine in the vessel in an axial direction by up to 500 millimetres – the minimum thickness of the grain layer – precisely to the millimetre under full load. In addition, this height adjustment can be made both at a standstill, while idling and during operation. For this, both the helical gear unit and the hydraulic lifting unit are designed to withstand the axial and radial forces which occur in the purification process without a reduction in pressure or power. A limit switch and an optical sensor were installed to position the height adjustment. The drive unit is designed to handle the forces which occur during the entire process. Because of the frequency control, the speeds can be varied to match the process-relevant parameters of the entire lautering process. "This ensures that the clouding of the spent grain is kept low and at the same time the flow is very efficient", says Würth. The design principle of the industrial gear units ensures that they have a long service life. "To check whether the system is running smoothly, the speeds, current consumption and the temperature of the motor are centrally monitored", explains Würth. The drive motor has a power of 18.5 kW and output speeds from 0.04 to 4 rotations per minute. In order to maintain the motor at a constant speed, an encoder is installed. The motor is also equipped with an external fan to ensure adequate cooling at low speeds. Oil expansion tanks are installed on both gear units to prevent the escape of lubricant from the vent valves at high temperatures. All of the bearings are integrated into a single housing block (Unicase), which was developed by NORD DRIVESYSTEMS. Because of this, the enclosed housing is especially strong and rigid as there are no joints between the output side and the housing which are subject to transverse forces or torque.

Each drive unit was tailored to the requirements of the individual application.

This compact and light construction also means that the gear unit is very quiet and has a longer service life and lower energy consumption in comparison with jointed gear units.

The lautering process is fully automatic. First, the mash flows at a low speed from the upstream vessel into the lauter tun, which is pre-heated to 70 degrees Celsius. Then the prepared brewing water is added. Pressure sensors start the drive unit and set the six arms of the machine in motion. The racking machine is equipped with geometrically arranged blades, which loosen the grain and ensure an even outflow of the wort and the subsequent leaching of the spent grain cake, while their special form prevents a preferred flow direction. Prepared brewing water is added for leaching. Due to the dovetail suspension, it is also possible to adjust the position of the blades during the optimisation phase. To provide homogeneous leaching of the whole area of the spent grain cake without dead zones and to ensure good flow characteristics, the false bottom consists of square elements with slits to allow the liquid to drain off. This shape increases the free open area by more than 20 percent. The flow characteristics of the lautering cones are optimised due to their form. In addition, pressure sensors below the floor detect the consistency of the spent grain. The speed of the machine motor is then regulated accordingly. "This intelligent control system enables flow rates of between 9 to 14 litres per minute and square metre", says Würth. This increases the quality of the wort, and raw materials are used efficiently. Once the lautering process is complete, the removal of the spent malt begins. The machine is gradually lowered and the flat bars mounted on the bottom of the arms push the spent grain out of the tun through the emptying hatch. This process is also fully automatic. If too much of the mass accumulates, the lowering process stops and the speed is adjusted by the process. This makes it possible to achieve emptying times of six minutes. The spent residue is then taken away for use as cattle food. Thanks to the modular system of the housing and gear unit elements it was possible to tailor the technology precisely to the requirements of the brewery and hence to reduce the time for the entire process in the lauter tun to about one and a half hours.

Especially gently

After the lautering process the liquid is pumped into the adjacent brewing vat and hops are added. Then the liquid is boiled for about an hour at low pressure. A modern internal boiler ensures that this boiling process is particularly gentle, so that as many natural substances as possible are retained in the liquid to give the beer its characteristic taste. This heating deactivates all the remaining enzymes, evaporates excess water, sterilizes the wort and promotes the coagulation of proteins. As well as this, the components of the hops gradually dissolve out. After boiling, the hops and protein residue are separated from the wort in the so-called whirlpool. This residue settles in the centre of the vat in the form of a sediment cone, which can then be easily removed.

900,000 hectolitres per year

After this final process in the brew house, the wort is cooled in a cooling plant with an iced water tank to 5 degrees Celsius and is then taken to the fermenting cellar, where it is fermented for seven days to produce 'green beer'. After this, the yeast which has settled on the floor is removed. During the following maturing phase, the liquid is kept at a very low temperature in the storage cellar for about two to three months. Finally the beer is filtered and bottled. The new plant is designed to produce 900,000 hectolitres of beer per year. Up to twelve brews per day can be produced, each with a volume of 630 hectolitres per brew.

A complex monitoring system has been installed to enable the brewers to keep a precise check on the automatic processes in the brew house and the subsequent fermentation. The special brewing process control enables all sections of the brewery to be monitored and centrally viewed. The control system on the vacuum evaporator is the only one of its kind in the world. The processes are monitored and evaluated via a camera system and a large number of measuring units.

Modern technology reduces steam consumption

"The new brew house is a showpiece project, which has been constructed to operate reliably for at least 40 years", says Dr. Walther Unterthurner, Technical Director of the Forst brewery about the plant. He emphasises that the impressive architecture is only a small part of this. "For the development of the new brew house, it was important for us to process the resources as gently as possible", says the Technical Director. "As well as this, we wanted to use this modern technology to considerably reduce energy consumption and emissions." Therefore, in addition to efficiently operating plants in the brew house a new heat recovery system has been integrated into the vapour condenser: The heat required for the production of the beer wort is stored in a large energy reservoir in the form of hot water tanks at the rear of the building and is reused for subsequent brewing processes. These various measures have already reduced the consumption of primary energy by 30 percent. "Our target is to reduce steam consumption by at least 47 percent", says Dr. Walter Unterthurner.

A parallel shaft gear is used to drive the screw conveyor and to remove the spent grain.

TRADE FAIR CALENDAR FEBRUARY 1 TO JUNE 30 2012

The NORD DRIVESYSTEMS trade fair concept: by now used uniformly all over the world and a great success with customers and employees:

01.02. - 02.02.2012	**EURO EXPO**	Kristiansand, Norway
03.02. - 05.02.2012	**International Industrial Expo & Conferences**	Chandigarh, India
15.02. - 18.02.2012	**Commex 2012**	Ahmedabad, India
29.02. - 03.03.2012	**BIET**	Dhaka, India
03.03. - 06.03.2012	**GEAPS Exchange 2012**	Minneapolis, Minnesota, USA
07.03. - 08.03.2012	**EURO EXPO**	Trondheim, Norway
07.03. - 08.03.2012	**SIAF** (SPS China)	Guangzhou, China
13.03. - 15.03.2012	**LogiMat**	Stuttgart, Germany
13.03. - 15.03.2012	**Bulk Solids**	Ahmedabad, India
27.03. - 30.03.2012	**Anuga FoodTec**	Cologne, Germany
28.03. - 29.03.2012	**EURO EXPO**	Skellefteå, Sweden
29.03. - 01.04.2012	**WIN World of Industry Part 2**	Istanbul, Turkey
18.04. - 20.04.2012	**Cranexpo**	Moscow, Russia
18.04. - 21.04.2012	**ChinaPlas** (Plastics & Packaging)	Shanghai, China
23.04. - 27.04.2012	**Hannover Messe International**	Hannover, Germany
08.05. - 11.05.2012	**NMW -** National Manufacturing Week	Sydney, Australia
08.05. - 11.05.2012	**Elmia Automation**	Jönköping, Sweden
09.05. - 10.05.2012	**EURO EXPO**	Hammerfest, Norway
22.05. - 23.05.2012	**NORDjob**	Lübeck, Germany
22.05. - 25.05.2012	**Nitra Trade Fair**	Nitra, Slovakia
22.05. - 26.05.2012	**Feira da Mecânica**	São Paulo, Brazil
23.06. - 24.06.2012	**EURO EXPO**	Gävle, Sweden
05.06. - 08.06.2012	**Russian Coal and Mining - 2012**	Novokusnetsk, Russia
06.06. - 09.06.2012	**Manufacturing Indonesia Surabaya**	Surabaya, Indonesia
12.06. - 15.06.2012	**Fispal Tecnologia**	São Paulo, Brazil
19.06.2012	**VDI Recruiting Day**	Hamburg, Germany
26.06. - 29.06.2012	**Mexico ExpoPack**	Mexico City, Mexico

Athlete with drive: Bettina Lange wins two gold medals in Beijing

Bettina Lange, current World Champion in Aquathlon and Triathlon (class W40) since Sept. 11 2011.

Bargteheide – Ullrich Küchenmeister, Managing Director of NORD, congratulated the triathlete living at Bargfeld-Stegen, district Stormarn: "All at NORD are particularly glad that we – together with other notable sponsors headquartered in Schleswig-Holstein –could support Mrs. Lange on her way to Beijing and to World Championship.

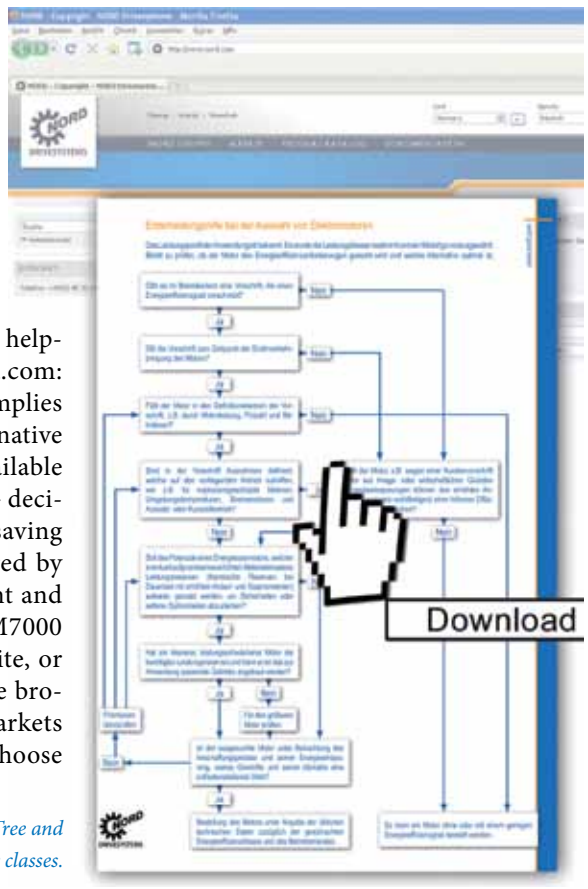
The 42-year-old athlete was the fastest swimmer and cyclist. In the final running course, there was no one to rival her. She reached the goal with an almost one minute lead over Canadian Suzanne Chandler and won the triathlon gold medal in her age group. A few days earlier, Bettina Lange had already won the Aqualon World Championship (running and swimming). The athlete had been runner-up World Champion in 2010 and won the championship in her age group 40 on the Olympic Distance (1.5 km swimming, 40 km cycling, 10 km running) at the European Triathlon Championship in Spain in June 2011.

The working mother of twins would not have been able to afford the trip to Beijing herself. Finance minister Rainer Wiegard, also Member of the Schleswig-Holsteinian Parliament for Stormarn-Nord, had initiated the search for committed sponsors to make the trip to Beijing possible for her. "It would have been a pity if Bettina Lange had missed the World Championship in Beijing. I congratulate her on the excellent results", said Rainer Wiegard.

Schleswig-Holstein's Finance Minister Rainer Wiegard (r) and sponsor Ullrich Küchenmeister (l), Managing Director of NORD DRIVESYSTEMS voiced their best wishes for Bettina Lange's start at the Triathlon World Championship in Beijing.

New motor efficiency requirements

The flow chart clearly and simply guides you through the decision making process.



Bargteheide – Many drive technology customers are currently busy adapting to the new efficiency requirements for electric motors, while some are only just starting to familiarise themselves with the standards. It is about time to do so: from June 16, 2011, only motors fulfilling IE2 efficiency requirements may be used for certain types of applications within the EU market. In addition to face-to-face consultation for customers worldwide, NORD DRIVESYSTEMS provides helpful and instructive resource information at www.nord.com: Clients who are unsure whether their chosen motor complies with the energy efficiency requirements, and which alternative is best suited, can use NORD's decision tree which is available for download from the website (nord.com > IE2 motors > decision tree). Also available online: an interactive energy saving calculator determines the operating cost savings offered by IE2 motors during continuous operation based on plant and machine data. Moreover, a print version of the new M7000 motor catalogue can be ordered from the NORD website, or a PDF version can be downloaded directly. The concise brochure lists the efficiency requirements in different markets worldwide and, organized by target regions, helps users choose the right motor.

Just visit www.nord.com, download the Decision Tree and gain fast orientation on how to handle new efficiency classes.

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