CHEManager EUROPE

2/2007 March

THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCES MARKETS

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Energy

Biofuels today and tomorrow

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Chemicals

Informex Europe postponed until April 2008

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Newsflow

Fresenius Medical Care has entered into a new agreement with Amgen Europe (Amgen) for Aranesp (darbepoetin alfa). Under the agreement, Fresenius Medical Care will devote efforts to assist Amgen in disseminating scientific information regarding the treatment of anemia to nephrologists and other dialysis experts. Amgen and its representatives are and will remain solely responsible for the product. The new agreement runs for three years.

▶ www.fmc-ag.com
▶ www.amgen.com

Huntsman has agreed to sell its U.S. commodity chemicals business to Flint Hill Resources a subsidiary of Koch Industries. This follows the divestment of its European base chemicals and olefins assets to Sabic Europe. The US-$761 million deal with Koch breaks down to US-$456 million in cash and US-$286 million to cover the value of inventory on 31 December.

McBride said it has agreed to acquire Henkel's European private label household products business, including dishwashing products maker Chemolux SARL and a production facility in Coventry, for up to £39.3 million on a cash and debt free basis. McBride said the acquisition is expected to be earnings per share enhancing in the first full year of ownership.

Lanxess said it will shut down production of Hydrazinhydrat in its Chinese Weifang unit for several months due to a malfunction. A spokesperson for the company said costs are estimated to be a medium one-digit million euro range. The Chinese operation is a joint venture between Lanxess and Weifang-Yaxing Chemical Company in which Lanxess holds 55%.

The board of executive directors and supervisory board of BASF Aktiengesellschaft have resolved to propose to the annual meeting on 26 April the transformation of BASF Aktiengesellschaft into a European Company (Societas Europaea, SE) with the name BASF SE. The company's headquarters and chief administrative offices will remain in Ludwigshafen, Germany.

'Every Last Bit'

UOP's New Business Sets Out to Develop Renewable Energy Technologies

UOP – a Honeywell business specialised in supplying and licensing of process technology, catalysts, adsorbents, process plants and consulting services – recently established a new business unit dedicated to introducing new technology for processing renewable energy sources in existing or new petroleum refineries worldwide. The new unit, called Renewable Energy and Chemicals, is to accelerate UOP's already existing efforts to develop renewable energy technologies by developing profitable ways refineries can use UOP's petroleum processing technologies to convert bio-feedstocks, such as vegetable oils, greases and certain waste products, into fuel and chemicals. CHEManager Europe's Brandi Hertig spoke with Jennifer Holmgren, director of the business unit.

Jennifer Holmgren
Director of UOP's Renewable Energy and Chemicals business unit

CHEManager Europe: Ms. Holmgren, could you give us a little background on the new business group Renewable Energy and Chemicals? Why now? What do you hope to achieve?

J. Holmgren: UOP has been working for a number of years in evaluating and developing technologies for bring renewable biofeedstocks into refineries. We've developed a technology to convert vegetable oil into high-cetane diesel, which we call green diesel. Because it's ready to go to the market, we had to make a decision as to how we would commercialise this technology. We decided that because renewable energy was going to become such an important part of the future, we wanted to create a stand-alone business to make sure that we devote enough resources to the effort.

What has UOP done in the past to develop renewable energies?

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MARKET REPORT

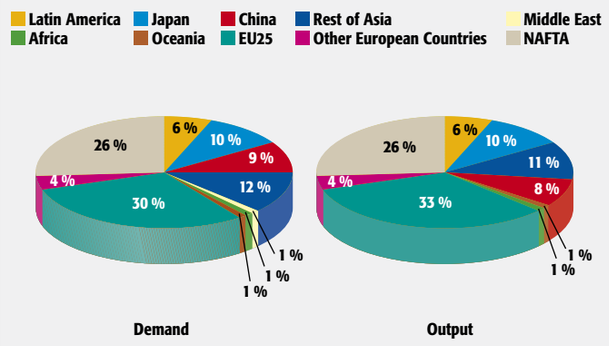
EU vs. China

By Dr. Klaus Griesar

China has enjoyed a 10% growth rate over the past 26 years, and it is already the third-largest exporter globally. Trade relations between the EU and China are thriving. With more than €200 billion in 2005, the EU-25 has become China's top trading partner and China is now the EU's second most important trading partner. At the same time, the EU deficit with China has reached an unprecedented level of €100 billion in 2005.

The structure of the global chemicals industry is changing, largely because China is becoming an increasingly important consumer and supplier of chemical products. The reasons for

Chemicals Demand and Output 2004 (including pharmaceuticals) — Figure 1



Source: VCI (2006), DB Research (2005)

▶ Continues Page 3

Innovation Keeps Brands Alive

Henkel's Strategy Builds Consumer Trust

In this day and age of interchangeable products, the implementation and establishment of a brand is of notable significance. Speciality chemical companies as well as companies affiliated with the chemicals industry – particularly those for whom the consumer market plays a key role – have developed intelligent strategies that can be transferred into other areas of the B2B chemical market. A prime example of a company with strong brand-orientation is Henkel, whose most well-known brand, Persil, turns 100 this year. Dr. Sonja Andres asked Henkel's chairman of the management board, Prof. Dr. Ulrich Lehner, about the company's concepts and market strategies.

Prof. Dr. Ulrich Lehner
Chairman of the management board, Henkel

CHEManager Europe: Henkel is a prime example of a strongly brand-oriented company operating in the chemistry-related consumer goods sector. Taking Henkel's top brand Persil as an example, the company's brand strategy already appears to have a long history. What do you see as the main reasons for the success of brand-name products?

U. Lehner: Strong brands are beacons that signal goods of high quality to consumers confronted by what has become a huge range of product choices. Strong brands enjoy consumer confidence, because this quality has been confirmed time and time again by positive experiences, often reaching over decades. In buying brand-name products, consumers acquire something special, something that offers them both material and non-material benefits. The success of a brand is closely tied to its ability to regularly set the benchmark in its market segment in terms of quality, product performance and convenience or ease of use. In all of this, innovation is the oxygen that keeps brands alive.

Brands need continuity in order to be credible to customers – yet brands also have to keep evolving in order to stay attractive. How can these two factors be reconciled?

U. Lehner: Take Persil, for example. The brand turns 100 years old this year, yet it is still successful because the product has been continuously updated and improved. The key has been to ensure that Persil consistently evolves as new demands and customer requirements come to light. At the same time, however, the quality promise of this premium brand has remained unchanged throughout its long history.

How is Henkel's technology research involved in this process of brand development?

U. Lehner: Our business success is based on a foundation of strong brands and technologies that are trusted by both consumers and industrial customers alike. In order to further expand this position, our research and development staff continuously creates innovative solutions and visionary products and services. The subject of research alliances is also becoming increasingly important. We realise that we need to tap into technical know-how at source. Consequently, we are working ever more closely with external experts. We have a worldwide network comprising more than 250 cooperation partners from university faculties as well as three research companies operated in partnership with universities.

How does Henkel maximise the chances of a successful product launch?

U. Lehner: We strive to recognise consumer demands at an early stage and to offer the right solutions in response. Yet it is also important here to remember that customer requirements can vary considerably around the world. For instance, washing machines and their mode of operation are very dissimilar internationally, and machines may not even be available in some countries. Therefore, the demands made of a detergent differ depending on the region.

And in terms of fragrances, too, people's preferences are very different internationally. Our product developments take account of this, and whenever possible, we devise the appropriate solutions in collaboration with our customers. We are systematising our internal research processes and the development of products to an ever greater degree. Work that does not yield results is discontinued at a predefined point. Our aim is to concentrate our energies on the most promising projects with the work always focused on the customer.

In some of your product categories – such as in the detergents

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CONTENT

BASF Reports Record Earnings in 2006


Dr. Juergen Hambrecht
BASF's chairman

In 2006, BASF said the company reached important goals. For the first time in the company's history, sales passed the €50 billion mark, and income from operations (EBIT) before special items climbed to a new record of more than €7.2 billion.

"We have broadened our competence and have become more resilient to cyclicality."

"Our value-enhancing acquisitions in the areas of catalysts, construction chemicals and resins for paint and printing systems have helped us to grow in highly innovative areas and have brought us closer to our customers. At the same time, we have broadened our competence and have become more resilient to cyclicality," said BASF's chairman, Dr. Juergen Hambrecht.

In 2006, BASF again earned a high premium of €2.1 billion on its cost of capital and grew faster than the market. Sales increased by 23% to almost €53 billion. The businesses acquired in 2006 contributed €4.2 billion to this amount. EBIT before special items climbed 18% to more than €7.2 billion.

▶ www.basf.com

ABB 2006 Net Income Up 89%


Fred Kindle
ABB president and CEO

ABB reported that its net income rose 89% to US-$1,390 million in 2006 amid strong demand for technology to increase power grid reliability, industrial productivity and energy efficiency.

"We are heading into 2007 in a strong position."

Revenues for 2006 reached US-$24,412 million, an increase of 11% over 2005, while orders were 22% higher at US-$28,401 million. The order backlog stood at US-$16,953 million at the end of 2006, up US-$5 billion or 42% (33% in local currencies) compared to a year earlier.

Growing revenues, higher capacity utilisation and further cost reductions all contributed to a 45% increase in EBIT to a record US-$2,586 million in 2006. The EBIT margin, or EBIT as a percentage of revenues, increased to 10.6% from 8.1% in 2005.

"We have the right technology and market positions to take advantage of the growing global demand for reliable power and higher industrial efficiency," said Fred Kindle, ABB president and CEO. "Our order backlog has grown significantly and improved business execution is allowing us to capture more of that growth in our bottom line. We are heading into 2007 in a strong position."

▶ www.abb.com

Solvay Reports 10% Sales Growth 2006

Solvay announced a 10% increase in sales for 2006, reaching €9.4 billion. The company also said its three sectors – pharmaceuticals, chemicals and plastics – showed "significant improvement." The group net income of €817 million was equivalent to the 2005 record and reflected the growth in operating performance. The group's net income in the fourth quarter was up 11% to €146 million over the same quarter in 2005.

▶ www.solvay.com

Dow Corning Reports 2006 Sales and Profits Growth

Dow Corning reported consolidated adjusted net income of US-$167.1 million for the fourth quarter of 2006, an increase of 67% from adjusted net income of US-$100 million reported in the same quarter of 2005. For all of 2006, adjusted net income was US-$601.8 million, an increase of 24% from adjusted net income of US-$485.3 million reported in 2005. Adjusted net income excludes a settlement with the US Internal Revenue Service in the second quarter of 2006 and a gain on issuance of subsidiary stock in the second quarter of 2005.

Sales were US-$1.162 billion in the fourth quarter of 2006, 23% higher than sales of US-$0.943 billion in the same quarter of 2005. Sales for all of 2006 were US-$4.392 billion, 13% higher than sales of US-$3.879 billion reported in 2005.

"2006 was a record year for Dow Corning, reflecting the focus our entire team places on innovation and meeting customer needs exactly," said Dow Corning's Vice President and Chief Financial Officer J. Donald Sheets. "We strengthened our portfolio in silicon and silicone technologies, despite the continued challenges of high costs of raw materials and energy."

▶ www.dowcorning.com

Eastman Chemical: 44% Profit Growth

Eastman Chemicals announced that its fourth-quarter profit rose 44% on improved results from most of its businesses, but sales fell short of expectations and the company guided below consensus for fiscal 2007.

Quarterly earnings grew to US-$95 million, or US-$1.12 per share, from US-$66 million, or 81 cents per share, in the prior-year period. Excluding asset impairments and other items, Eastman said it earned US-$1 per share in the recent quarter. Sales rose to US-$1.75 billion from US-$1.73 billion as higher volumes offset lower selling prices.For the full year, Eastman said earnings fell to US-$409 million, or US-$4.91 per share, from US-$557 million, or US-$6.81 per share. Revenue grew to US-$7.45 billion from $7.06 billion.

▶ www.eastman.com

Ciba Names New CEO


Armin Meyer


Brendan Cummins

Armin Meyer, Ciba Specialty Chemicals chairman of the board and CEO announced that the board has decided to dissolve the company's double mandate as of 1 January 2008. The company has appointed Brendan Cummins, who has acted as chief operating officer since October 2005, to CEO. Meyer will continue as chairman of the board. In agreement with members of the executive committee and three other senior managers, the board of directors of Ciba Specialty Chemicals has decided to cancel their retention agreements with immediate effect. They had been entitled to receive severance payments in the event of a change of control of the company.

▶ www.cibasc.com

Honeywell Acquires Business from PAS

Honeywell said it has acquired the Advanced Process Control (APC) and Optimisation business of PAS, a software provider for the process industries. The acquisition includes all the software offerings related to the APC business, which complement Honeywell's portfolio of advanced control and optimisation technology. According to Honeywell, the software offerings also will enhance the company's family of process simulation tools used to design better processes and train operators to be more efficient.

As part of the deal, Honeywell acquires PAS' Advanced Process Control and Optimisation employees and will continue to serve the division's customers.

▶ www.honeywell.com
▶ www.pas.com

chemanager@gitverlag.com

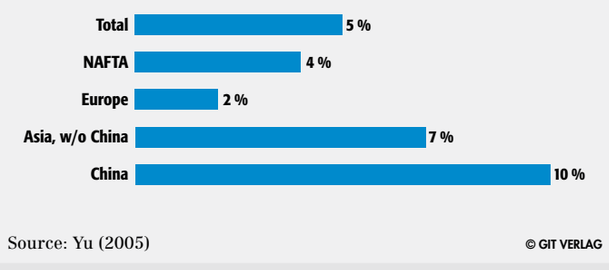
MARKET REPORT

EU vs. China: Challenges for the European Chemical Industry

Continued Page 1

this are China's cost advantages over industrialised countries tin the production of chemical products and strong demand conditions due to key customer industries building up production capacities in China. Consumption of chemicals in China has increased by around 12% per year over the past 10 years, while the EU-25 and the U.S. posted figures of only 4% and Germany a mere 2%.

Growth Rate for Fine Chemicals per Region — Figure 2



Source: Yu (2005)

Market Output And Demand

In 2004, the EU-25 was the largest global market for chemicals with 30%, followed by the U.S. with a 24% share, Japan with 10% and China with 9%. World chemicals production (including pharmaceuticals) was estimated at €1,776 billion in 2004, and the EU-25 accounts for 33% of the total. The EU is therefore also the largest chemicals producing area in the world and the only region where output outstrips demand (fig. 1).

With chemicals turnover (including pharmaceuticals) of €137 billion in 2004, China has become the world's fourth largest chemicals producer. Only in the U.S. (€415 billion), Japan (€185 billion) and Germany (€142 billion) were more chemicals produced. Ten years ago, China's share of global chemicals turnover was only 3.5%. In 2004, it had almost tripled, rising to over 9%.

International Trade

In 2004, the global total of chemicals exports was estimated at €756 billion. The EU-25 accounts for 60% of this trade, making it the biggest global player. By comparison, China's low share of global exports (2.5%) reflects its minnow status in the global chemicals business and to some extent its inability to fulfil the quality requirements of global customers. However, China's relatively low share of global exports is also explained by China's increasing industrial expansion, which fuels domestic demand for chemical inputs. China's already significant share of global imports already stands at almost 6%, with China's growth in imports rapidly outpacing its growth of exports in the last decade.

There are two main reasons for China's continued inability to fulfil its domestic demand. Firstly, chemicals consumption is rising enormously as a result of rapidly expanding industrial capacity, fuelled by double-digit economic growth. Secondly, the market is demanding increasingly high-quality products that China will not be able to produce in sufficient quantities in the foreseeable future.

Intra-Regional Trade

China's thirst for chemical inputs does not necessarily mean that China will become an attractive export destination for Europe. For commodity chemicals producers, whose logistics costs such as freight and tariffs can often account for up to 30% of total costs, the global chemicals industry has a distinctly regional character. Even between the world's three main manufacturing regions (U.S., Europe and Japan) only limited trade flows take place relative to overall output.

In 2003, only 10.6% of total output was shipped between these three regions. Accordingly, EU-25 chemical exports to China (including pharmaceuticals) only amounted to US-$5.9 billion or only 1.1% of total EU chemicals output, and only 7.6% of China's total chemicals imports. To fully tap into the potential of the Chinese market, European chemicals producers will therefore have to localise production within China. Not surprisingly, inter-regional trade is particularly limited for volume products, which are relatively expensive to transport.

Chemical companies in the rest of Asia are becoming increasingly dependent on sales to the Chinese market. About 50–80% of chemical exports from other Asian countries end up in China. As a result, China is the biggest driver of profitability for Asian chemical companies. Japan, South Korea, Singapore, Malaysia and Taiwan also contribute 80% of China's polyester imports. About 90% of China's styrene butadiene rubber imports came from Japan, South Korea, Russia and Taiwan.

Chinese Market Growth and Potential

Due to the importance of geographical proximity in the chemicals industry, multinational companies are increasingly shifting chemicals activities to China, following their main clients. This increase in demand from both foreign as well as local customer companies means that the market is estimated to grow 10% over the next decade, more than three times the growth rate of demand in the U.S. (3.5%) and Germany (3%). Despite increasing local production capacity from foreign as well as Chinese companies, BASF predicts that at least some of the increased demand will have to be made up from increased imports.

Chinese Market Segmentation

With basic chemicals accounting for 58% of the demand in the Chinese chemicals market, commodity chemicals are currently still the largest market segment in China with demand for fine chemicals (15%) and specialty chemicals (11%) trailing behind substantially in importance. However, market forecasts predicts that over the next five years, the importance of basic chemicals relative to specialty and fine chemicals will decline substantially (a drop from 58% in 2003 to a 40% share in 2010). Specialty chemicals in particular will grow in importance, almost doubling its current share (from 11% in 2003 up to 20% in 2010).

Commodity Chemicals

Despite the aforementioned relative decline in the importance of commodity chemicals vis-à-vis other chemicals, commodity chemicals will continue to be by far the biggest market in China.

The Chinese chemical industry passed a landmark in 2005 with the start-up of three multi-billion dollar petrochemical joint ventures. BP and BASF commissioned separate joint ventures with Sinopec in Shanghai and Nanjing respectively, becoming the first foreign invested entities in China to produce olefins and derivatives. A third petrochemical joint venture, involving Shell Chemical and China National Offshore Oil Corp. (CNOOC), was also started in 2005. These three crackers added a combined 2.3 million mt/y of ethylene capacity, increasing China's total by 37%, to 8.5 million mt/y.

From 2004 till 2010, the Chinese domestic production of ethylene is forecasted to grow with a compound growth rate of 19%, versus a growth rate in domestic ethylene consumption of almost 11%. Nevertheless, the required actual imports into China will continue to grow, albeit at a more modest level. By 2010, BASF forecasts China will import some 12.5 million t of ethylene and equivalents, up from 9.9 million in 2004. At the same time, Chinese ethylene capacity is forecast by BASF to increase to 16 million t by 2010.

Similarly, most products in the petrochemical chain are likely to remain in domestic deficit well past 2010.

Specialty And Consumer Chemicals

The recent years of chemical market growth in China have been dominated by meeting the demand for basic chemicals. Many multi-national customers are investing billions to build their own production plants in China. Chemical companies will increasingly have to offer these customers higher-value products from further down the value chain. Major specialty chemicals sub-segments are expected to double their volume vis-à-vis other chemicals segments by 2010. These include special chemicals needed for a large number of products like coatings, additives, adhesives, flavours, scents and pharmaceutical feedstock.

Fine Chemicals

The Chinese fine chemicals industry has an estimated output worth around US-$12 billion, already representing a significant part of the world's fine chemicals industry. Total market volume is about US-$ 120 million. In 2004, about 60% of this market was devoted to active pharmaceutical ingredients (APIs). In 2004, Chinese companies already accounted for 13.1% of global market share in the merchant market for APIs, compared to a 44% share for European companies. Chinese companies are especially strong in the field of generic APIs. In this segment, Chinese producers account for 30% of merchant trade, while European companies at 36% account for only a slightly higher proportion of total world trade. China is also the world's largest producer of dyes, the second-largest producer of pesticides and the second-largest producer of composite feedstuffs.

The Chinese fine chemicals industry has been growing at an annual rate of more than 10% over the past 10 years. Due to China's generally strong economic growth, production relocation of multinational chemical companies, and the increasing trend among downstream manufacturers like the pharmaceuticals and agrochemicals industries to source from China, it is likely that this growth rate will be maintained for the next five years.

▶ ec.europa.eu

The EU And China

Five years after its accession to WTO, China is nearing the end of the transition for implementing its accession commitments. China and the EU have called for opening negotiations on a new EU-China Framework Agreement that would entail new commitments on trade and investment.

The European Commission is currently preparing a new Communication to the Council on a strategy for EU trade and investment in China. It will assess the future challenges in the EU's relations with China and outline EU policies to maximise the opportunities offered to EU business by the economic rise of China. The main purpose is the identification of the opportunities offered by the Chinese market in the next five years as well as of the market access obstacles faced by EU industrial and service operators and the main actions required to foster competitiveness and market access in these areas. A consortium of two consulting agencies, Emerging Markets Group (EMG) and Development Solutions Europe has implemented the study.

This article is an excerpt of the studies' section devoted to the chemicals sector. The full report – which covers additional items such market obstacles, trade barriers and a SWOT analysis for the European and Chinese chemical industry as well as recommendations regarding actions to maintain/develop EU Chemical Industry competitiveness will be published soon by the DG trade.

The author of this article, Dr. Klaus Griesar (Senior Manager Business Development Chemicals at Merck KGaA and President elect of the German Association for Chemistry & Economics), was the key expert contracted by the consortium EMG and Development Solutions to prepare the studies on chemicals and pharmaceuticals under the project on EU China Trade and Investment relations. The views expressed herein are those of the author and do not represent any official view of the Commission.

PORTFOLIO

Linde Group Acquires Russian Technical Gases Supplier The Linde Group has acquired the Russian company SaKiZ (ZAO Samarsky Oxygen Plant), a regional supplier of technical gases, located in the south Russian city of Samara. Terms of the transaction were not disclosed. The company employs more than 200 people and produces and sells air gases (nitrogen, oxygen, carbon dioxide, helium and argon), both in liquefied and gaseous form.

▶ www.linde.com

3M Acquires Acolyte Biomedica 3M has acquired Acolyte Biomedica. Acolyte Biomedica brings to 3M's infection prevention platform a pipeline of rapid culture-based screening tests for microbes, such as MRSA and vancomycin-resistant enterococcus (VRE), that simplify the diagnostic process by automating traditional culture methodology resulting in reliable confirmed "negatives" in hours rather than days.

According to the company, the addition of Acolyte Biomedica allows 3M to expand more quickly into the emerging market of infection prevention diagnostics, especially in Europe where Acolyte Biomedica has commercialized product for MRSA.

▶ www.3m.com

▶ www.acolytebiomedica.com

Sulzer Interested in Acquisition of Weir Pump Lines Sulzer announced that it is considering the acquisition of selected pump lines of the Weir Group PLC, Glasgow, Scotland. These belong to Weir Pumps, a business unit within Weir Group's Clear Liquid division. The pump lines generate annual sales of around CHF170 million.

The business unit Weir Pumps develops and manufactures its pump lines and associated spare parts in Scotland. The main segments served are oil and gas as well as power generation. Sulzer Pumps intends to broaden its product portfolio with these pump lines. In the event of successful negotiations, the acquisition will be signed in the first quarter of 2007 and closed in the second quarter of this year subject to regulatory approval.

▶ www.sulzer.com

▶ www.weirclearliquid.com

Sigma-Aldrich Acquires Epichem Group Sigma-Aldrich Corporation has acquired all of the outstanding shares of Epichem Group Limited of Bromborough, UK, to expand its SAFC Hitech business offering. The purchase price of US-$60 million was paid in cash. The acquisition of Epichem's US-$40 million in annual revenues is expected to help Sigma-Aldrich achieve its growth goals in key high technology markets over the next several years and will be neutral to mildly accretive to earnings in 2007, with no significant initial charges.

Barry Leese, managing director of Epichem, its majority equity holder and one of the founders of the company has been appointed president of the SAFC Hitech business segment. Epichem management and employees will remain in place.

▶ www.sigmaaldrich.com

▶ www.epichem.com

Rockwell Automation Acquires ProsCon Holdings Rockwell Automation has acquired ProsCon Holdings, a privately held engineering firm offering proven and technically unique design solutions to the process industry. Areas of expertise include process technology, control systems and information technology. ProsCon also provides modular solutions as an innovative and cost-effective approach delivering faster implementation of new facilities as well as retrofits for existing plants.

▶ www.rockwellautomation.com

BASF Venture Capital invests in U.S. Fuel Cell Company BASF Venture Capital is investing in UltraCell Corporation (U.S.). UltraCell develops and manufactures complete micro fuel cell systems for portable devices such as satellite phones, radios and laptop computers, which require long runtimes away from the power grid.

UltraCell has raised US-$10.3 million in its Series C financing round, of which BASF Venture Capital has provided US-$3 million. UltraCell will use proceeds from the financing round to ramp up production, expand worldwide sales and marketing, and for the development of next-generation products. UltraCell was founded in 2002 and has currently 45 employees. Its fuel cell system uses a pioneering micro reformer, which generates hydrogen from methanol. This reformed methanol system can yield, with the same cell size, twice the power of comparable lithium batteries, according to the company.

▶ www.basf-fb.de

▶ www.ultracellpower.com

Lonza Closes Acquisition of Cambrex Bio Businesses Lonza has completed the acquisition of the Research Bioproducts business and the Microbial Biopharmaceutical business of the U.S. company Cambrex. The deal was announced in October; integration of the two companies began in February. The Microbial Biopharmaceuticals business will be integrated into the existing Lonza Biopharmaceuticals business sector and supports Lonza's microbial biopharmaceutical growth. The Research Bioproducts will be positioned as a standalone business unit and renamed as Lonza Bioscience. Its leading position in cell-based research, endotoxin detection and cell therapy manufacturing is highly complementary to Lonza's Biopharmaceuticals business.

▶ www.lonza.com

Chemetall Acquires Wirral Fospray Business Chemetall PLC has acquired of the chemical division business from Wirral Fospray Limited, Hawarden, North Wales. The business will be integrated into Chemetall and shall strengthen Chemetall's position in metal surface treatments, especially in the aluminium finishing market and particularly in the UK, Ireland and the Middle East.

▶ www.chemetall.co.uk

▶ www.wirralfospray.com

Lyondell, Cristal Sign Agreement Lyondell Chemical Company and the National Titanium Dioxide Company (Cristal) have signed an agreement for a proposed sale by Lyondell of its worldwide inorganic chemicals business to Cristal in a transaction valued at approximately US-$1.2 billion, including the assumption of certain liabilities directly related to the business. Cristal is a global producer of titanium dioxide exporting to more than 70 countries. Lyondell stated that the transaction would include a cash payment of $1.05 billion, and estimated its after-tax proceeds at US-$975 million.

▶ www.lyondell.com

DSM Profit Up 6%


Peter Elverding

DSM reported that its operating profit from continuing operations for the full year 2006 was €835 million, up €48 million (6%) from 2005. Net profit was €547 million, up €20 million (4%). The net profit included a negative contribution of €4 million from exceptional items (€ 36 million negative in 2005). At €186 million, the operating profit from continuing operations for the fourth quarter of 2006 was €6 million (3%) higher than in the fourth quarter of 2005. Net profit amounted to €89 million, down 21% from the fourth quarter of 2005 (€112 million). Peter Elverding, chairman of the DSM managing board, said, "In 2007, I expect continued good volume growth, but some attractive contracts related to the acquisition in 2003 of Roche's Vitamins division – now DSM Nutritional Products – will come to an end."

"In 2007, I expect continued good volume growth."

▶ www.dsm.com

Pfizer Joins Accelrys Consortium

Accelrys, a provider of enterprise cheminformatics software, announced the addition of Pfizer to the Accelrys Enterprise Cheminformatics Consortium. The Consortium will be a collaborative software development project led by Accelrys in partnership with a group of commercial member organisations. Its goal is to prioritise, design, and develop enterprise cheminformatics software components and services to allow members to implement industry-leading cheminformatics systems. The Consortium commenced in early 2007 and will have a three year duration.

This latest consortium initiative in the enterprise cheminformatics area will be an extension of the Accelrys consortium model, which in previous consortia has delivered important scientific advancements in areas such as catalysis, combinatorial chemistry and nanotechnology. The consortium model is a customer-centric approach to better understand development needs. Consortium members collaborate in directing research and development activities that will result in products and services that solve important business issues and, accordingly, members will secure a period of exclusivity on the resulting consortium deliverables.

▶ www.accelrys.com

▶ www.pfizer.com

Schwarz Pharma Sales Up

Schwarz Pharma Group announced that 2006 sales reached €1 billion, up +1% from the previous year. Operating profit amounted to €49.5 million after a loss of €17million in 2005. Net profit was also up, reaching €12.4 million after a loss of €54.1 million in 2005. The company said it expects a sales volume of €800–850 million and a positive net result in 2007. For fiscal year 2007, the company said it expected that innovative drugs would not be able to offset sales declines, which they attributed to the downtrend in U.S. business. Despite ongoing high expenses, including expenses for restructuring the U.S. and German business, the company again seeks to achieve a positive net result. In order to do this, the company said it is considering product disposals and/ or partnerships.

▶ www.schwarzpharma.com

NPIL Pharma to Leverage Strengths

NPIL Pharma has announced a new programme to leverage its global strengths in formulation services to further advance its position in custom development and manufacturing. Across its early and late phase manufacturing formulation services in the UK and India, NPIL has invested approximately US-$50 million over the past three years and plans a similar investment over 2007–09. The programme includes a new sterile supplies pilot plant due on stream in Mumbai in the fourth quarter of this year.

By integrating its capabilities and assets in India and the UK, NPIL Pharma's formulations package now includes API pre-formulation services, formulation development for clinical trial manufacturing and scale-up to commercial manufacture in finished dosage forms – including injectables, solutions, capsules and tablets.

The company will launch its fully integrated formulation capabilities to both existing and new small/ virtual and large pharma customers in Europe and North America, via a series of roadshows scheduled to begin in the second quarter of this year.

▶ www.npilpharma.com

Linde Sells Mexican Business to Praxair

The Linde Group has sold its industrial and medical gases business in Mexico to Praxair. Linde's Mexican business operates under the name of the subsidiary AGA S.A. de C.V. Terms of the transaction were not disclosed. The transaction excludes the Mexican assets of the the BOC Group, which Linde acquired as part of its worldwide acquisition of BOC. The transaction has been approved by Mexico's Federal Competition Commission and is expected to close in a few weeks.

The sale of Linde's Mexican business is part of a mutual agreement between Linde and Praxair under which Linde had acquired the Turkey based industrial gases producer Karbogaz A.S. in July 2006. Karbogaz was formerly a joint venture company between Ismail Aytemiz of Istanbul and Praxair.

AGA S.A. de C.V. was acquired by Linde in 1999 as part of its acquisition of Swedish gases producer AGA AB. The business operates throughout Mexico, generating sales of approximately €61 million in fiscal 2006.

▶ www.linde.com

▶ www.praxair.com

▶ www.aga.com.mx

Rhodia: Sale of Silicones Business


Jean-Pierre Clamadieu

Rhodia said it has finalised of the sale of its silicones business to China National BlueStar Corporation. This business generated sales of €417 million in 2005 and has a total of 1,200 employees. It is mainly situated in Europe, with major production sites at Saint-Fons and Roussillon, in France.

"The start of 2007 gives me full confidence that the group will continue on its route of profitable growth."

In addition, the group sold Rhodia Organics' Sulfuric Products activity to Adisseo, subsidiary of China National BlueStar Corporation. This business generated sales of €47 million in 2005 and has a total of 67 employees. It is based at Les Roches de Condrieu, in France.

Rhodia CEO Jean-Pierre Clamadieu said, "This divestment constitutes the last step of the plan we launched in 2003 to restore profitability and to focus the group's portfolio on businesses in which we hold strong leadership positions. This will contribute further to the group's debt reduction."

Commenting on the operating environment: "Despite a raw material and energy price environment that remains volatile, the start of 2007 gives me full confidence that the group will continue on its route of profitable growth."

▶ www.rhodia.com

Sartorius Combines Division

Sartorius, a worldwide laboratory and process equipment provider, signed a binding agreement with the biopharmaceutical supplier Stedim Biosystems and its major shareholders. Under the terms of this agreement, Sartorius acquires a substantial stake in Stedim and combines its Biotechnology Division with Stedim's business. Sartorius will pay €43 per share. Upon completion of this transaction, Sartorius will become Stedim's majority owner controlling the combined company. The overall transaction, which is subject to approval by Stedim's shareholders and to regulatory clearance, is expected to be completed in summer 2007. The combined company will be named Sartorius Stedim Biotech S.A..

▶ www.sartorius.com

▶ www.stedim.com

Sun Chemical Creates New Division

Sun Chemical has created a single business division to manage the sourcing, sales, marketing and distribution of print-associated consumables products across Europe. The Consumables Division has been formed to serve the growing market trend of consolidated purchasing. According to the company, consumables products purchased from Sun Chemical will be fully supported by its sales and technical service teams, and customers shall also benefit from the company's extensive supply and distribution network to ensure quick and easy access to products.

▶ www.sunchemical.com

Borealis, Piramidal Enter Alliance

Borealis and Piramidal Termoplásticos LTDA have entered a strategic alliance regarding the distribution of Borealis' Polypropylene compounds, further supporting customers by providing full after sales care.

Located close to São Paulo, Brazil, Piramidal will work as an extension to Borealis in the marketplace to provide them with valuable technical support and better serve the needs of customers through its proven efficiency in logistics distribution and after sales care. The distribution operation that started in January is expected from both companies to bring a significant improvement on overall results.

▶ www.borealisgroup.com

▶ www.piramidal.com.br

Huntsman, NMG: Joint Venture

Huntsman Corporation and NMG announced the creation of a new, Russia-based joint venture, ZAO Huntsman – NMG, to manufacture and sell polyurethane systems to the adhesives, coatings, elastomers and insulation markets in Russia and other areas in the former Soviet Union. The financial terms were not disclosed. Huntsman NMG will be based at NMG's existing headquarters in Obninsk, close to Moscow, and will be managed by a General Director Sergey Ovcharov. The company employs over 200 employees and has manufacturing and distribution facilities in Obninsk and a network of branch offices across the region, including in Belarus and the Ukraine.

▶ www.hunstman.com

Essar, Eastman: Joint Oxo Project

Essar Chemicals – part of India's Essar Group, and Eastman Chemical Company have announced the signing of a memorandum of understanding and the completion of a joint feasibility study regarding potential opportunities for the production of oxo and oxo derivatives for the domestic market in India.

The feasibility study includes plans for a 150,000 t/y oxo aldehyde plant and its derivatives. Oxo and oxo derivatives are part of Eastman's performance chemicals and intermediates segment. These intermediates are used to manufacture a variety of end-use products such as coatings and paints, solvents and plasticizers.

▶ www.eastman.com

Bayer Healthcare Boosts Presence

Bayer Healthcare has taken over the marketing and distribution network of its partner Pharmonyx in Russia, Belarus, the Ukraine and Kazakhstan. Pharmonyx has been responsible for marketing and distributing BHC's products in these countries since 1999. Both parties have agreed to refrain from commenting on the financial details of the takeover. This new organisational alignment shall strengthen Bayer HealthCare's presence in Eastern Europe and provide a boost to the expansion plans of its Consumer Care, Bayer Schering Pharma and Diabetes Care divisions. 219 staff will be integrated into the Bayer Healthcare organization under the terms of the transaction. The majority of the new employees will continue to provide sales and marketing support for medical practices and pharmacies in the future.

▶ www.bayerhealthcare.com

▶ www.pharmonyx.ru

chemanager@gitverlag.com

Innovation Keeps Brands Alive

Henkel's Strategy Builds Consumer Trust

Continued Page 1

portfolio – you actually have brands manufactured by Henkel competing with one another. How do you distinguish these from one another?

U. Lehner: The success of a multi-brand strategy is critically dependent on discrete brand positioning aligned as far as possible to a zero overlap. You need a brand mix to appeal to different user groups; one single brand cannot cover the full range of consumer preferences. Differentiation criteria in terms of positioning may take the form of the performance promise, pricing, convenience factors or communicative appeal. The target group is clearly defined for each of our detergent brands, for example.

Do consumers really appreciate the differences?

U. Lehner: For our premium brand Persil, we resolutely focus on providing top quality and state-of-the-art technology. The detergent Weisser Riese came onto the market in 1966 to offer the fast-growing target group of young families a powerful and high-yield detergent for many different types of stains. Spee, on the other hand, was the leading detergent in East Germany, produced in the former Henkel plant in Genthin near Magdeburg. After reunification, Henkel acquired the brand rights and effectively positioned the product with the slogan "The smart way to wash." Spee offers good basic quality at an economical price. Product differentiation is assisted by different line additions and complementary products. By pursuing a successful multi-brand strategy in this manner, we are able to increase our total market share.

To what extent did the corporate brand strategy, launched in 2002, make an additional contribution to the success of your product brands and the company?

U. Lehner: Behind our claim "A Brand like a Friend" is a long-term orientation through which we wish to communicate, both internally and externally, our self-perception, our attitude and – on an international level – our strengths. There are various markets of importance to Henkel, of which the sales market remains our most important.

Persil was launched as Germany's first self-acting laundry detergent in 1907 and celebrates its 100th birthday this year.

The name Henkel as a corporate brand is being constantly reinforced in all its facets. Our vision expresses our desire to make people's lives easier, better and more beautiful with brands and technologies. It's a philosophy that can be traced back to company founder Fritz Henkel, who, through Persil, so fundamentally revolutionised the laundry chore. We endeavour to fulfil this commitment by responding every day and around the world to the differing customer requirements that prevail. The corporate brand as an umbrella brand also helps to support our individual product brands. It is particularly useful when we launch new product brands, for instance, because the Henkel corporate brand has an immediate positive effect, imparting to the new brand an "advance" in consumer confidence. Wherever of benefit to a product brand, a conspicuous reference is made to Henkel as the manufacturer – both on the packaging and in the associated advertising. This reference is made in the form of the standardsed quality logo "Quality from Henkel" in the relevant language. The Henkel brand is thus communicated millions of times over every day – on all continents and in around 125 countries around the world.

Henkel's three strategic areas of competence involve a large number of product brands, with more being added all the time. How do you keep control of such a sizable brands portfolio?

U. Lehner: Henkel maintains around 750 brands, which we market to our customers globally, regionally or locally as appropriate. In the case of our industrial business, the world market leader in adhesives, sealants and surface treatment technologies for engineering and manufacturing applications, we have to operate on a global scale because our industrial customers too are globally structured. When it comes to adapting and developing our brand portfolio, our main concern lies in ensuring the ongoing alignment of products within a brand family to the newly identified customer requirements. It is not our goal to establish new brands at any price.

Can you also see any disadvantages in your industry that could arise from brand building or a brand policy?

U. Lehner: The extremely positive experiences we had with the launch of the corporate brand clearly underscored the advantages of systematic brand building and a brand policy. What is critical for success in all of this is that a brand should remain dynamic. We are constantly optimising our brands and their performance and adapting them to our customers' needs. This is the only way that brands and, ultimately, the entire company can remain successful in the long term. The one imperative for us is that every brand must be at the top of the quality scale of its particular class.

Innovative strength is indispensable to acquiring leading positions in the global market, and research naturally plays a key role in this respect. Given this fact, how high is the Henkel research budget in relation to sales?

U. Lehner: In 2005, Henkel invested a total of €324 million in R&D, representing an increase of more than 19% compared to the previous year. Overall, our research expenditures constitute around 3% of sales. The innovative strength of a company does not, however, hinge solely on its research budget. At Henkel, innovations played a predominant role in 2006 and will continue to do so in 2007. We have adopted a highly inclusive approach in this regard, in the awareness that an innovative company always draws its creative strength from three root sources: product innovation, customer and brand innovation, and process and organisational innovation.

According to Henkel, the average number of employees working in research, product development and applications engineering in 2005 was approximately 2,800, with the majority operating in Germany, France, Ireland, Japan and the U.S.

In instituting this innovation initiative, our goal is to bring about a lasting change in the attitude and awareness of all our employees. Our specific intermediate goal at the product level is for Henkel to be generating one third of our sales through new products – meaning products that are less than three years old – by 2008.

> *"One single brand cannot cover the full range of consumer preferences."*

Our innovation initiative has set us on the road to ensuring a sustained and even more systematic orientation of the company toward innovations, in order to further enhance our organic growth in the long term.

What is Henkel's formula for success?

U. Lehner: Our brands portfolio comprises a mix of well-known and flourishing local brands and long-established global brands. And it is this combination that makes us so successful. At Harvard, this "global" strategy is taught as the "Henkel Business Case." The most important requirement is to have strong brands. If these are local in scope and nature, then this is because local customers want them. Our business development shows that we are successful with and within all our business sectors. We want to remain so in the future and will therefore pursue expansion throughout our full range of operations.

▶ www.henkel.com

Translation of an interview in German, originally published in issue 1/2007 of CHEManager.

Hovione Receives Certifications

Hovione's Loures and Macau sites have been presented with Good Manufacturing Practice (GMP) Certificates issued by an EU Medicines Agency evidencing for a specified list of 20 APIs that they operate in compliance with GMP as defined by ICHQ7a – the certificates are valid for three years.

The Loures site has received EU GMP certificate for bulk formulated products and for human clinical trials for oral and inhalation administration and has also just been accredited by the Japanese Ministry of Health and Welfare as a foreign manufacturer regarding four drug substances.

The environmental management system at both Loures and Macau sites are now certified under ISO14000. The company's New Jersey site has been advised by the U.S. Department of Labour's Occupational Safety and Health Administration (OSHA) that it will be invited to join the Voluntary Protection Programs in official recognition of the outstanding efforts in achieving an exemplary occupational safety and health performance.

> *"Compliance and the environment are very much part of the agenda."*

"The recent flood of certifications that Hovione sites have received recently evidence a high level of compliance, and this is good news for our customers and for patients. It also sends a strong message that compliance and the environment are very much part of the agenda." said Guy Villax, Hovione's CEO.

▶ www.hovione.com

Univar Czech Acquires Ekozym Business

Univar's subsidiary Univar Czech in Prague has acquired the enzymes distribution business of Ekozym based in Vizovice, Czech Republic.This highly specialised business is based on the distribution of products from Novozymes A/S, a producer of enzymes. Univar said the move was another step towards the company's ambitions to be a key player in Central and Eastern Europe. It will further expand Univar's activities serving the detergent, brewing, beverage alcohol and food markets in the Czech Republic, as well as strengthen the relationship with Novozymes.

▶ www.univareurope.com
▶ www.novozymes.com
▶ www.ekozym.cz

‘Every Last Bit’

UOP’s New Business Unit Sets Out to Develop Renewable Energy Technologies

Continued Page 1

J. Holmgren: UOP has been around since 1914. We are the largest technology provider to the refining and petrochemicals sector. Rather than building units or producing products, we license the technology that enables refiners to convert petroleum feedstocks into gasoline or diesel or chemicals, and biofeedstock is the first renewable feedstock that we’ve started to work with.

Do you see any competition to UOP as far as the technology you’re developing is concerned?

There are many biodiesel and biofuel technology suppliers globally, and our technology competes directly both. We’re not going after diesel substitutes like biodiesel or a gasoline substitute like ethanol. Instead, we’re making diesel, jet fuel and gasoline from biofeedstocks.

The entire automotive and distribution infrastructure has to be modified to use these fuel additives. That is why we are really targeting fuels that are well-aligned with existing infrastructure.

In what industries are you finding a demand for green diesel?

J. Holmgren: This was really designed as a refinery process, but we have found that large agriculture producers are also quite interested in using this process to convert their vegetable oils to diesel. There are multiple customers and multiple market segments.

UOP teamed with Pacific Northwest National Laboratory – also known as PNNL – in 2004 to deliver technology for converting glycerol, a by-product from converting vegetable oil to biodiesel, to higher value propylene glycol. What can you tell us about other by-products that come from such conversions?

J. Holmgren: Methanol is added to vegetable oil in the process of making biodiesel. This results in not only biodiesel, but glycerol as well. In our process, hydrogen is added to the vegetable oil, and the byproduct is propane. There is no undesirable by-product. We figured that the increased manufacture of biodiesel would create a glycerol glut. That is we are working on a technology for the efficient conversion of glycerol to propylene glycol, which has a much higher value. We are in the last stages of the development process and commercialisation, and we will be launching that product in the middle of next year. Hopefully, that will help the biodiesel industry make their entire process more economic. However, for now, the first thing we are launching is our green diesel.

And do you have any plans for the propane?

J. Holmgren: Propane is a valuable product. If nothing else, it can be used as fuel. One of the things we are looking to do in places where hydrogen is expensive is to make the hydrogen necessary for the green diesel process from the propane co-product. If we can do this effectively, we would have a fully renewable diesel fuel since the hydrogen used to convert the vegetable oil to green diesel would also come from the vegetable oil. That integrated process is something we are looking at. However, propane has a higher value right now in most settings than hydrogen, so those plans are a little farther out in the future.

Where do you see the trend going with biofuels in the next 10 years?

J. Holmgren: The future is one of energy and feedstock diversity. Biofuels are going to play an increasingly important role as we diversify the feedstocks we use to generate fuels and energy. Many people talk about biorefineries as being the “refinery of the future,” I personally do not think of it that way. I see the refineries of the future as being flex-refineries with flex-feedstocks. I see petroleum, coal, solar, as well as biofeedstocks playing a key role in the future energy mix and in the future of chemicals.

In Europe, starch is extracted from potatoes and from corn in the U.S. Which raw materials do you use?

J. Holmgren: Our process uses vegetable oils, but it can also use fats and greases. It is not sensitive to the free fatty acid content like biodiesel is. Therefore, a palm oil could be processed just as easily as a rapeseed or soy. As far as we can tell, this is completely versatile as far as the type of feedstock is concerned. It can use any vegetable oil in any region of the world.

If we look at the use of ethanol in Brazil, it becomes clear why the price of sugar is often dependent on the price of oil. What will it take for biofuels to become independent from the oil prices?

J. Holmgren: The price for vegetable oil has also really gone up since people started using them for fuels. What we are looking at for the future is using lignocellulosic waste as a biomass feedstock. For example, in the U.S., there is a lot of forest residue that is left behind after the forest is harvested for pulp and paper mills etc. The number can be as high as 50 % in some cases. That waste has a lot of lignin, which we can convert to gasoline.

Whatever the waste, we are looking at approaches to convert it to biofuels. That way, we minimize competition with the food and water supply. Also, you do not have the variable pricing that links to other factors. People are also looking to convert cellulosic waste to ethanol. It is the same story: to create a sustainable biofuels infrastructure we have to use waste biomass.

I cannot stress the importance of cellulosic waste enough. You just cannot get there from here without harnessing the cellulose – not the sugars, starches, vegetable oils. That is the path to get the sustainable infrastructure.

Will a bio refinery someday be comparable to an oil refinery as far as the diversity of products created is concerned?

J. Holmgren: There’s no question: The only way to make these processes economical is to use every last bit. When you bring in your feedstock, you are going to have to use the vegetable oil, the sugars, the cellulose, the lignin and you are also going to have to create a slate of products so that you can make the whole economics work in the future.

What potential do you see for biomass, not only as fuel, but also as raw materials in the chemical industry?

J. Holmgren: As far as a renewable source, biomass is the only source of carbon. In terms of making chemicals, if we are not using fossil resources, we are going to have to use biomass. There is simply no other way. Therefore, biomass will play an important role in the future in making chemicals. In contrast, fuels and energy could come from diverse sources, which include fossil resources. Fossil fuels are here to stay. They will be used for at least the next 50 years.

What are the implications of such technology for the chemical industry?

J. Holmgren: The more the chemical industry can diversify its feedstock supply, the less it will be dependent on fluctuations. Diversified feedstocks will also make different products more accessible.

In his State of the Union address in January, U.S. President George W. Bush came out and said that the U.S. is too dependent on oil. What does this change of heart mean for UOP?

J. Holmgren: Europe has been leading the way in terms of biofuels. Now the U.S. is affirming the importance of biofuels and aligning itself with the rest of the world, which means diversifying feedstocks. As that becomes a more global imperative, it’s certainly better for this part of our business.

▶ www.uop.com

Biofuels Today And Tomorrow

The Energy of the Future Proceeds from Plants

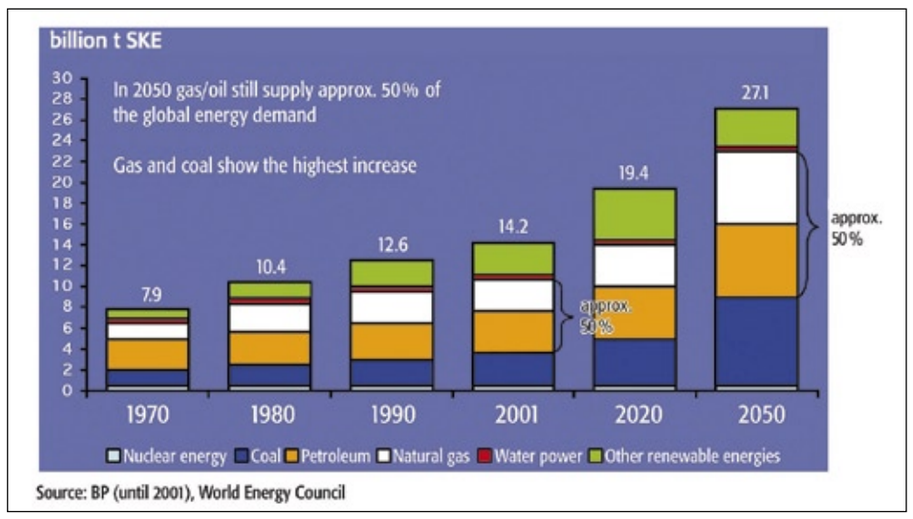
Worldwide demand for energy is growing constantly. Energy consumption is bound to increase appreciably in the coming years, mainly in densely populated countries like China, India and on the continent of Africa. Estimates from the most varied sources predict doubling of the world energy consumption up to the year 2050. In order to enable the populous countries to achieve a standard of living similar to the industrialised nations, all resources available on the globe have to be utilised. The demand for energy cannot be met by petroleum and natural gas alone; renewable resources have to be exploited as well. By 2050, while only around 50 % of the energy will still originate from petroleum and natural gas, the balance will proceed from coal and, increasingly, from biomass.

In 2005, biomass only covered 10–15 % corresponding to 45±10 Exajoule (EJ) of the global energy requirement of 420 EJ. At the same time, 3.8 billion t of crude oil were processed. Although emission levels of noxious substances are being curbed continuously, the amount of CO_2 released to the atmosphere will increase steadily unless more effective technologies or renewable resources are applied. The Kyoto Protocol and the associated requirement to cut CO_2 emissions drastically will mainly take effect in Europe. This European trend will also prompt other countries like the U.S., Brazil and China to issue the respective laws and to invest in technologies for the production of biofuels.

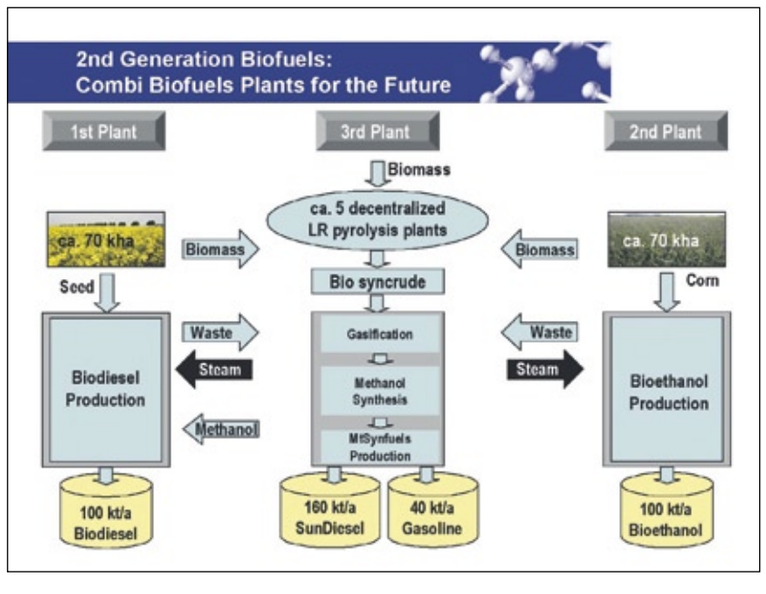
First Generation Biofuels

Biodiesel and bioethanol, the first-generation biofuels, are produced from oil fruit and plants supplying starch. In 2005, 125 million t of fats and oils were produced, of which around 90 % was consumed in the food industry. These figures illustrate that the use of biodiesel and bioethanol only constitutes a first step in solving the world energy problem. Experts estimate that by the year 2010, 14–15 t of the mentioned two fuels will be added to fossil fuels in Europe. The situation is much different in Brazil. There, more than 50 % of the transport fuels is produced from sugar cane. The U.S., too, is increasingly concentrating on ethanol. Meanwhile more than 10 million t/y are being produced there. For comparison: In 2005, the world output of bioethanol amounted to about 40 million t.

Many countries are in the process of considering existent and future technologies for producing fuels on the basis of renewable resources. The Frankfurt-based plant engineering contractor Lurgi has raised its biodiesel process to a world standard, based on its fats and oils technologies that have been known for decades. In 2005, about 50 % of the biodiesel produced worldwide originated from plants using the process of that company. This trend is bound to intensify up to the year 2010. The plant sizes will increase from, initially, between 10,000 and 40,000 up to between 200,000 and 500,000 t/y. Such plant sizes will become viable as a result of the ongoing development and optimisation of the plant concepts, modularisation of plant components and the processing of the most diverse vegetable oils.



Source: BP (until 2001), World Energy Council



Experts anticipate that by the year 2010, bioethanol plants will be built in Europe that will attain the same size as those for biodiesel. In this sector, Lurgi is benefiting from its experience with the most varied raw materials like sugar, cereals, corn and cassava in the U.S. and in Europe. In the field of bioethanol, the trend is in the direction of distinctly higher plant capacities. Initially, 50,000 t were produced, but meanwhile the world standard plant sizes yield outputs of 100,000 to 300,000 t/y of bioethanol.

Biofuels of the Second Generation

In spite of the enormous investment efforts made in the meantime, fuels like biodiesel and bioethanol based on seeds and fruits of plants alone are not capable of solving the CO_2 problem and meeting the growing energy demand. For this purpose, biofuels of the second generation are needed which are made from feedstock based on the whole plants and biomass and which, in the opinion of experts, could cover one third of the world energy demand. This is the reason why worldwide more and more research projects are being launched for the purpose of developing biomass-based processes to commercial maturity.

In order to utilise biomass, this material must first be compressed to achieve high energy density and to convert it to synthesis gas, a mixture of CO, H_2, CO_2 and N_2. Independent of the raw material processed, the various synthesis gas production technologies are playing a key role in this context. The most varied biomass processing technologies are being developed worldwide. Two processes have turned out to be especially successful: In the first of these, previously pelletized biomass is directly gasified at low pressure, the resulting syngas being purified and submitted to a Fischer-Tropsch synthesis reaction.

The second process is preferred by Lurgi and is being developed to commercial maturity in cooperation with the Large-scale Research Centre Karlsruhe. In decentralised units, biomass is converted to bio crude oil, which can be transported and stored. The LR technology, which has been tried and tested on a commercial scale for many years, is applied to this end. This is a flash pyrolysis process in which the biomass is converted in a double-screw reactor to pyrolysis oil, gas and coke within seconds.

The stabilised bio crude oil can subsequently be transformed to syngas in an entrained flow gasifier, for example. The gas is purified by means of proven commercial-scale processes like Rectisol, a method of converting carbon monoxide to hydrogen in order to adjust the right syngas ratio, followed by a synthesis reaction to obtain petrochemicals or fuels. For the production of petrochemicals, methanol synthesis is applied as key reaction.

> ***“Fuels like biodiesel and bioethanol based on seeds and fruits of plants alone are not capable of solving the CO_2 problem and meeting the growing energy demand.”***

This can most suitably be implemented according to the Lurgi MegaMethanol technology, which allows producing up to 6,500 t of methanol per day. The methanol thus obtained can be processed further to propylene by applying the Lurgi Methanol-to-Propylene (MTP) technology. This technology is already being used in two commercial-scale plants in China where polypropylene is to be made from coal. However, methanol can also be used as such or employed in the Methanol-to-Synfuels process. When applying the MtSynfuels method, an intermediate stage will yield olefins which can be processed downstream to produce diesel, gasoline or lube oils.

> ***“The demand for energy cannot be met by petroleum and natural gas alone.”***

Alternatively, syngas may be converted to olefins or fuels by applying the Fischer-Tropsch process. Today, Lurgi offers this method in a technology joint venture with Statoil and PetroSA on the basis of natural gas.

As a further development of the existing biodiesel and bioethanol processes, Lurgi has devised the concept of combi-biofuel plants in order to allow the optimal utilisation of the plant fruits and whole plants. According to this concept, in the first two steps a biodiesel and a bioethanol plant are built and subsequently the residual biomass plus additional biomass are processed to bio crude oil. Options on this basis are the energetic exploitation or the downstream processing to syngas and synthetic fuels. From the synthesis gas, methanol may also be produced in an intermediate stage. This product can in turn be fed to the biodiesel process for obtaining 100 % green biodiesel.

Summing up, it should be highlighted that the first-generation biofuels like biodiesel and bioethanol have to be placed on a broader raw materials base in order to render them economically feasible. And, what is more, the by-products have to be utilised as well. However, this first generation is not capable of meeting the world fuel requirements or satisfying the demand for energy. For this purpose, it is essential to exploit the plant as a whole as raw material source.

Worldwide studies on biomass availability confirm the future development of biomass conversion to energy sources. Conservative assumptions predict that in the year 2030, one third of the world energy demand will be covered from biomass. For this to materialise, it is imperative to intensify research efforts in this field and build demonstration plants in the various regions. Furthermore, those development projects should be integrated with long-term programs and backed by reliable legislation.

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Structural Shift in EU Energy Portfolio

Further Biofuel Growth Expected at the Expense of Mineral Oil Refinery Capacities

Today, biofuels are being hyped in both the industry and in politics. Because of their sustainability, their use is seen as an environmentally sound solution to energy and emission problems, especially in Europe. Therefore, the share of biofuels in the European energy portfolio is increasing. Oil majors, traditionally offering mineral oils, as a consequence are expected to experience an increasing road fuel surplus, putting current mineral oil refining capacity utilisation at risk. German firms are observed to be leaders in making use of renewable energy and will profit most from the obvious shift in offering structure.

As EU targets for the percentage of biofuels are ambitious (5.75 % of all road fuels by 2010), these targets may not be met. But on the other hand, A.T. Kearney experts are positive that the EU's 2020 targets for bio fuels (20 % representing a total market size of up to 12 million t/y) can be even exceeded (given a continuation of governmental and EU subsidies or blending obligation respectively).

These expectations mean significant growth opportunities in biofuels for both mineral oil players and agro companies in almost all EU countries. Germany already represents approximately one third of the EU biofuel market. EU wide, some companies have taken on a pioneering role and are likely to influence product standards, such as EN 14214, which is an international standard that describes the minimum requirements for biodiesel that has been produced from rapeseed fuel stock.

Quality acceptance of palm-oil derived biofuels seems to be just a question of time; blending restrictions and quality issues raised by mineral oil players are about to be solved. Particularly the future mandatory blending of biofuels will accelerate the development of quality standards in the short-term, since rape seed as basis for biodiesel is expected to become short.

Second Generation Biofuels to Top Biodiesel

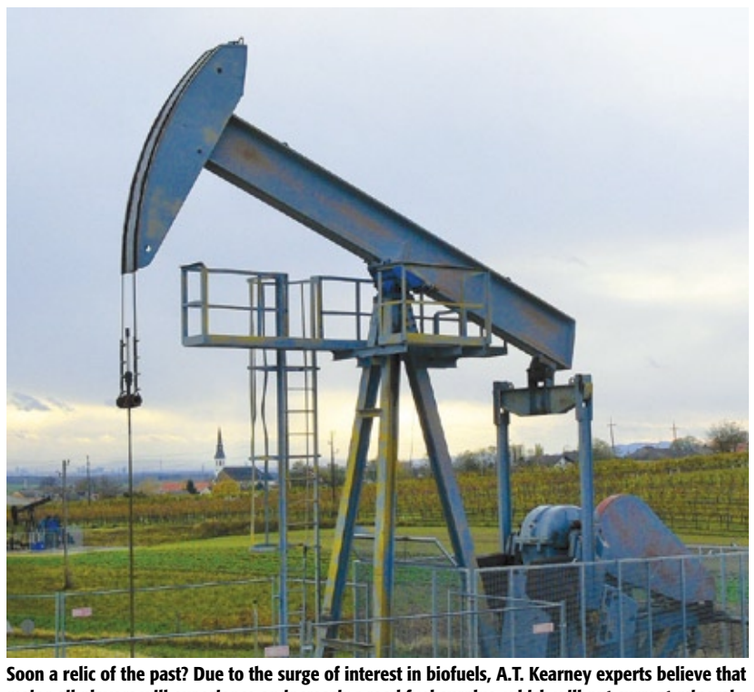
As biodiesel and ethanol are still the only commercialised biofuel products and both are based on edible substances like rape seed or sugar, there is a demand for second generation biofuel that do not contain edibles.

Biomass-to-liquid (BTL) is the alternative with major advantages, such as a very efficient energy balance and applicability in fuelling cars. These fuels are based on gasification of biomass and are produced in a complex thermo-chemical process. A.T. Kearney expects BTL to have the best chances of becoming the preferred future (bio)fuel, depending on how fast technology catches up. Pilot plants like Choren (a cooperation of Shell, DaimlerChrysler and Volkswagen) are working towards a fast solution aiming at the establishment of BTL/synthetic fuel as default biofuel.

The EU Biofuel Supply Chain to Focus Northwestern Europe

Given the expectation that the EU's position in favour of the application of biofuels increases, current mineral oil based supply chains need to change. As the EU is not self sufficient in generating the crops needed for biofuel production, increasing crop imports are predicted.

Therefore, Malaysia, Indonesia and also the Ukraine are expected to become major suppliers of relevant crops or oils to the EU. Given current cost advantages of crop supplies from abroad, it is also expected that volume imports further increase. Even though the EU would be interested in using as much owns crops as possible, increasing imports ask for new logistics facilities in the EU, in the countries of origin and also along the supply routes down to the refiner.



Soon a relic of the past? Due to the surge of interest in biofuels, A.T. Kearney experts believe that major oil players will experience an increasing road fuel surplus, which will put current mineral oil refining capacity utilisation at risk. Photo: Pixelquelle

Following this, production facilities have to be established at locations that are logistically suitable. As the dependence on crops asks for a particularly flexible supply chain, investments have to be made in line with these demands.

In the mid-term, the North Sea ports in Rotterdam or Wilhelmshaven as well as the French port of Marseille in the Western Mediterranean will remain as especially important discharging terminals and could profit from this development. As these ports have enormous capacities (together nearly 250 million t/y) it can be expected that a country such as Germany will satisfy its increasing crop demand in the future by more and more imports. By 2020, experts predict the development of a gap between first generation biofuel demand and production of about 15 million t/y that has to be bridged by imports.

Different Technologies in the New Biofuel Refining Market

This new market will also mean new technologies have to be developed and applied and biofuel refining capacities have to be built. Major investors in biodiesel are Diestel, Loders Crooklaan, Kuok Oils and Grains and Cargill. These agro companies are positioning themselves as pioneers.

Future investors might also be agro companies or crop importers. The agro companies are likely to diversify their offering portfolio to set the basis for future growth, such as with palm-oil derived biodiesel. Also, traditional oil majors will become more active in the biofuel market but focusing on technology-driven and complex second generation BTL technology, trying to become first movers in this market.

Leveraging these new technologies enables them to gain a competitive advantage against first generation biofuels and thereby aiming to secure their traditional mineral oil based core business, particularly downstream oil refining.

Traditional Mineral Oil Refineries to Suffer Market Shrinkage

Production capacities for traditional mineral oil refiners are expected to become obsolete to an extent of about one million bbl/d, which will represent about one fifth of the European refining capacity by 2020. This is resulting from the expected long-fall in automotive diesel which – in sharp contrast with today's diesel shortage situation – will occur in the long run.

As balancing of automotive diesel production versus the mineral oil production mix is seen as limited and would further increase the negative impact on motor gasoline/heating oil, adjustments in the supply and demand situation up to the point of refinery dismantling have to be considered.

This will lead to consolidation of the refinery landscape, where small-sized plants with limited leverage of economies of scale will be the first to be under discussion. Moreover, the value added produced will be decisive in the consolidation process. The less value added is produced (e.g. downstream petrochemical integration), the less chance for survival of the producer in the future. In Germany this can lead to closing down up to five traditional refineries with a focus on minerals oils. Even larger capacities are at risk e.g. in the Netherlands that today head up the refineries market in the EU.

Conclusion

As the share of renewables in the EU energy portfolio is increasing to meet environmentalists' demands, the oil majors will have to realign their core competences and their portfolio in accordance. Otherwise, they will suffer from expected increasing road fuel surpluses and, as a consequence, from a decrease in margin already expected. Countries with fewer traditional refinery capacities are likely to profit from the shift to renewable energies. Players that manage the changes actively will experience enormous growth in the decades to come.

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Diversa and Celunol Announce Merger

Diversa Corporation and Celunol have signed a definitive merger agreement to create the first company. within the cellulosic ethanol industry to possess integrated end-to-end capabilities in pre-treatment, novel enzyme development, fermentation, engineering, and project development. It will seek to build a global enterprise as a leading producer of cellulosic ethanol and as a strategic partner in bio-refineries around the world. At the same time, the company will continue to pursue broad market opportunities for specialty industrial enzymes within the areas of alternative fuels, specialty industrial processes, and health and nutrition, with a primary focus on enzymes for the production of biofuels. The combined company will be headquartered in Cambridge, Massachusetts (U.S.) and have research and operations facilities in San Diego, California (U.S.); Jennings, Louisiana (U.S.); and Gainesville, Florida (U.S.).

The merger between Diversa and Celunol is expected to be completed by the end of the second quarter.

Under the terms of the merger agreement, Diversa will issue 15,000,000 shares to acquire the outstanding equity of Celunol. In addition, Diversa will provide Celunol with up to US-$20 million in debt financing to fund its operations prior to the closing, which will be assumed by Diversa at the closing. On a pro-forma, fully diluted basis, Diversa stockholders will retain ownership of approximately 76 % of the combined company, and Celunol stockholders and option holders will own approximately 24 %. The merger agreement has been unanimously approved by each company's board of directors and is subject to approval by their respective stockholders, regulatory agencies, and the satisfaction of other customary closing conditions. The transaction is expected to be completed by the end of the second quarter of 2007.

Celunol has recently commenced operations of the nation's first cellulosic ethanol pilot facility in Jennings, Louisiana and expects to complete a 1.4 m g/y, demonstration-scale facility to produce cellulosic ethanol from sugarcane bagasse and specially-bred energy cane by the end of 2007. In addition, Celunol's process technology has been licensed by Tokyo-based Marubeni Corp. and has been incorporated into BioEthanol Japan's 1.4 m l/y cellulosic ethanol plant in Osaka, Japan. The combined company plans to bring its first U.S. commercial-scale cellulosic ethanol plants into production in late 2009.

▶ www.diversa.com
▶ www.celunol.com

Don't miss CHEManager Europe 03/07 on 29 March

Informex Europe Postponed

Organisers Cite Market Preference for a Spring Timing'

CMPi, which organises such trade shows as Informex and CPhI, have announced that they have postponed the launch of Informex Europe until 16 – 17 April 2008. The show was initially planned to start this June in Berlin. The trade show organiser said the decision came in response to market feedback, which they said evidenced event a market preference for a show with spring timing.

"The decision to re-schedule to April 2008 listens and directly responds to our market," said Show Director Jennifer Jessup. "Research has strongly and consistently supported the concept of a high-quality Informex event in Europe. But our latest feedback indicates that customers would prefer a spring timing – which will preserve their opportunities and options for involvement in both Informex Europe and other European chemical shows."

The first planned date for the launch of Informex Europe was slated for June 2007, three weeks before rival show Chemspec Europe, which caters to the same target group. The move sparked a competitive situation among the existing trade shows (CHEManager Europe 5/2006). When the launch of Informex Europe was first announced last summer, Kate Chambers, group exhibitions director – Chemical and Pharma Ingredients Group CMPi, said the new show's date had been based on research that showed a demand for a "quality mid-year show" ahead of the European summer holidays in July and August. At the time, Andrew Warmington, editor of Speciality Chemicals Magazine, the sister publication of all Chemspec shows said, "Informex Europe is clearly a direct competitor to Chemspec Europe. It is unlikely that many exhibitors or visitors will want to do two shows in the same month."

After the rescheduling announcement, Jessup said, "We are committed to our exhibitors and attendees. They know the market and they know what they want. Re-timing our Informex Europe debut is CMPi's response to what we've heard from them."

Warmington said that he was not surprised by the move, noting that only 18 companies had signed up as exhibitors as of February. "It seems clear that there is little market demand for a show of this format in Europe in June," he said. It is a very good show in the U.S., but that does not necessarily mean that it can be transported readily to other markets."

Warmington also said that the Informex Europe's original date had no effect on bookings for Chemspec Europe 2007, and he said he does not expect it to hamper attendance in the future. "The key point is whether or not there is a need for more than one horizontal fine and speciality chemicals event in Europe in any year," he said. "Having talked to many people in the industry since the original launch of Informex Europe, I do not believe that there is any loud call for new events – just the opposite is true, in fact. Most people say that there are already enough events in this space."

Now with a lead time of almost 15 months, CMPi said it will upgrade its the showcase, networking and key educational elements of the event.

"Time will tell if there is any need for an event in the spring," Warmington said. "We welcome competition because it keeps us on our toes, but I think that any new event must serve real industry needs."

Brandi Hertig

Chemspec Europe
27–29 June in Amsterdam
Informex Europe
~~5–7 June in Berlin~~
16–17 April 2008 in
Cologne

Air Liquide Teams Up With Total for CO_2 Capture

International experts now herald CO_2 capture and geological storage as promising ways for preserving the environment and contributing to combating climate change. These processes consist of capturing industrial emissions of CO_2 and burying them in the deep layers of the earth, thereby reproducing what nature has been doing for millions of years in natural CO_2 pools.

Air Liquide has entered into a technology partnership with Total Group to supply new oxycombustion technologies for the first pilot CO_2 capture and storage installation in France in the Lacq industrial basin in South-Western France. New combustion technologies are used to replace the air by oxygen. Using oxygen for fossil fuel-based energy production technologies, leads to high concentrations of CO_2 in the flue gases, making it economically viable to capture, transport and store CO_2 in the subsoil. Air Liquide has developed highly specialised expertise in this field, with over 800 combustion patents to its credit.

Under the agreement, Total will inject up to 150,000 t of CO_2 over two years into a former natural gas pool near Lacq at a depth of 4,500 m. The first CO_2 injections will be made in November 2008.

Air Liquide is already involved in several other CO_2 storage research projects, notably in Poland, the United States, and Canada.

▶ www.airliquide.com
▶ www.total.com

Sasol Doubles German Diethyl Ether Capacity

Due to strong global demand, Sasol has announced it will double diethyl ether (DEE) capacity at its Sasol Solvents plant in Herne, Germany from 2,5 kt/y to 5 kt/y. Implementation is scheduled for September. DEE is used as solvent, extractor and reaction medium in several applications. It is used widely as an extraction solvent for the production of vitamins and aromas in the pharmaceutical, fragrance and flavours industries, as well as a starting fluid for diesel engines. The additional capacity is foreseen to serve Sasol's European, U.S. and other export markets.

▶ www.sasol.com

ChemDiv, Merck KGaA Extend Collaboration

ChemDiv announced that Merck KGaA has renewed and expanded on an agreement with ChemDiv as its preferred provider of discovery libraries of lead-like small molecules through 2009. The new agreement expands the collaboration that has been going on for the last three years, and roughly doubles the FTE effort at ChemDiv's Chemical Diversity Research Institute in Moscow.

Under the terms of the agreement, a steering committee with representatives from Merck KGaA and ChemDiv will determine projects to be produced by ChemDiv for early stage discovery at Merck. Promising hits will then be further optimized and placed into Merck's discovery pipeline. Financial terms were not disclosed.

▶ www.chemdiv.com
▶ www.merck.de

Lanxess Plasticizers Approved

Lanxess has received the approval of the U.S. Food and Drug Administration (FDA) for its plasticizer Mesamoll II. This approval covers its use in products that come into contact with aqueous based foodstuffs. The universal plasticizer alkylsulfonic phenyl ester is suitable for polymers such as polyurethane, NBR rubber and PVC.

▶ www.lanxess.com

Production
FACILITIES · PROCESSES · TECHNOLOGIES

Powtech Showcase
Gearing up for this year's Powtech
Page 10 – 11

Production
Nozzle systems used in combustion process
Page 12

IT
New GHS procedures to be implemented soon
Page 13

Uhde Awarded Contracts for Tail Gas Treatment Units

Uhde has been commissioned by the Hungarian fertiliser company Nitrogénmüvek Zrt. to engineer and supply a tail gas treatment unit based on the Envinox technology. The unit will be installed in a new nitric acid plant in Petfürdö, around 80 km south-west of Budapest and is scheduled to come on-stream in May. Future annual emissions from the Hungarian plant will be reduced by approximately 3,200 t of nitrous oxide.

A second contract for a tail gas treatment unit has also been awarded by Enaex of Santiago, Chile. The unit will be installed in a nitric acid plant, thus reducing annual emissions of nitrous oxide by 3,000 t. The unit is due to come on-stream in Mejillones, some 1,400 km north of the capital Santiago, in late 2007. Both contracts comprise the licence, basic engineering, supply of key equipment and supervision of the commissioning of the units.

▶ www.uhde.biz

Air Products Breaks Ground on NF_3 Facility in Korea

Air Products announced it has broken ground on the first phase of its nitrogen trifluoride (NF_3) plant in Ulsan, Korea. The new production facility, which will be operated by Air Products Korea Electronics, shall produce more than 500 mt/y when completed in late 2007.

Upon completion, Air Products global capacity shall be more than 2,500 mt annually. The company has safely manufactured and distributed NF_3 for more than 25 years from its manufacturing facility in Hometown, Pa. Air Products will continue to operate its three existing NF_3 plants at that location to ensure a reliable global supply of NF_3.

▶ www.airproducts.com

Sulzer Wins Contract for Pearl GTL Project

Qatar Shell GTL Limited has selected Sulzer Chemtech to design and supply column internals and other key equipment for the Pearl Gas to Liquids (GTL) plant in Ras Laffan Industrial City, Qatar.

The Pearl GTL project comprises the development of upstream gas production facilities and an onshore GTL plant that will produce 140,000 b/d of GTL products, including naphtha, GTL fuel, normal paraffins, kerosene, and lubricant base oils. In addition, the plant will also produce approximately 120,000 bb/d of condensate, liquefied petroleum gas, and ethane. When completed, it will be the world's largest integrated GTL complex. GTL is complementary to liquefied natural gas and pipelines and helps countries to diversify their energy supplies. GTL products are clean and odorless, contain virtually no sulfur, nitrogen, and aromatics, and result in higher air quality for cities.

▶ www.sulzer.com

BASF to Build New DHDPS Plant in Ludwigshafen

BASF has started the construction of a new plant for the production of the base material DHDPS (dihydroxy diphenyl sulfone) in Ludwigshafen, Germany. The plant will have an annual production capacity of 6,000 t and is expected to go on line in mid-2008. DHDPS is a feedstock for the manufacture of the high-performance plastic Ultrason E (polyether sulfone: PES) that BASF has been producing in Ludwigshafen since the early 1990s.

Due to the high demand, the production capacity of the Ultrason plant in Ludwigshafen will be increased from the current 6,000 to 12,000 t/y. Therefore, the need for DHDPS is so large that it pays off for BASF to invest in its own DHDPS plant. The entire quantity of the material made in this new plant will be employed to make the plastic. Up until now, BASF had been purchasing the DHDPS needed for the manufacture of Ultrason from outside sources.

▶ www.basf.com

Bayer Materialscience to Expand Production Capacity

Bayer Materialscience said it will boost the annual capacity of the planned plant for producing toluene diisocyanate (TDI) in Shanghai from 160,000 to 300,000 t. According to the company, this Bayer subgroup is harnessing an innovative process technology in the construction that, among other things, enables investment and energy costs to be dramatically reduced. Bayer Materialscience is planning to invest a total of around US-$1.8 billion at the Shanghai site by 2009. The company expects its newly developed TDI process technology to cut investment costs by some 20 % compared with conventional processes. The process – known as gas phase phosgenation – has already been successfully trialed in a company pilot plant with an annual capacity of 30,000 t.

▶ www.bayermaterialscience.com

Fieldbus – The Unknown Entity?

Still Reliable After All These Years

How reliable, or in other words, how good is the actual availability of the fieldbus? In between all the discussions in recent years the user has had good reason to feel uncertain; along with the uses of fieldbus technology there are automatically questions relating to its behaviour with age. At last year's Namur annual general meeting, Michael Pelz, chairman of the Namur working group "Fieldbus" presented a study relating to the chemical and pharmaceutical industry, which was conducted by Sven Seintsch of Rheinhold & Mahla Test Laboratory. The conclusion? The fieldbus is reliable. And with fieldbus diagnostics it is becoming even more reliable and easier to comprehend and to operate. GIT Publishing spoke with Juergen George of Pepperl+Fuchs.

Juergen George
Pepperl+Fuchs

GIT Publishing: Why does the world of processing need a fieldbus diagnostic tool?

J. George:: On the one hand for the commissioning of the fieldbus systems: The planners and commissioning engineers required a fieldbus expert at their side, at least up to the point at which the system is running free of faults. With a good diagnostic module, it is possible to see just which items are running correctly and which require further attention. Corrections can then be undertaken in a targeted way. The whole process of commissioning is simplified.

The second argument in favour of a diagnostic tool relates to the overall life cycle of the installed fieldbus system. The investigations mentioned above have shown, that the fieldbus, when it initially has started to operate, is very stable and available – reliable, but under certain circumstances with minimal operating reserves. The system sometimes can handle three terminators instead of two, and it runs. But then suppose, for example in an aggressive atmosphere, terminal corrosion sets in or EMC problems arise due to problems with cable installation or the screening concept. Then the whole segment may fail in an unpredictable and abrupt way. Imagine the situation in which an extension has been planned from the start – additional devices shall be coupled to the bus in future. Even with such unidentified problems, the segment is running reliably. However, the additional devices are then added and the bus fails. With the diagnostic tool the operator will know about the quality of the data transfer and will be warned in good time of the impending risk. The cost of a good diagnostic tool is certainly small when compared with the benefits – for example the avoidance of unplanned plant downtime.

How has the diagnosis of a fieldbus system previously taken place?

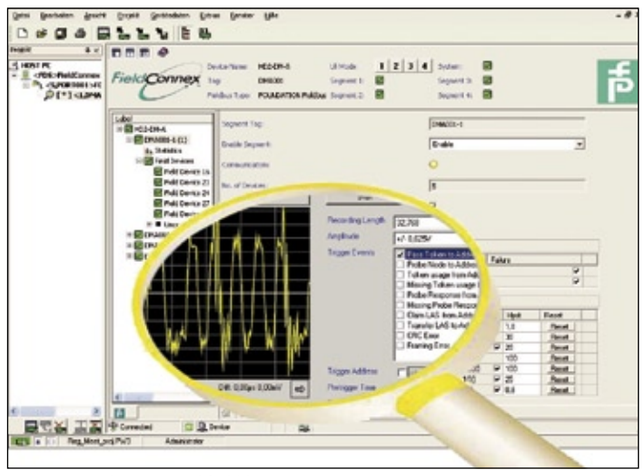
J. George:: It was always quite clear that you don't get very far just armed with an ohmmeter. Trained specialists have to be employed. In simple cases handhelds could be used, but in more complicated and difficult to explain phenomena bus monitors and/or oscilloscopes become indispensable. And these have to be handled by experts. In other words: A large number of measurements and measuring instruments are required, which even in combination were not able to present a complete image of the state of the fieldbus physics.

What does your tool do in detail? How does it differ from comparable systems on the market?

J. George: The Advanced Diagnostic Module is a plug-in module for the FieldConnex Power Hub. It monitors the fieldbus physics online and in real time. It continuously measures all the parameters that are of relevance to the fieldbus and each field device. The trip values for all warnings and alarms are stored in the module and so it is now possible to obtain information on changes in the signal quality in the control system. The plant operator normally receives information in advance before a field device goes out of business. That really is a first.

The module saves history for up to two years. So long term effects – possibly due to ageing – can be traced and analysed. In addition, the data can be very conveniently exported as a text file or directly to Excel. The software, Diagnostic Manager, contains additional functions, which essentially ease the operation of the fieldbus: For example, there is a Commissioning Wizard. This guides the user through simple menus of the type recognizable from typical Windows presentations and enables many operations to be executed in just a few minutes: The complete validation of the fieldbus segment and the connected field devices; the setting of the trip values for all relevant alarm parameters required for operation; the automatic configuration of the diagnostic bus and all connected modules. All fieldbus segments are conveniently and efficiently operated from a workstation. And, of course, the associated documentation is available in both printed and electronic formats.

Which typical faults can be detected with your system?

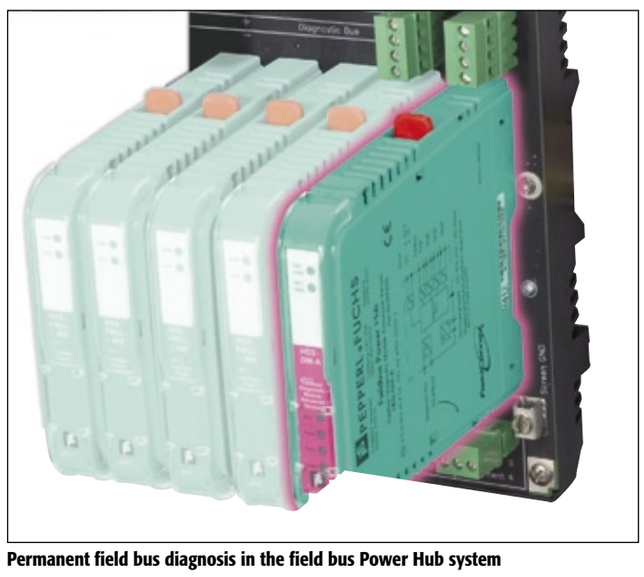


Diagnosis with integrated field bus monitor

J. George: It starts with simple items, such as an incorrect termination or a short-circuit between a signal cable and the screen, but goes on to cover more difficult to locate faults such as noise and excessive jitter caused by individual fieldbus components, the transient characteristics of individual stations and incompatibilities between individual components. In practice it has been found that only two in 100 segments actually need to be corrected during commissioning.

But, let's make it quite clear: The fieldbus is reliable and the diagnostic tool is not required just to detect any faults that may occur. It has very much more to do with detecting long-term changes in the physical layer parameters and visualising them at a point in time when they have not actually become a problem. The aim is to provide information on changes while the parameters are still within the permissible range. The key phrase here is preventive maintenance to make the fieldbus even more reliable and therefore even more available.

You said that the files are displayed on a maintenance computer. How does that work? Does it mean additional cabling? Is an additional bus required for the transfer of the diagnostic data?



Permanent field bus diagnosis in the field bus Power Hub system

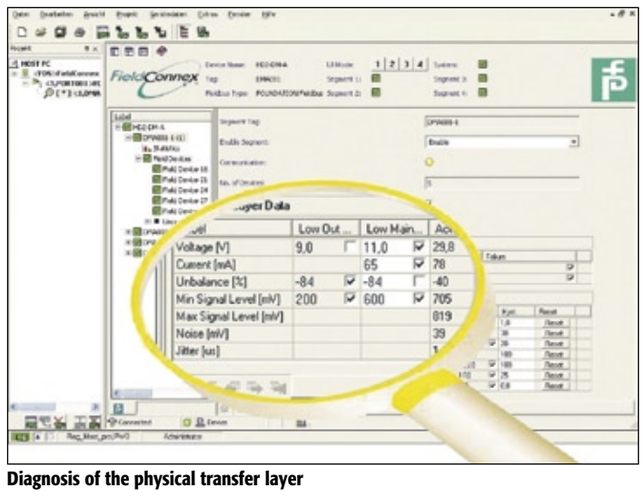
J. George: You can imagine that with such a large number of measurements a considerable volume of data accrues, particularly if the integrated oscilloscope is used. With this volume of data we do not want to cause additional load on the control communication and yet we want to display the data as soon as possible. A simple two wire bus in the cabinet with an RS485 interface is used to interconnect the diagnostic modules. Using a simple converter, which we can also supply, this signal can be transformed to the Ethernet. We use here very robust and proven and tested technology, which is also cost-effective.

It may also be the case that you do not want to directly use the medium you have just diagnosed for data transfer. We offer a transparent coupler for Profibus DP and PA. And we can now make a distinction here: Profibus PA is monitored by the Advanced Diagnostic Module. We are currently working on a solution, with which the diagnostic data for the physics of the PA bus are transferred via a tunnelling via DP. This is possible because it involves two separate cables.

Are the diagnostic data evaluated directly in the control system or is additional software required?

J. George: The plant operator does indeed have some understanding of the fieldbus, but in day-to-day operation it is not of great interest to him. The diagnostic module provides OPC data via an open interface. OPC has become established as a standard in the world of control technology for the transfer of data between different systems. These group signals are integrated in the control system. The plant operator merely receives the warning that the fieldbus needs to be checked.

With this information the maintenance personnel can then scrutinise the information in detail at their workstation to see which trip value violations have led to the warning. It is particularly important that the service personnel now make appropriate decisions and plan the appropriate course of action to be taken while the plant is still running satisfactorily. In most cases, with the appropriate knowledge about the state of the communication it should be possible to take the appropriate action at the next planned servicing, re-equipping or plant modification. The fieldbus tolerates almost any fault, even something like a single-sided short-circuit. The important thing is that this initial fault is detected and can be eliminated before a further fault arises. So the fieldbus is not only reliable in the way it functions, but is also easy to comprehend and manage by commissioning engineers, plant operators and maintenance personnel.



Diagnosis of the physical transfer layer

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POWerful Exhibition

Powtech: Europe's Marketplace for Powder and Bulk Solids Technology

Around 700 exhibitors from Germany and abroad are expected at Powtech Europe's leading exhibition for mechanical processing technologies and instrumentation in Nuremberg from 27–29 March. The TechnoPharm exhibition (life science process technologies) and the Partec Congress (particle technology) and ESMG Symposium (explosion protection) are parallel to Powtech.

This year's Powtech offers a concentrated and comprehensive survey of the latest state of the art of all mechanical processes.

The range of products on display covers:

- Basic processing technologies for powder and bulk material
- Plant engineering and processing components
- Particle analysis and characterisation
- Nanoparticle technology
- Measurement and control
- Safety and environmental technology
- Services (e.g. plant construction/ planning, analysis)

Partec 2007: Abstract presentations

- Jinghai Li of the Chinese Academy of Science on "Particle Technology in China – perspectives in science and industries"
- Richard A. Williams of the University of Leeds, UK, on "Intelligent wireless particles"
- Hans Herrmann of ETH Zurich, Switzerland, on "Simulation of granular matter"
- David Pui of the University of Minnesota, U.S., on "Delivery of Nanoparticle Biomolecules for Nanobiotechnology Applications"
- Paul Mulvaney of the University of Melbourne, Australia, on "Using single nanocrystal spectroscopy to probe the world of neglected dimensions"
- Karsten Mäder of the University of Halle, Germany, on "Nanoparticulate Drug Delivery Systems: in vitro/in vivo characterization"
- Reg Davies of IFPRI, U.S., on "Back to the Future – 50 Years of Particle Characterisation"

Partec 2007: Tandem presentations

- "Experiments and simulation of SiO_2 nanoparticle production in an industrial flame reactor" by S. Horender, M. Sommerfeld, Martin-Luther-University, Halle-Wittenberg, and K.U. Badeke, J. Röper, Heraeus Tenevo GmbH, Hanau
- "Large-scale Selective Bio-Separation by Functionalized Magnetic Particles – Fundamentals and Industrial Application" by Prof. Dr.-Ing. H. Nirschl, University of Karlsruhe, and Dr.-Ing. Karsten Keller, DuPont Experimental Station, Wilmington, U.S.
- "Monitoring Particle Agglomeration using FBRM Technology" by N. Kail, H. Briesen, W. Marquardt, RWTH-Aachen, and J. Worlitschek, B. Smith, C. Roehr, Mettler-Toledo, Switzerland and U.S.
- "Effect of material properties on optimum stress intensity and specific energy in stirred media milling" by A. Kwade, TU Braunschweig, and P. Bonnett, Syngenta-Huddersfield Manufacturing Centre, Leeds, UK
- "Scale-up and Control of Binder Agglomeration Processes – Batch and Continuous" by G. Tardos, University College New York, U.S., and P. Mort, Procter and Gamble, Cincinatti, U.S.
- Particle interactions in dispersions of micro- and nanoparticles" by F. Babick, G. Salinas Salas, TU Dresden and University, Chile, T. Sobisch, D. Lerche, L.U.M. GmbH

Safety and Explosion Protection in Industrial Plants

As 80% of all industrially processed dusts are explosive, safety and explosion protection in industrial plants are key topics at the Powtech. The European Safety Management Group will provide information about process safety and industrial explosion protection at its international ESMG Symposium. The symposium presentations deal with the analysis of industrial damage incidents, new methods from safety research, new findings on risk assessment, safety engineering and new techniques for preventive and design measures for explosion protection. The daily demonstrations of dust and gas explosions in the exhibition centre park are especially impressive in this connection and show the enormous potential hazard.

Partec 2007: News From Particle Technology

The Partec Congress, which takes place in the new CCN Ost congress centre at the Nuremberg exhibition site, covers the latest findings from the field of particle technology (see box). Some 500 participants are expected at PARTEC, which in 2007 is directed by Prof. Wolfgang Peukert from the chair of Particle Technology at the University of Erlangen-Nuremberg.

Hot Links

www.partec2007.de
www.powtech.de
www.technopharm.de

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Inline Particle Probe IPP 70-Se

PRODUCT At Powtech 2007, Parsum will be showing its new In-line Particle Probe IPP 70-Se for use in potentially explosive environments. Within ATEX this probe is classified as an intrinsically safe instrument suitable for use in zones 0, 1 and 2, 20, 21 and 22. The IPP 70-Se is an optical rod probe with no moving elements and the same mechanical dimensions like the standard version.

The probe measures particle size by detecting interruptions of a laser beam caused by material passing through it. It is insensitive to vibration and slight impacts. An integral pressurised air feed ensures that the optical sapphire windows are protected from product build-up – a particularly important feature for potentially fouling applications. It is suitable for the measurement of particles size distributions in the range 50 to 6,000 µ at temperatures up to 100°C.

▶ Parsum
Tel.: +49 3 71 53 47 3 28
info@parsum.de
www.parsum.de

Hall 7, Booth 7-247

Optical Analyzer

PRODUCT Comex delivers industrial system solutions and processing equipment for sophisticated and demanding applications. The main core activities are related to the technologies for production and classification of fine powders and optical separation of large particles. After significant efforts in R&D projects Comex provides today the latest state-of-the-art equipment together with the know-how for industrial process solutions.

Optical identification provides possibilities to identify different particles or objects based on their colour, size, shape and texture. These technologies incorporate on-line image analysis techniques with a unique software to identify different objects.

▶ Comex AS
Tel.: +47 67 152410
post@ comex-group.com
www.comex-group.com

Hall 7, Booth 7-635

Lightweight Dosing Valve for Glove Box

PRODUCT J-Tec has designed a new light-weight version of its dosing valve for application in isolators or glove boxes, used to protect the operator from hazardous substances, for instance in the chemical and pharmaceutical industries. For this purpose J-Tec designed a light-weight construction with two (light-weight) dosing valves and a pipe that can easily be dismantled. Because the operator can only handle the construction through the support rings these requirements were made. To achieve this, J-Tec's R&D department designed special flanges with hooks, ensuring that the maximum weight to be lifted does not exceed 6 kg.

▶ J-Tec Material Handling
Tel.: +49 6204 700 170
info@j-tec.com
www.j-tec.com

Hall 9, Booth 9-433

Dust-free Filling Of FIBCs

PRODUCT We offer many different models for various materials and different general and ambient conditions. The following options are available to adapt standard units to customers' special requirements:

- weighing and recording devices being qualified for calibration
- adjustment to various FIBC sizes
- lifting and vibrating devices for compaction/de-aeration
- automatic bag loop ejectors
- FIBC stacking devices
- pallet transport on roller conveyors

▶ GEL-Verfahrenstechnik GmbH & Co. KG
Tel.: +49 5231.9193 0
info@gel-verfahrenstechnik.de
www.gel-verfahrenstechnik.de

Hall 7, Booth 7-460

Planetary Ball Mill

PRODUCT The planetary ball mill PM 400 pulverizes and mixes soft, medium-hard to extremely hard, brittle and fibrous materials. Dry and wet grinding can be carried out. The high speed of 30 to 400 min^{-1} in combination with the very large sun wheel diameter of 300 mm guarantee extremely high fineness in a short time. With its powerful, maintenance-free drive the PM 400 is particularly suitable for long-term trials or – in the special version PM 400 MA-type – for mechanical alloying.

▶ Retsch GmbH
Tel.: +49 2129 5561 155
info@retsch.com
www.retsch.com

Hall 7, Booth 7-348

Production Plant In Commissioning

PRODUCT During Powtech 2005, Glatt introduced the ProCell 5, the laboratory unit for continuous processes. Using this unit our customers can evaluate not only the innovative spouted bed technology but also fluid bed processes. Working in a 1 kg scale, new recipes can be developed and the process for the production of new products can be optimised. An internal filter with a large filter area ensures a stable process over a long time, which is a big advantage for continuous spray granulation processes. Agglomeration of powder and coating of particles can be tested in batch and continuous operation.

The ProCell 5 is manufactured in small series in order to offer it at an attractive price and to shorten the delivery time. The reaction of the market is very positive, since the last Powtech more than 10 laboratory units have ordered.

In addition to this pilot and production units were delivered to our customers. At the moment the first production units are in the commissioning phase. One of them is used for the production of micro-encapsulated flavour oils. At this product the advantages of the ProCell can be fully utilised. Small product volumes in the processing chamber allow a frequent product change, at the same time ensuring short residence times. By this means the loss of volatile and temperature sensitive flavours is minimized.

▶ Glatt Ingenieurtechnik GmbH
Tel: +49 3643 47-1506
redaktion@glatt-weimar.de
www.glatt.com

Hall 11, Booth 11-105

Flexible Compact Isolator

PRODUCT Designed to meet the demands for a cost effective, flexible, barrier containment solution, the Hosokawa Stott flexible isolator offers companies involved in scientific research, biotechnology or pharmaceutical development, high level, product and personnel protection across a range of processing applications. The contained clear air environment offers complete "shirt sleeve" operations. Its benefits include a flexible compact modular design; manual and automatic handling procedures carried out with minimal operator exposure; and Sizes available from 1 m x 0.5m footprint. It can be used in a number of applications, such as laboratory analysis and product transfer.

▶ Hosokawa Micron Ltd
Tel.: +44 1928 755100
info@hmluk.hosokawa.com
www.hosokawa.co.uk

Hall 7, Booth 7-465

Solutions For Suppressing Explosions

PRODUCT This year will again see Kidde Brand- und Explosionsschutz – the specialist for fire and explosion safety based in Ratingen – presenting intelligent solutions that help prevent the risk of explosions. At the Powtech, the company will be exhibiting a special sensor solution that recognises and prevents explosions within milliseconds – even before pressures are able to increase to a technically dangerous point. The technology developed by Kidde Explosionsschutz ensures that the system is automatically monitored on a continuous basis. The static and dynamic detection systems register any changes in pressure and transmit the data to the EXUZ 5000 Multizone Centre or the EX 100.1 Compact Control Centre. All information is sent to the intelligent control centre where it is monitored for deviations from the standard.

▶ Kidde Brand- und Explosionsschutz
Tel. +49 2102 57 90 0
info@kidde.de
www.kidde.de

Hall 9, Booth 9-329

Automated Moisture Measurement

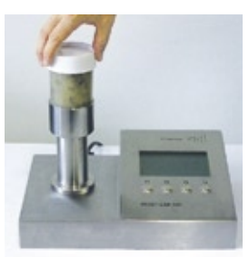
PRODUCT Automated moisture measurement for the fluidised bed drying and granulate process. The PharmaScan measures the moisture of granulate and powder. It can be mounted onto the standard flange of a fluidised bed granulator and directly integrated into the production process. Here it will continuously measure temperature and moisture content of the products. The PharmaScan is completely certificated for Ex-Zone-20.

▶ Döscher & Döscher GmbH
Tel.: +49 40 89070 800
info@doescher.com
www.doescher.com

Hall 11, Booth 11-227

Moisture Measuring Instrument

PRODUCT Moist xLAB is a ruggedised laboratory moisture meter on a microwave basis for reproducible offline measurements close to the production process. The recurrent conception carrying out a material or product moisture measurement as easy as air humidity measurements must be disproved by reality.



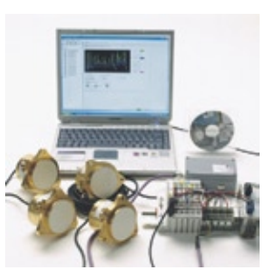
The product works on the basis of reflection principle, meaning that the part of a microwave will be measured which is reflected from the material dependent on its moisture content. The portable, compact and robust instrument can be used for fast moisture measurements in solids, bulk goods and planar materials. One reading takes only one second. The measurement detects moisture at the surface and in the core of the sample. Customer specific material calibrations allow exact and reproducible measurements.

▶ hf sensor GmbH
Tel.: +49 341 49726 0
sales@hf-sensor.de
www.hf-sensor.de

Hall 7, Booth 7-540

Digital Moisture Measuring

PRODUCT The company ACO (Automation Components), Moisture Measuring Systems and Industrial Components introduces the new digital moisture measuring sensor type DMMS. Now available in mixer version with 10mm ceramic measuring surface and in version dust Ex_Zone 22 Sensor.



Integrated micro controller, average function, limit evaluation, material flow control, digital processing of actual values, sensor replacement without new calibration are standard. This digital sensor is applicable for almost all bulk materials, granulates, powders, mixings and blending, pastes, concrete and aggregates of all kind of industries. The application for all bulk products is straight forward and easily achieved.

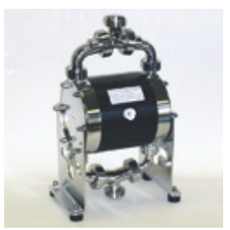
▶ ACO Automation Components
Tel.: +49 7746.91316
aco.mail@t-online.de
www.acoweb.de

Hall 9, Booth 9-327

Air-operated Diaphragm Pumps

PRODUCT The Almatec pump series Biocor is especially designed for sterile applications within the pharmaceutical, biotechnical and food industry. The air-operated diaphragm pumps are EHEDG certificated and ATEX conform according to 94/9/EG directive. The special design with the integrated cleaning-system enables the CIP (clean in place) and SIP (sterilisation in place) capability.

Always a demand for sterile applications: all housing parts of the Biocor pumps show no horizontal areas. Each pump comes with four ball lifting magnets, which can be attached to the pump housing from the outside at the location of the four ball valves. The ball valves are risen up magnetically out of their seats and the pump is drained entirely without having to be dismounted. There are no mechanical ball lifters with parts and seals in the wetted area.



▶ Almatec Maschinenbau GmbH
Tel.: +49 2842 961 0
info@almatec.de
www.almatec.de

Hall 12, Booth 12-261

chemanager@gitverlag.com

Central Monitoring System

PRODUCT No more moving from data logger to data logger to monitor and download information. Now you can review and analyse recorded temperature, humidity, CO_2, particles or pressure differential data from any PC in your lab and continue to comply with FDA 21 CFR Part 11, GLP, GMP and GAMP 4. Central Monitoring Systems from Elpro are often used with cell culture incubators to monitor temperature, humidity, CO_2; refrigerators, freezers, ultra-low freezers or liquid nitrogen storage to monitor temperature; warehouses to monitor temperature and humidity and clean rooms to monitor pressure differential. The system is not complicated to define, set up and use because we work with you every step of the way, from analysing your facility's needs to helping you choose the appropriate dataloggers and sensors to training your staff to offering continued support.

▶ ELPRO Messtechnik GmbH
Tel.: +49 7181 979480
brd@elpro.com
www.elprogmbh.de

Hall 12, Booth 12-521

Portable Test Systems

PRODUCT Charles River Laboratories received FDA approval for the handheld endotoxin testing system, the Endosafe-PTS. This new Portable Test System (PTS) is designed to test LAL samples quickly and quantitatively providing results in about 15 minutes. Now with FDA approval, the PTS can be used for in-process and final product release testing. The PTS platform has been the foundation for new test technologies from Charles River including a fast Gram identification method, the Endosafe-PTS Gram ID, and a protein determination assay the Endosafe-PTS BCA. The ease-of-use portability of the PTS make it a suitable platform for future innovations in laboratory diagnostics from Charles River.

▶ Charles River Laboratories - Endosafe
Products & Services
Tel. : +49 7531 818866
comments@crl.com
www.criver.com

Hall 12, Booth 12-164

Laboratory On Wheels

PRODUCT Retsch is now offering only offer comprehensive application support for their mills, sieve shakers and sample dividers with free-of-charge test grindings in their application laboratory. They also have a laboratory on wheels, the Retsch bus. Retsch has been offering this service for more than 30 years and has just equipped a completely new mobile lab with the latest product generation. This will go on tour throughout Europe allowing visitors to have their own sample material prepared in the mills and crushers thus giving them the opportunity to test the instruments in practice.

▶ Retsch GmbH
Tel.: +49 21 2955 61-155
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www.retsch.com/events

Hall 7, Booth 7-348

Product Information Online

PRODUCT The entire product range provided by InProcess Instruments Gesellschaft für Prozessanalytik, complemented by examples of use and a descriptive company presentation, have now been published on CD in German and English language. In order to present the varied possible applications of online gas analytics with the aid of quadrupole mass spectrometry, the key aspects of online analytics and mass spectrometric metrology are highlighted on the CD in detail. The role of sophisticated analytics for the development of new materials, products and procedures is particularly emphasized. Applications in production management and control, as well as quality assurance are of similar interest. In addition to the common systems for the chemical industry, iron and steel production, as well as laboratory and technology, special systems are also presented, for example for the production of glass or lamps. Product descriptions for ten systems are available for printout as PDF files.

▶ InProcess Instruments
Gesellschaft für Prozessanalytik mbH
Tel.: +49 421 52593 0
mail@in-process.com
www.in-process.com

Lyondell Wins Approval for Facility in China

Lyondell Chemical and Sinopec Zhenhai Refining & Chemical Co. (ZRCC) have received final government approval for a project to construct a world-scale propylene oxide/styrene monomer (POSM) manufacturing facility in Ningbo, China, across the Hangzhou Bay from Shanghai. The project is a partnership between Lyondell and ZRCC, and the companies expect that this plant will be one of the lowest-cost POSM plants in the world, capitalizing on Lyondell's industry-leading POSM technology, both companies' operating experience and raw materials provided by ZRCC's future olefins plant in Ningbo.

Lyondell will contribute its POSM technology and its overall operating and technical experience in exchange for a share of the propylene oxide (PO) profitability from the plant. The parties will jointly market all of the PO manufactured by the new facility. The companies expect to complete construction in 2009.

▶ www.lyondell.com
▶ www.zrcc.com.cn

The Linde Group Receives Engineering Order

The engineering division of The Linde Group has received an order from the Norwegian oil company Statoil ASA for the engineering services of the Kollsnes Gas Network Extension project, Norway. The Kollsnes Gas Network Extension project comprises an additional dew point control train and two additional sales gas compressor trains of 33 million Nm³/d capacity each for the natural gas landing onshore at Kollsnes as well as associated auxiliary facilities. The total natural gas export capacity of the Kollsnes site will thereby be increased to 183 million Nm³/d.

▶ www.linde.com
▶ www.statoil.com

Repsol Selects Basell's Spherizone Technology

Repsol Polímeros, an affiliate of Repsol YPF, has selected Basell's Spherizone technology for a new 300 kt/y polypropylene plant it plans to build in Sines, Portugal. The start-up is planned to take place in 2010.

The Spherizone process, which has been licensed by Basell since 2004, has now been selected for 10 polypropylene projects in all major polyolefin markets; these licenses represent nearly 3 million tons of capacity. Spherizone is the latest generation polypropylene technology based on new multi-zone circulating reactor technology.

www.repsolypf.com
www.basell.com

Süd-Chemie to Invest in Lithium Iron Phosphate Production

Phostech Lithium (Boucherville, Canada), an affiliate of Süd-Chemie (Munich, Germany) has completed the construction of a production line of 300 mt/y Lithium Iron Phosphate ($LiFePO_4$). The capacity will reach 900 mt/y after the present extension of that production line. The investment amounts to CAN$ 6 million. The plant is situated in St. Bruno. In 2007 and 2008, Phostech Lithium will invest in further capacity of a new production line with investments of more than CAN$ 35 million in the Montreal area. This additional capacity will reach 1,500 mt/y.

▶ www.sud-chemie.com
▶ www.phostechlithium.com

Eastman to Sell Spanish Plant

Eastman Chemical has entered into an agreement for the sale of Eastman Chemical Iberia, S.A., located in San Roque, Spain, to La Seda de Barcelona, S.A., located in Barcelona, Spain. The sale includes Eastman's PET polymers manufacturing assets in Spain and the related polyester resins business. The sale is subject to competition authority approvals in Spain. Terms of the transaction, which is expected to close during second quarter 2007, were not disclosed.

The sale of the San Roque site could change the previously reported decision to permanently shut down the site. It does not impact Eastman's previously announced decision to shut down its CHDM manufacturing assets at the site. The company still expects to record asset impairments and restructuring charges related to the San Roque site in first quarter of 2007.

▶ www.eastman.com

DSM to Build China Campus in Shanghai

Royal DSM has decided to build a DSM China Campus in the Zhangjiang Hi-Tech Park in the Pudong New Area of Shanghai (PRC). The China Campus will comprise both all Shanghai offices of the DSM (China) Ltd. Holding and several business groups and the R&D labs of DSM in China. The DSM China Campus will initially house about 400 people with the possibility to further expand the facilities in the future. The Campus will be built in the course of the next 18 months and will be ready by mid 2008.

Presently, the DSM R&D facility in China is located at the Gonglu site in the northeast of Shanghai and the offices are distributed over three offices in two different downtown buildings. Concentrating these facilities and offices at one location will have economic and social benefits for the company and its employees.

▶ www.dsm.com

Ineos Phenol to Invest in China

Following approval by the National Development Reform Commission (China), the Ministry of Commerce and the Jiangsu Province Administration of Industry and Commerce, Ineos Phenol has announced its intention to invest in a 400,000 t phenol plant in Zhangjiagang, Jiangsu Province, China. The new facility, which will also produce 250,000 t of acetone, will be solely owned by Ineos and is expected to be completed at the end of 2009.

▶ www.ineosphenol.com

Saudi Kayan Signs Contracts for New Plants

Saudi Basic Industries Corporation (Sabic) affiliate, the Saudi Kayan Petrochemical Company (Saudi Kayan) signed letters of award with two companies for the construction of new polypropylene (PP) and low density polyethylene (LDPE) plants at its complex in Al-Jubail Industrial City. One contract was signed with Samsung Engineering for the construction of a 350 kt/y PP plant and the other with Simon Carves Limited for a 300 kt/y LDPE plant.

Saudi Kayan is currently under construction. SABIC holds 35% of the company's capital of SR 15 billion and Kayan Petrochemical Company holds 20%. The remaining 45% will be offered for public subscription.

The company's complex at Al-Jubail Industrial City is expected to go live in 2009 with an annual capacity exceeding 4 million t of chemical products. It will add some specialised chemicals to the Saudi marketplace that will be produced in Saudi Arabia for the first time. These products include aminoethanols, aminomethyls, dimethylformamide, choline chloride, dimethylethanol, dimethylethanolamine, ethoxylates, phenol, cumene and polycarbonate. This is in addition to ethylene, propylene, polypropylene, ethylene glycol, polyethylene and other products which will provide wide opportunities for downstream industries.

▶ www.saudikayan.com

ExxonMobil Chemical Upgrades LaGrange Facility

The Films Business of ExxonMobil Chemical said it plans to significantly increase production of specialty oriented polypropylene (OPP) films in LaGrange, Georgia (U.S.). The facility will be upgraded to increase its North American capacity for multilayer white OPP films. The multimillion dollar investment will allow the company to satisfy the rapid growth in demand for specialty OPP films sensitive labeling. This current upgrade is a continuation of ExxonMobil Chemical's strategy to invest in specialty assets for its OPP films business. Since 2002, the company has added two new state-of-the-art orienters, a new coater and two new metallizers in its affiliated worldwide OPP film manufacturing facilities. Additionally, the company continues to upgrade existing assets like at LaGrange.

▶ www.exxonmobilchemical.com

Air Products to Expand Production Capacity at U.S. Facilities

Air Products announced plans to expand its industrial gas production facilities at both its Ashland, Kentucky, and Reidsville, North Carolina facilities. The expansions are being undertaken to meet market demand from industrial gas customers in these key regions, particularly the oilfield services market and also electronics, metals manufacturing and heat treating, and food processing.

The Reidsville facility will expand production capacity by nearly 400 t/d and will be on stream in the second quarter of 2008. The Ashland facility will expand production by approximately 450 t/d and will be on stream during the third quarter of 2008. These facilities serve customers in markets across Kentucky, North Carolina, Tennessee and Virginia.

▶ www.airproducts.com

Ineos Oxide: EO and EOA Expansion at Lavéra

Oxide announced the intention to expand its ethylene oxide and ethanolamine derivative capabilities at its site in Lavéra, France. The expansions will include additional EO capacity and de-bottlenecking of its 55 kt ethanolamine unit to a 180 kt facility. Production from these facilities shall commence early in 2010.

▶ www.ineosoxide.com

And It Burns!

Nozzle Systems Used in Combustion Processes

In the industry, heating oil and liquid residues are completely incinerated in order to produce or reclaim energy. Due to poor or incomplete combustion of the medium, soot is produced, and at the same time the emission values in the combustion chamber increase. With liquid fuels, combustion always takes place in the gas phase: The liquid fuel is first atomised, then vaporised, mixed with air, and finally burned in the gas phase. This article shows how atomisation can be influenced by various special nozzles.

In order to increase the surface area, and to enable the vaporisation and the mixing of the fuel vapour with air, the liquid is transformed into droplets. Nature strives to achieve the minimum surface area, so therefore a spray represents an unstable condition. The spray either evaporates, whereby the surface area reduces, or many small droplets combine due to collision, forming a few large drops, which again reduces the surface area.

Atomisation Requirements in the Combustion Process

For the complete combustion of the atomised liquid, the nozzle system must fulfil a number of boundary conditions. Experience shows that the volumetric average diameter of the droplets must not exceed a particle size of 40 µm. Depending on the operating rate, the quantity of liquid can be set between 10% and 100% for a given load, with a constant quality of atomisation. Due to the different characteristics specific to the material (density, viscosity, surface tension), the nozzle must be able to influence the quality of atomisation.

Technical Realisation of the Spray

If one considers the nozzle systems used for combustion processes, pressure nozzles or dual-material nozzles, one finds that the stated requirements are only fulfilled to a limited extent. We differentiate between pressure nozzles, nozzles with external mixing, and multi-material nozzles with internal mixing.

Pressure nozzles

Two-substance nozzle with external mixing

Pressure Nozzles

For pressure atomisers, hollow-cone nozzles are used. The expected size of the droplets depends on the cross section of the nozzle and the differential pressure applied to the liquid. The smaller the nozzle cross-section, and the higher the differential pressure applied to the liquid, the finer the spectrum of droplets. Due to this fact, only small liquid controlling ranges are possible (1:3 as a maximum). Hole cross-sections of less than 0.5 mm, and pressures up to 40 bar are necessary in order to achieve droplet sizes below 50 µm.

The materials are selected according to their chemical resistance, and the prevalent temperatures from 800 °C to 1,250 °C Schlick uses heat-resistant 1.4841 stainless steel. If the operating life of the burner gun is reduced by chemical corrosion, special materials (e.g. Hastelloy or Inconel) are used. Often, highly toxic liquid residues are incinerated. In this case, the burner guns are designed according to the Pressure Equipment Guideline 97/23/EG (Category II to IV). The required permanent operation of the nozzles makes it necessary that they are not prone to clogging.

The fluid is fed to the nozzle under pressure and enters the circulation chamber via tangential slits or holes. Here, the pressure energy is converted into rotational or kinetic energy. A rotating film of liquid is formed around a core of air, which leaves the exit hole as a hollow-cone jet, which disintegrates into a multitude of fine droplets after overcoming surface tension.

The quality of atomisation and the droplet spectrum depend on the diameter of the hole, the pressure, the dispersion cone, the density, the viscosity and the surface tension. Due to the necessary swirl plate, with very small helical slits or holes inside of the nozzle, reliable continuous operation is no longer achieved.

Multi-substance Nozzles

One or more of the liquids fed to the nozzle is torn into droplets by one or more gaseous atomisation media (air, steam, etc.). We generally differentiate between internal and external mixing, according to where the liquid and the gas meet. Because of the better regulating behaviour, advantages with regard to clogging, wear, distribution of droplet size etc., Schlick usually employs external mixing, although at present, patented Schlick developments with improved internal mixing and without these disadvantages are in the course of being tested.

Two-substance Nozzles with External Mixing

In external mixing systems, the liquids and the atomising medium (usually compressed air) are thoroughly mixed shortly after leaving the front face. The exit cone for two-substance nozzles is approximately 30° to 40°. With a volumetric average droplet size of 40 µm, the liquid residue or heating oil is completely incinerated after a distance of 1,000 to 2,000 mm. Due to the tube-in-tube design, the outside layer of compressed air protects the liquid within. This prevents, premature vaporisation due to the high temperatures, and therefore ensures a continuous feed quantity.

Due to the separated feed, this nozzle technology is considerably less prone to clogging than two-substance nozzles with internal mixing. The desired droplet size can be individually adjusted via the mass-ratio of air to liquid. In order to operate with large controlling ranges of liquid, it is necessary to integrate a pre-atomisation at the liquid side, whose flow characteristics prevent clogging. A triple-groove swirl plate was developed, which has a lesser deviation angle compared with other liquid swirl plates. For liquid control ranges of 1:5, a pressure control range of 1:25 is necessary. In practice, the nozzle is designed for a minimum throughput of 0.3 bar and a maximum throughput of 7.5 bar. At present there are five model variants, which cover the throughput range from 1 l/h to 1500 l/h.

Two-substance Nozzle with Internal Mixing

The fundamental concept of the development was the modification of the geometry of the internal mixing zone, in particular to avoid fittings prone to clogging, and to achieve a more thorough mixing of the atomising air and the liquid. This makes it possible to reduce the amount of air which the nozzle requires to produce a constant droplet size, and therefore to minimise the penetration power of the spray. As well as this, the configuration of the holes was designed to greatly increase the spray angle. The stream of liquid impinges centrally onto the tip of a cone in the mixing chamber. The resulting film is then disintegrated into individual drops by the atomising air. The flanks of this cone taper into the nozzle holes. The nozzle holes are inclined to match the angle of the cone. Liquid residues are therefore blown out in a defined manner, and the surface impinged upon is larger. The entire removable front section of the nozzle is referred to as the air cap.

Three- and Four-substance Nozzles

For combustion processes in which heating oil, waste water and liquid residues are burned simultaneously, three- and four-substance nozzle systems with external mixing are used. Schlick multi-substance units provide the possibility of very fine atomisation of several liquids at the same time, using one nozzle, and only one atomising medium (air, gas or steam). At the same time, thorough mixing of the media takes place at the nozzle exit. There is also the possibility of charging one channel with air, gas or steam, in order to create a greater exchange area between the atomising medium and the liquid. Reactions between the different liquids inside the nozzle are ruled out, as due to the external mixing of the media, they only meet at the exit of the nozzle. Multi-substance nozzles generate a full-cone spray pattern.

Atomisation in the Combustion Chamber

In the combustion of exhaust gases and residual liquids, the nozzles are mainly used in two fields: namely for the injection of residual liquids into the combustion zone or the combustion chamber, and for injection of reduction media for selective non-catalytic reduction (SNCR) in a reaction chamber, in order to convert nitrous oxides into non-hazardous nitrogen.

In both cases, in order to achieve a good reaction result, it is necessary to achieve the most even distribution of the liquid as possible over the available chamber cross-section, together with the finest possible dispersion of the liquids. The incineration of liquids which provide energy is carried out in the highly turbulent swirl burner, the combustor. Due to the type of air supply and the form of the outflow unit, an axial motion is created, which is superimposed on the swirl flow. The result is a thorough mixing of the hazardous substances with the process air/ fresh air and the auxiliary fuel.

The rotary flow created in such a manner that it:

- brings about an extremely rapid mixing of the reactants in the highly turbulent regions, and therefore enables a complete conversion of the hazardous substance and the fuel in the smallest possible space.
- the combustion process is stabilised with regard to flow, and therefore ensures reliable combustion behaviour even under extreme conditions.

The fine dispersion of the residual fluids in the swirl field also ensures the rapid and residue-free conversion of the hazardous substances. The energy content of the liquids compensates for the fuel consumption. If the energy content is high enough, the use of an auxiliary fuel can be dispensed with.

Boundary Conditions for Complete Combustion with the Nozzle System

- The volumetric average droplet diameter should be between 20 – 40 µm
- Homogeneous distribution of fluid over the entire cross-section
- Liquid control range up to 1:10
- Temperature resistant
- Corrosion resistant
- Not prone to clogging, in order to ensure uninterrupted operation
- Maximum contact area between the spray and the combustion air
- Even distribution of velocity with sufficient exit velocity for optimum utilisation of the combustion chamber geometry.

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A Winning Series

Serial Pump Installation Leads to Higher Performance

The more spectacular the building project, the more difficult the drainage. When the pumping distance becomes too great for any one pump, Japanese experts recommend installing waste water pumps in series. Today, ambitious tunnelling projects are demonstrating the feasibility of this solution.

Two main factors determine the performance of a pump: Maximum flow and maximum head (or lift). The maximum flow indicates the highest possible volume under ideal circumstances. Usually this means an outside temperature of 15 °C, a homogenous medium and pumping completely on the flat. This third factor directly affects the maximum head: The greater the incline or distance, the higher the demand for power. If a project calls for vertical pumping, the pump needs to generate enough flow speed to lift the weight of the water column. In addition, the specific weight of the medium as well as its viscosity will play a role in selecting the right pump.

120 m Riser Pipe

Sometimes construction projects require a level of performance, which cannot be fulfilled by any one pump. One example is the Koralmtunnel in Austria, which at 32.8 km will be the longest rail tunnel in the country. It will connect the cities of Klagenfurt and Graz following a route that will cut down journey times substantially. Its construction presents a serious geotechnical challenge. Exploration tunnels are currently being built to evaluate the feasibility of the route, which will pass at depths of up to 1,200 m.

Construction companies Max Bögl Bauunternehmung and Swietelsky Baugesellschaft are already on site carrying out this initial phase of the project. Starting from the west portal, the 2.6 km long Mitterpichling section is close to completion. Work has also begun on the 6 km long Paierdorf connection tunnel, where the ground water had to be delivered upwards via the supply shaft – a true show of strength bearing in mind the 120 m vertical climb involved. Considering the scale of the task it was unsurprising that no single-solution pump could be found at an acceptable cost.

About 900 m stretch of pumping in the Blessberg Tunnel in Austria: Chains of pumps of such lengths and more are possible when connecting pumps in series

To solve such problems, experts from pump manufacturer Tsurumi developed an efficient cascade connection system. Two rising pipes are installed in the shaft and smaller pumps are fitted at 40 m intervals. The units are equipped with a pressure relief valve, so that the accumulated water does not damage the mechanical seal.

At the base of the shaft the abrasive ground water is channelled into a basin, into which the lowermost pumps are submerged. This solution has delivered such positive results that the operating company are now using 17 Tsurumi pumps in the €145 million project.

The pumps to be used come from Tsurumi's KTZ-range. These multi-purpose pumps, designed for tough jobs, are best-sellers for the global market leader whose European operation is headquartered in Düsseldorf, Germany. The company's range includes 250 models offering delivery volumes of up to 50 m³/minute or 170 m head. The model currently installed on the Paierdorf site has an 11 kW motor power and is equipped with a four inch coupling, which can deliver 1,440 l/minute.

Failure-free Dry Running

Many of the KTZ's components are made of special cast iron, which improves their resistance to abrasion. Further technical features distinguish the Japanese pumps from their European counterparts. The unit's dry-run capability is of utmost importance: If water delivery is interrupted because the water level in the basin is nearing zero, then there is no risk of a KTZ pump overheating and breaking down, even though it is no longer being cooled by the pumped liquid. This can be a particularly difficult issue in cascade connection, since the pumps are often sited at inaccessible locations because of the nature of the work. Owing to the huge economic and safety implications of failure risks, Tsurumi manufactures its pumps with a preventative double interior mechanical seal and patented oil lifter. Additionally, an insulated shaft sleeve keeps the medium away from the shaft, to prevent mechanical wear from day one. With design features like this aimed at protecting components from wear and tear, the pump can operate continuously at full power – an important benefit which has proven popular with operators.

Tsurumi's multi-purpose KTZ pump

Horizontal Pumping

Another application for Tsurumi pumps saw the manufacturer take a new direction during the construction of the 8.3 km long Blessberg rail tunnel, which will house the new high speed line between Nuremberg and Erfurt in Germany. Lead contractor Bickhardt Bau required a dewatering over a horizontal distance of 930 m. Tsurumi engineers installed the reliable KTZ-pumps, on this occasion opting for the smaller KTZ35.5 model. With only a 10% height differential to overcome between the tunnel head and the entrance, pumps were installed every 150 metres to serve as a booster in the delivery flow, giving problem-free drainage. The 5.5 kW KTZ235.5 comes equipped with a smaller three inch discharge, and offers a delivery of 1100 litres per minute – more than sufficient for the project.

Difficult terrain does not always necessitate powerful and expensive pump technology. Tsurumi offers small, mobile multi-purpose pumps, which are equally suitable for these kinds of application, not least because they are versatile enough to be re-used at other locations on the same the project. Whatever the ultimate purchase decision is, the chosen pumps should always be dry-run capable since continuous operation is vital to meet the demands of most drainage projects.

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Time To Act

New GHS Procedures to Be Implemented Soon

Without a doubt, the focus of compliance discussions in recent times has been on the new European chemicals legislation Reach. While these have been taking place, however, a second system has been introduced – the Globally Harmonised System of Classification and Labelling of Chemicals (GHS). This new set of regulations came into effect in Japan in December 2006, although the EU has granted companies a much longer transition period. Nevertheless, there is already an urgent need for practical compliance management solutions among global players in the chemical sector to help them fulfil all the regulatory requirements that exist around the world.

The A3 highway near Limburg, Germany, was closed completely on 5 September 2006 when a truck carrying hazardous goods was involved in an accident on the Lahn Bridge and burst into flames. Because the load did not display any hazardous goods labelling, the fire services extinguished it using conventional means. As a result, the chemical mercaptobenzothiazole, which is hazardous to waterways, was released in the river. This accident underlined the importance of implementing an effective system of compliance management. Basically, this involves recording the properties of dangerous substances accurately with no risk of confusion and making legally required documentation, such as safety data sheets or labels for dangerous substances and dangerous goods, available along the entire process chain.

The United Nations introduced the GHS in 1992 to ensure consistent communication worldwide and to replace the national classification and identification systems for substances and preparations with an international solution. For communication to be effective, the content and structure of the labels and safety data sheets has to be standardised. By doing this, the system aims to minimise the risk to humans and the environment caused by the production, transportation and use of chemicals. GHS labels will then be interpreted in exactly the same way on German highways as they are in Asian ports or U.S. airports. The GHS also aims to abolish many of the obstacles to trade created by the plethora of national regulations.

National Implementation

Implementation of the GHS is finally underway after years of institutional preparation. Many countries, including Brazil, New Zealand and Thailand, already accept GHS documents as an alternative to their national provisions. Japan has gone a step further: Since December 2006, the country has requested GHS-compliant labels for particular hazardous substances. Companies that want to produce legally compliant safety data sheets and labels therefore have to act now and introduce Globally Harmonised System.

Compared to the pioneers of the system, the EU is taking much longer to introduce GHS. Its launch is expected in April, which means it will be implemented in parallel to Reach. The present legislation on classifying and labelling chemicals and hazardous substances is to be replaced fully by the GHS by 2014/15. There will be two stages to the transition – the first for substances (by 2010) and the second for preparations. Concrete plans have been drawn up to a greater or lesser extent for the U.S. and China, too. GHS will not be introduced there before 2008, however.

Different Approaches

In order to standardise the classification process at a national level, some countries are currently compiling central classification lists for substances. Japan and New Zealand lead the way in this respect and have already published their first lists. In the EU, discussions have focused on a list of carcinogenic substances.

It is to be expected that the country- or region-specific lists will deviate from one another. This is due to the fact that different data can be entered in the classification. For example, if country A classifies the health risk of a substance using toxicity test X, country B might classify the substance differently because it uses toxicity test Y. In view of the wide range of different lists, the challenge for the integrated compliance management system is to establish an efficient means of data management that always provides the latest versions of the respective lists.

As this example clearly shows, it will not be possible to introduce the GHS consistently. The United Nations may well have passed regulations in the GHS document (also known as the Purple Book) regarding the method of classifying substances and preparations, but the Purple Book leaves a lot of room for interpretation when it comes to applying it in national legislation. The overall framework contains individual building blocks that can be removed and managed on a country-specific basis. The EU intends to make wide use of this.

Compliance managers in global chemical companies should therefore be prepared for the fact that GHS will not represent a common language but a variety of dialects. In the medium term, the system is unlikely to reduce the existing complexity of compliance. An additional complication is that many countries have not yet decided if and when they are going to introduce the GHS. Increasingly, companies will use integrated compliance management systems to minimise the resources needed to fulfil the different requirements.

Integrated Compliance Management

No matter how long it takes to introduce the GHS, there is an urgent need for the chemical industry to act. Its supply chains are globally interconnected, so GHS has to be introduced soon in order to fully safeguard the existing level of market access. The comprehensive range of substances makes the changeover process highly complex. However, the complexity will decrease as companies integrate GHS into their business operations. An effective approach is to embed the compliance management solution into the enterprise resource planning (ERP) system and thus maximise the automation of the compliance processes.

On the one hand, this allows the required operational data to be transferred to the classification and labeling process without having to change system. On the other, the integrated system forwards the created documents directly to the parties who are charged with providing evidence of GHS compliance. However, to gain effective results from a largely automated process, existing IT systems have to be adapted accordingly.

Complex Adjustment Process

The GHS-specific further development of Technidata CSM shows the tasks that have to be resolved. In this compliance management solution, which is integrated in SAP EH&S, the new regulatory requirements affect various IT building blocks. This starts with the design of the database fields (characteristics) in which the GHS-compliant data is to be entered. It is important not only to have the right structure but also to ensure that users can store both existing and future GHS classifications during the transition period. The system must also be able to manage regionally distinct GHS classifications.

The list of new identification terms (e.g. risk alerts and signal words) that are defined in the GHS classification system must be incorporated into the current catalogue of text modules (phrase catalog). It is fundamentally important to provide these texts in as many languages as possible. The GHS can only be understood worldwide if the documents are available in each national language.

When these technical conditions have been met, the raw material data can be entered. The compliance management system helps the user to do this by providing basic data such as classification lists. However, the user will often have to contact manufacturers and suppliers or carry out detailed searches in specialist databases. It is also likely that more data will be available about particular substances as a result of Reach.

The raw material evaluation includes the classification of preparations (recipes, mixtures). GHS has a defined procedure for all risk classes that uses decision trees and calculation formulae to assign classifications. This is made a lot easier for users through programmed algorithms (expert regulations) that determine the necessary classifications from the recipe and ingredient data. It may be necessary to calculate regional classifications.

Finally, the layouts (WWI templates) of the safety data sheets and labels will also have to be adapted to meet the new requirements. This is because GHS includes a range of special information, risk symbols and formats that differ from the existing national systems.

Narrow Time Window

The compliance management system will only be able to create GHS-compliant documents if all these building blocks fulfill the new requirements. The complex changeover process requires a great deal of planning. Managers should act now to ensure that chemical companies can meet all the current and future requirements for safety data sheets and labels in good time. The time window has already closed for the Japanese market. The situation in the EU also means that it is in companies' best interests to establish a system of compliance management that also meets the requirements of the Globally Harmonised System.

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TechniData CSM

Technidata CSM (Chemicals Safety Management) provides a complete system of compliance management for the process industry. The solution enables companies to meet all the raw material and product data management requirements for handling hazardous substances and goods, registering chemicals and creating safety data sheets and labels. The IT solution is based on SAP EH&S (Environment, Health and Safety). It helps companies to fulfil future requirements in time by taking regulatory changes into account quickly. Technidata provides a best practice solution for implementing the software, which is based on the experience gained from numerous implementation projects and addresses specific CSM processes. The presettings and compliance data delivered with the solution means companies can begin using the compliance management system immediately after installation.

GHS

The objective of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) is to standardise the classification and identification of substances and preparations worldwide. To achieve this, the GHS aims to standardize the content and structure of the labels and safety data sheets, thus reducing the risks to humans and the environment caused by the production, transportation and use of chemicals. GHS will gradually replace the different national systems. Many states, including Brazil, New Zealand and Thailand, already accept GHS documents as an alternative to their national provisions. Since December 2006, Japan has requested GHS-compliant labels for a selection of hazardous substances. In the EU, the switch to GHS will take place in two stages – firstly for substances (by 2010) and then for preparations (by 2014 – 15).

International CeBIT Summit

On 14 March, senior managers from around the world will have an opportunity to engage in high-level mindsharing with other industry shakers and movers. The world will be watching as visionary thinkers map out the shape of (digital) things to come – at the International CeBIT Summit. The Summit, which will take place immediately prior to the CeBIT 2007 opening ceremony – will feature high-ranking speakers from the worlds of trade, industry and politics.

The papers will cover a wide range of topics: innovation and globalisation strategies, promising new business models, technology management and more. The impact of the digital revolution on how we live and work, both today and tomorrow, will figure prominently. The International CeBIT Summit is targeted at managers and executives from every conceivable sector and will provide a platform for CEOs, CIOs and managers keen on obtaining a bird's-eye view of trends-in-the-making.

Confirmed speakers include:

- Torsten Ahlers, senior vice president audience, member of the board, AOL Deutschland
- Nikesh Arora, vice president of European operations, Google
- Willi Berchtold, president of the German Association for Information Technology, telecommunications and new media (BITKOM)
- Achim Berg, managing director, Microsoft Deutschland
- Dr. Stefan Groß-Selbeck, managing director, eBay GmbH
- Matthias K. Hartmann, managing director of IBM Germany and general manager of IBM Global Business Services
- Peter Sondergaard, senior vice president and global head of research, Gartner USA
- Ben Verwaayen, CEO, British Telecom

▶ www.cebit-summit.com

CeBIT: Bookings Ahead of Target

This year's CeBIT in Hannover, Germany (15–21 March), will not only showcase the world's best in IT and telecommunications technology, but will also feature over 1,000 conferences, conventions and dedicated forums with a program of supporting events. CeBIT 2007 will feature a international mix of about 6,000 exhibitors from 70 different countries. "While this figure is below last year's, we are ahead of our 2007 target. In this context it should be added that several recent mergers and strategic corporate alliances have led to a double-digit thinning of our exhibitor ranks since many companies who used to exhibit on their own just a year or two ago are now staging joint displays," said Ernst Raue, managing board member at Deutsche Messe.

In 2008, a brand-new CeBIT will be unveiled, which organisers say promises to boost efficiency and create even more business value for its exhibitors and their clientele. The new concept, which is the result of a concerted effort on the part of the entire CeBIT community, features several major changes, including a shorter duration (six days instead of seven), new participation options, attractive new rates and a 30-point action plan designed to help exhibitors generate even more promising leads among their respective target groups at the show.

▶ www.cebit.de

Keeping Track

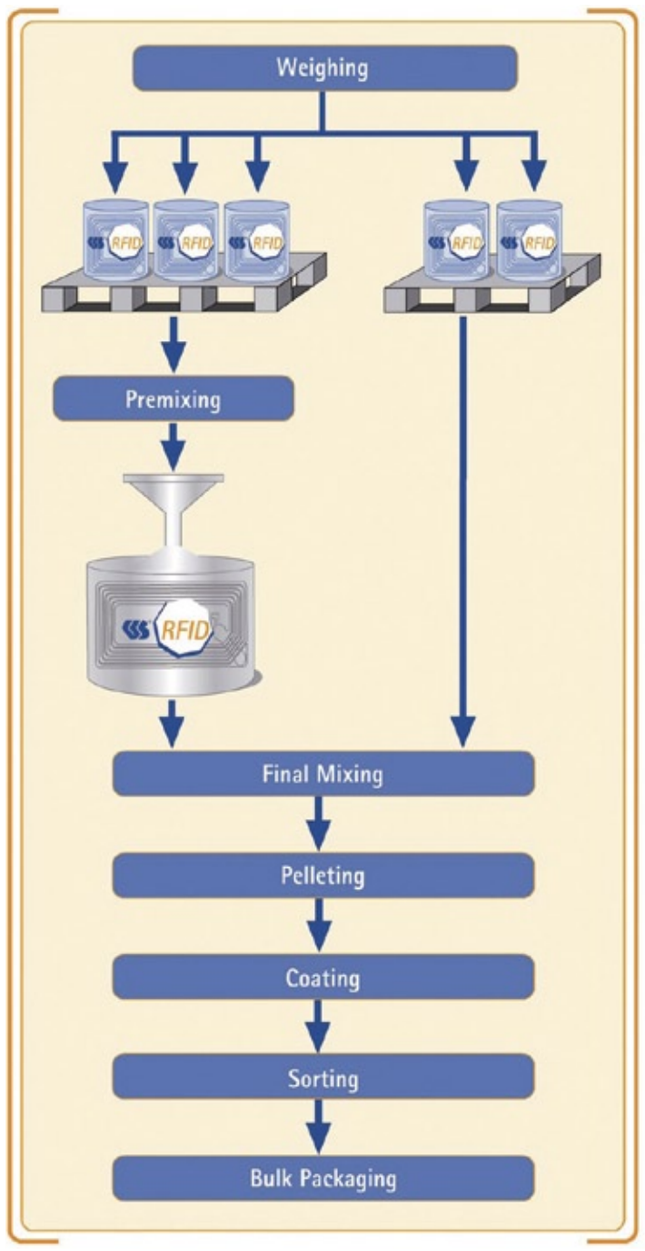
Economical Use of RFID in the Chemical Industry

The chemical and pharmaceutical industry is known to be among the most regulated industries. The current trend is going toward even stricter surveillance of production processes to guarantee adherence to legal prerequisites. This results in high requirements regarding the structuring of processes, because existing conditions are often either difficult to change or cannot be changed at all.

The main task during process restructuring is to ensure adherence to the statutory and officially required process security. Process security in this case includes the spatial separation of production steps, avoidance of cross transports and securing handling of the processing steps by qualified employees.

This could affect production start if different substances come together during weighing or mixing.

Since all containers need to be recorded and their stock managed by the system, container management is a useful aid for process optimisation. By managing the containers through the system and with the help of transponders, contents can be assigned, stocks can be updated, goods entry and exit can be registered and the storing location can be determined.



This should increase transparency in order to meet the high quality requirements and to avoid mistakes. Aside from improving process security, further requirements should be addressed: the possibility of an ergonomic and maybe accelerated cycle as well as operational process optimisation while ensuring cost efficiency. RFID is the perfect technology for realising this restructuring of processes and the associated goals.

Procedures And Data Analysis

In the chemical and pharmaceutical industry, there are various process steps that require special attention and are subject to legal and official restrictions. For example, spatial separation of different process steps is one of the main requirements which often can not be put into practice due to technical reasons.

According to current official requirements though, only one product may be in a production room at any one time. This regulation especially affects critical route crossings of single additives and components in elevators or at gates, cross transports.

Furthermore, tracing components in the warehouse is not possible if they are in use (i.e. if they are part of the "Work in Process" stock). An order-specific route planning for transportation must be secured and mixing with other orders must be avoided. This, however, is currently made difficult by missing data for the components in the warehouse. As a result, inter-process communication (IPC) checks still need

to be carried out in many cases to control the content of each container for completeness and correctness and to take corrective measures, if necessary. This leads to delays, additional costs, and blocked lab capacities.

Using RFID technology in combination with the industry-specific ERP software, CSB-System provides a solution to these problems. The system solves identification problems and controls each process step thus complying with economically necessary and officially required process security while reducing costs. In a first step, however, the main logistic processes need to be identified and checked thoroughly and all containers involved must be fitted with RFID transponders.

For example, the automatic door opening system, which is quite common in this industry, can be linked with the CSB-System and controlled by it. If a production employee registers an order in one of the production rooms, the system checks the authorisation/qualification of the employee and the correctness of this production step based on the information it has saved. Once both checks have turned out positive, the door opens and the next production step can be carried out.

Even interim containers with premixed substances are fitted with RFID transponders and can be traced just like basic material due to their container label and specifications. The RFID transponders allocated to an order ensure that the correct components are processed in the right production room by a qualified employee. This is achieved by searching the components list for the container or its content. That way, IPC checks become redundant because quality and completeness are controlled by the system. The degree of integration that the customer chooses determines the extent to which all activities are documented through RFID transponders. Management of the containers within a company is paperless in most cases.

The CSB-System in combination with RFID technology facilitates ergonomic work processes and provides an economically sensible solution: relatively fast amortization of the invested money as well as secure and controlled production that fulfills all official requirements.

The transponders that are attached to each container have an identification label (transponder ID) consisting of several alphanumeric characters. This transponder ID is then linked via a reference table (which usually resides on the CCM server) with the container label. When the transponder ID is read, its data is compared with the system data for a match.

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Visit CSB-System at this year's CeBIT, 15–21 March in Hannover, Germany Hall 5, Booth D16

Small And Flexible

Moorfields Pharmaceuticals Specialises in Unique Products

The Moorfields Eye Hospital NHS Foundation Trust, located in London, UK has invested over £12 million in their specials (unlicensed medicines) sterile manufacturing facility to create Moorfields Pharmaceuticals, a manufacturing facility specialising in the manufacture and supply of sterile liquid products. Based in London, the vast majority of the products Moorfields Pharmaceuticals now makes are not manufactured anywhere else in the world. The facility's remit has been to enable clinicians and researchers to ensure patients receive the most appropriate treatment for their clinical conditions. This has resulted in staff at Moorfields Pharmaceuticals building up a reservoir of knowledge from manufacturing a vast array of different products, unlicensed and licensed, often preservative free presented in unit dose form.

Alan Krol, managing director of Moorfields Pharmaceuticals, explained, "The hospital was very entrepreneurial when they took the decision to develop the facility. They recognised the benefits, not only to protect their own security of supply, but also to create an entity which could deliver more back to the NHS. We were created as an autonomous organisation, able to operate in a commercial fashion, so we can be truly competitive with a clear, commercial focus.

"Demand for formulations in use at Moorfields has grown, we now are able to supply product to clinicians all over the world, and, in order to continue manufacturing, we have to meet international regulatory requirements. This requirement has partly driven the hospital's decision to invest."

The manufacturing facility, which is completely underground, is designed to run short to medium runs, from a single unit up to 50,000. Krol said the customers will most likely be mainstream pharma companies or small research-based organisations at the early stages of clinical development.

"Very few companies want to get involved with the small, fiddly stuff," Krol said.

Currently employing 40 employees, Moorfields Pharmaceuticals is a small organization in pharmaceutical terms, but the team has already increased sales of products by 40% since its inception. A recent Medicines and Healthcare products Regulatory Agency inspection identified the facility as achieving the same standards as the best in the pharmaceutical industry. Alan sees the size of the organisation as a positive.

Moorfields Pharmaceuticals specialises in the manufacture and supply of sterile liquid products.

"We are truly flexible," he said. "We are used to dealing with our customers in a very direct way. We frequently develop products alongside specialist clinicians, our manufacturing expertise complimenting their clinical knowledge. As we have grown and our status has changed, we have boosted the team with people who have a broader experience of the pharmaceutical industry as a whole."

The organisation plans to achieve growth via three routes. The first is by taking a larger market for specials. Moorfields Pharmaceuticals have a natural advantage, as clinicians tend to come to them first to ask about formulations. The hospital trust's reputation is acknowledged world-wide. Since the investment, the organisation is far better placed to meet this demand quickly, with many products being manufactured for stock.

Secondly, the company has introduced new products driven by demand. The first product developed through this route is ready, and additional products are in the pipeline. As there is currently a strong demand for preservative free formulations and increased concern over microbial contamination, Moorfields Pharmaceuticals has developed the ocular lubricant Hypromellose as a preservative-free formulation; it was manufactured in unit dose form to meet this need. Further products are following a similar development route.

And finally, they intend to chase the clinical trials business available from big pharma to virtual or manufacturing free R&D organisations. For all contract manufacturing organisations, clinical trials are the Holy Grail. Typically high value, short run work these partnerships are very attractive, but competition is fierce. It is now a truly international market with companies using cutthroat competition to get in at the early stages with a view to maintaining the relationship to reap rewards in the long term.

Nick Precious, Moorfields technical director, is in talks with several organisations with a view to utilising Moorfields facilities; he said their offering is different to a typical steriles contract manufacturer.

"We are looking for people with a strong pipeline of broad based research, such as organisations in pre-clinical toxicology studies or early Phase 1 and 2 work. There is a need for a fast response to these companies' requirements; they need to be able to demonstrate success – or failure – fast.

"It is very common for manufacturing companies to plan at least 12 weeks in advance. We are designed to be able to take on manufacturing at very short notice, to literally answer a telephone request for a formulation immediately," Precious said.

Worldwide revenue for contract manufacturing and research is expected to rise to US-$168 billion in 2009. Contract manufacturing of over-the-counter (OTC) and nutritional products are the largest and fastest growing segments and are expected to be worth US-$102 billion by 2009. Analysts maintain that solid dose will continue to make the largest revenue contribution. According to Frost and Sullivan, liquid dosage forms are expected to lose market share to injectables, which primarily include sterile products and biopharmaceuticals.

"We have evolved out of doing specials; we have to manufacture product to order, for delivery in the next 48 hours." Precious said. "This is a concept which is alien to many big pharma players. Companies say they can fill single vials – and they can – but there will be huge wastage, the lead time will be weeks and weeks and they will be very, very expensive."

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Eric Noyrez

Eric Noyrez President of Rhodia's Silcea Enterprise Rhodia announces the appointment of Eric Noyrez as president of the Rhodia Silcea Enterprise and member of the group's executive committee. He will also represent Rhodia in the Rhone-Alpes region of France. Noyrez joined the Peugeot-Citroen Group in 1986 to take up various responsibilities in automotive design projects. He joined Shell in 1989 to develop the automotive business and headed several businesses until 2000. He joined Rhodia Polyamide as Business director for the Automotive market, then managed marketing and sales programmes for the group. Since 2005, he has been Rhodia Silcea's general manager for the Silicas and Electronics & Catalysis activities.

▶ www.rhodia.com


Monika Engel-Bader

Monika Engel-Bader President of Chemetall Rockwood Holdings has announced that Dr. Monika Engel-Bader has been appointed to the position of president of Chemetall and related businesses. In this position, Engel-Bader will have full responsibility for Rockwood's global specialty chemicals segment, consisting of surface treatment, lithium/fine chemicals, special metals and metal sulphides. Engel-Bader joined Rockwood in February 2004 as president of Chemetall's Lithium/Fine Chemicals business. She previously spent 15 years with Celanese Corporation (formerly Hoechst AG), most recently as vice president of Ticona, the technical polymer division of Celanese.

▶ www.chemetall.com

Air Products Appoints New VP, Chief Technology Officer Air Products has named Montgomery Alger vice president and chief technology officer. Alger brings to Air Products more than 23 years of technology, engineering and business management experience at General Electric, where he served most recently as general manager of technology for GE Advanced Materials (silicones and quartz), which became Momentive Performance Materials when Apollo Management, L.P. acquired the business in late 2006. As chief technology officer, Alger has oversight responsibility for Air Products' global research and development activities. He will report to John Jones, chairman and CEO.

▶ www.airproducts.com


Daniel M. Bradbury

Daniel M. Bradbury CEO of Amylin Pharmaceuticals Amylin Pharmaceuticals announced that Daniel M. Bradbury has become president and CEO. He succeeded Ginger L. Graham, who had led the company since 2003. In June 2006, Bradbury was named president and COO and became a member of the board of directors. He previously served as executive vice president from June 2000 until his promotion to COO in June 2003.

▶ www.amylin.com


Jerry R. Repass


J. Parker Smith

Eastman's Repass Retiring; Smith Named Successor Eastman Chemical Company has announced the retirement of Jerry R. Repass, vice president and general manager of Worldwide Manufacturing Support, effective 1 April. Repass will be succeeded by J.Parker Smith, currently superintendent of Centralised Maintenance and Services at Eastman's Tennessee Operations.

▶ www.eastman.com

New VP Human Resources at Air Liquide Augustin de Roubin has replaced Larry Altobell, who retired at the end of 2006, as vice president of human resources at Air Liquide. The company said de Roubin will develop a human resources policy in the global business lines and the main geographical zones, and will encourage career development, international opportunities and diversity.

▶ www.airliquide.com


David N. Weidman

Celanese Appoints New Board Chairman The board of directors of Celanese Corporation announced that it has appointed David N. Weidman, president and chief executive officer of Celanese Corporation, as chairman of the board replacing Chinh E. Chu. Chu resigned as chairman but will remain on the board of directors. Weidman will continue his role as the company's president and chief executive officer.

As a result of its reduced ownership position, the Blackstone Group will reduce its representation on the Celanese board of directors. Benjamin J. Jenkins, senior managing director, The Blackstone Group, will resign his Celanese board position effective 26 April, the date of the company's annual meeting of shareholders, reducing the number of directors on the board from 11 to 10.

▶ www.celanese.com


Brent Cross

Brent Cross New PPSA President Brent Cross, Global N-SPEC Manager for Brenntag Oil & Gas, has been named president of the Pigging Products & Services Association (PPSA) for a one-year period. The PPSA was formed in 1990 and is one of the major platforms in the Oil & Gas industry with a total worldwide membership of over 80 companies. The association is providing information and intelligent pigging technology as well as services for pipeline operators and the piping industry in general. Pipeline pigs are cleaning or inspection devices that are pushed throughout the length of a pipeline.

▶ www.brenntag-oilandgas-europe.com
▶ www.ppsa-online.com

Nova Chemicals Announces Board Changes Nova Chemicals Corporation announced that J.E. Newall, chairman of the board of directors of Nova Chemicals, will step down as planned at the end of his current term at the annual shareholder meeting on 12 April. The company also announced that James M. Stanford has been elected by the board to succeed Newall as chairman, and Chris Pappas, Nova Chemicals' COO, has been appointed to the board of directors.

▶ www.novachem.com

Pfizer: Constance J. Horner Elected Leader Director Pfizer said that Constance J. Horner, a member of the company's board of directors since 1993, has been elected lead director. She succeeds Dr. Stanley O. Ikenberry, who has announced plans to retire from the board in accordance with Pfizer's mandatory retirement age. Horner will preside over executive sessions of Pfizer's independent directors and will facilitate information flow and communication between the directors and the chairman, in addition to other duties specified by the board. Going forward, the lead director, who will be elected annually, will be expected to serve a multi-year term. Horner also serves as chair of the board's Corporate Governance Committee.

▶ www.pfizer.com

Bayer MaterialScience: Dr. Axel Steiger-Bagel Chief Administration Officer Dr. Axel Steiger-Bagel has been appointed chief administration officer (CAO) of Bayer MaterialScience. He will be a member of the management board and executive committee of this Bayer subgroup. Steiger-Bagel succeeds Prof. Dr. Gottfried Plumpe who is leaving the company by mutual consent. Steiger-Bagel has been senior Bayer representative and Bayer Healthcare senior country representative in Turkey since mid-2006.

▶ www.bayermaterialscience.com

'Reach for the Sales Force'

The Chemical Business Association (CBA) has launched a key programme of one-day seminars for sales people on the new Reach legislation. CBA are offering the seminar programme in two forms: a dedicated in-company event held on company premises or, alternatively, a seminar for any CBA member or non-member to be held at the association's head office in Crewe on 5 June. The seminar is priced at £97.50 + VAT for CBA members and £150 + VAT for non-members. The seminar is for a maximum number of 14 delegates.

Full-day in-company seminars are also available and are priced at £1,050 + VAT for a maximum number of 16 delegates.

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Agilent: Company of the Year

The technical instruments newsletter Instrument Business Outlook (IBO) has named Agilent Technologies as its 2006 Company of the Year. The award recognises noteworthy achievements of Agilent's life sciences and chemical analysis business.

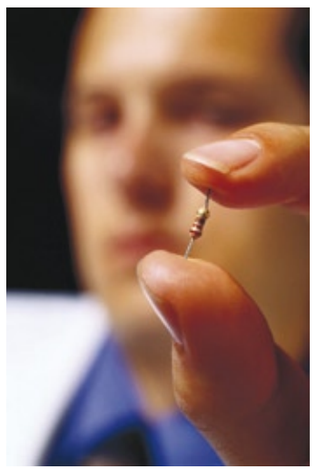
The IBO award, now in its second year, honours an instrument maker that has accomplished significant technical, operational and financial achievements during the previous calendar year, as measured by financial performance, market leadership, product introductions and key strategic investments.

In its 15 January issue, IBO praised Agilent Technologies' bio-analytical measurement business for transforming itself into a powerhouse in the years since Agilent was founded in 1999.

▶ www.chem.agilent.com

Nanotech Northern Europe

Nanotech Northern Europe 2007 (NTNE 2007) takes place for the third time, in Helsinki, Finland from 27w–29 March. Keynote speakers will include Professor Shuji Nakamura, winner of the 2006 Millennium Technology Prize, and the 2005 Japan Prize winner Professor Erkki Ruoslahti. NTNE 2007 is held in parallel with Chem-Bio 07, providing combined overview of nanotechnology, chemistry and biotechnology. The NTNE 2007 Congress will feature leading international experts, representatives of industry, investors and policy makers. The main themes of the congress will cover new solutions in nanoelectronics and nanophotonics, nanotechnology instruments and tools, nanomaterials and particles, and nanobiotechnology and diagnostics. The event aims to accelerate



development from scientific research into industrial processes and consumer goods.

▶ Spinverse Consulting
Fax: +358 9 2517 7888
www.spinverse.com
www.nanotech.net

Technology Excellence Congress

Bayer Technology Services will present the 3rd International Technology Excellence Congress 18–19 April in Shanghai. Lectures from academia and industry will describe in details principles and examples of execution of investment projects, process management, expert consulting and process innovations for the chemical and pharmaceutical industry in China. Target groups are the top management in the field of production and R&D, opinion leaders and investors in China.

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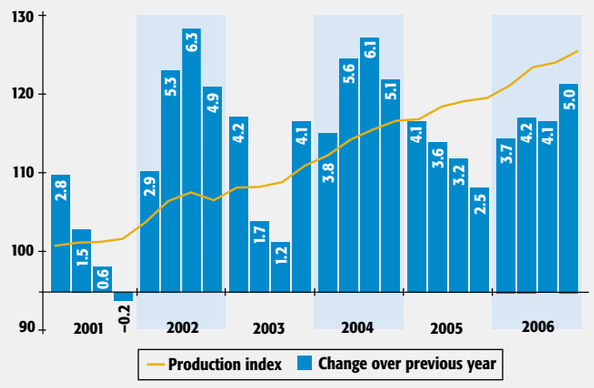
EU Chemicals Regulation 2007

Informa Life Sciences EU Chemicals Regulation 2007 brings together two conferences: Regulation of Chemicals in Europe and Biocidal (Non-Agricultural Pesticides) Products Directive. This is the leading meeting place for regulatory affairs professionals involved in the U.S. chemical industry. The event will take place 1–2 May at the Georgetown University Conference Hotel-Marriott, Washington, D.C.

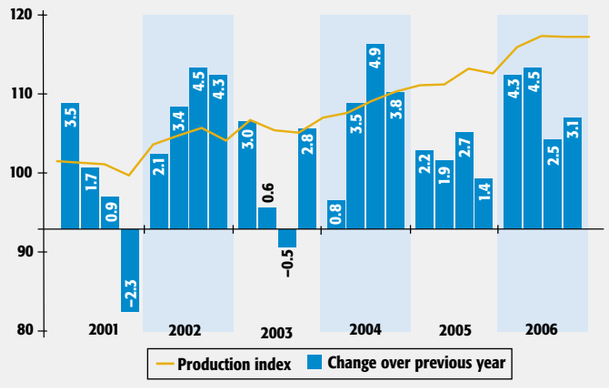
▶ www.iir-events.com

Worldwide Chemicals Business

Chemical production worldwide
Seasonally adjusted, index 2,000 = 100



Chemical production in the EU active ingredients
Seasonally adjusted, index 2,000 = 100



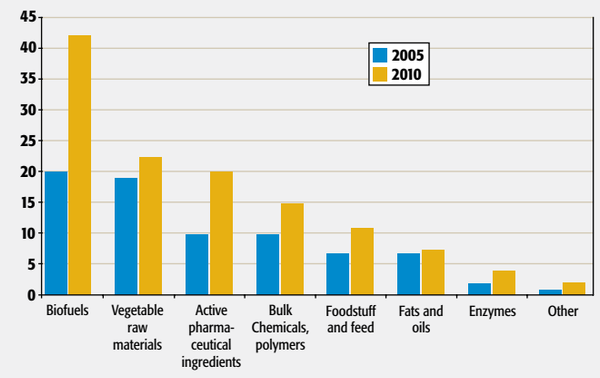
Source: VCI

The chemicals business performed well globally in 2006, and chemical production enjoyed strong growth. Growth picked up speed over the course of the year, and following a promising beginning, global chemical production rose steadily from quarter to quarter. The average growth for the year was 4.2%. This was an improvement over 2005, although it was also considered a good year in its own right.

With growth at around 2%, the European chemical business cycle was disappointing in 2005. The industry changed gears in 2006 with a growth of 3.6%, which was significantly more than the long-term growth trend. The European chemicals business boomed in 2006, due in part to a rise in exports, an increase in business within Europe and an increase in domestic demand. Investments and consumption also invigorated the market.

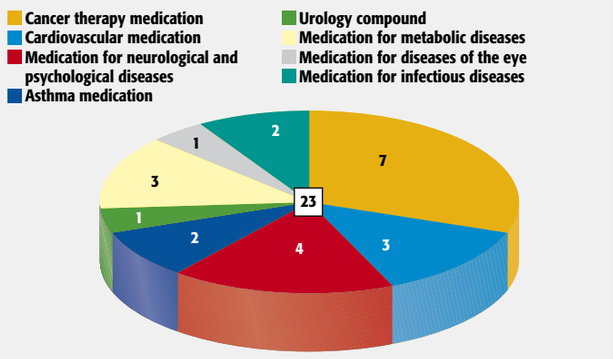
Biotechnology & Pharma

Worldwide turnover of biotech products in 2005 and in the future



Source: VCI

Therapeutic fields and number of new active ingredients in 2005

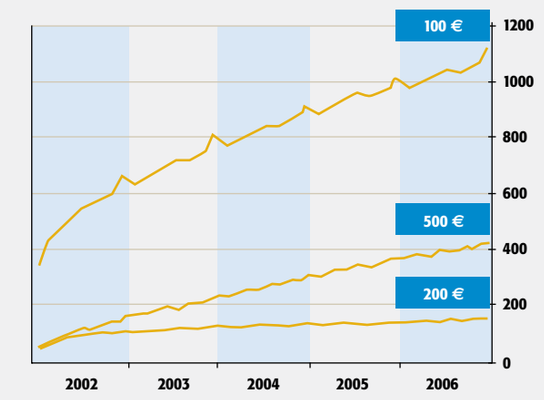


Source: VFA

According to McKinsey & Company, industrial biotechnology – counting products made from biobased feedstocks or through fermentation or enzymatic conversion – accounted for 7% of sales and US-$77 billion in value within the chemical sector in 2005. The consulting firm predicts that by 2010, industrial biotechnology will account for 10% of sales within the chemical industry, accounting for US-$125 billion in value. Biotechnology also plays an important role in the development of new active ingredients for the pharmaceutical industry. A total of 23 new active ingredients were approved in 2005. Since 2004, the main focus of active ingredient innovation has been on improving cancer treatment. Two of seven oncological compounds are used for lung and colon cancer. Two other medications in this class were developed to relieve the side effects of cancer treatment.

The Euro at a Glance

Number of euro notes in circulation

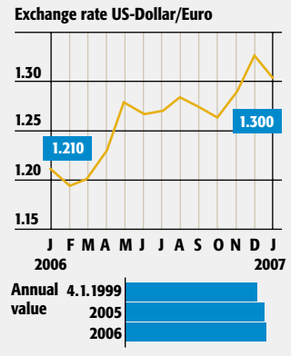


Source: FAZ Sonntagszeitung

The European Central Bank has ascertained that more and more euros are in circulation. Particularly popular are €50, €100 and €500 bills. According to the bank, circulation of the purple-coloured €500 bill has gone from 61 million in 2002 to 419 million by the end of 2006. To cover demand and wear-and-tear, the central banks in the EU countries are to print 190 million €500 bills, with a worth of €95,000 million.

Value of the euro

Exchange rate US-Dollar/Euro



Exchange rates in January 2007		Change in percent over...	
1 Euro is...		January 2006	Euro-Start 4.1.1999
Dollar (USA)	1.300	7.4	10.3
Yen (J)	156.6	12.0	17.1
Franc (CH)	1.616	4.3	–0.1
Pound (UK)	0.663	–3.3	–6.7
Kronen (S)	9.080	–2.5	–4.1
Kronen (DK)	7.454	–0.1	0.1

Monthly average; source data: German Federal Bank, European Central Bank

Source: IWD

In its study "Euro Money Market Study 2006," the European Central Bank (ECB) reported that the aggregated turnover of the euro money market increased strongly in the second quarter of 2006, after two years of slow growth. This increase was particularly strong for overnight indexed swaps, forward rate agreements and other interest rate swaps, which recorded a yoy growth rate of over 40%.

Volcanoes And Nanotechnology

Since their discovery in the early 1990s, carbon nanotubes and carbon nanofibers – tiny structures made of pure carbon – have been used in a wide variety of applications. They have become indispensable in the nanosciences and nanotechnology. However, because their production on an industrial scale remains expensive, their commercial use in such areas as catalysis has remained unthinkable. This could now be changing, thanks to researchers from the Fritz Haber Institute in Berlin: Dang Sheng Su and his co-workers have used igneous rock from Mount Etna to produce carbon nanotubes and fibers directly by deposition from the gas phase. As they explain in the journal Angewandte Chemie, the naturally occurring iron oxide particles in lava make it an effective natural catalyst, possibly smoothing the way to a more efficient production method.

Lava rock is extremely porous and contains large quantities of finely divided iron oxides. This is just what is needed for the synthesis of these tiny carbon structures. The researchers pulverize the rocks and heat them to 700°C under a hydrogen atmosphere. This reduces the iron oxide particles to elemental iron. When a mixture of the gases hydrogen and ethylene is directed over the powder, the iron particles catalyze the decomposition of ethylene to elemental carbon. This is deposited on the lava rock in the form of tiny tubes and fibers. The catalyst is produced naturally in large quantities and is thus affordable; the catalytic iron does not need to be deposited on any kind of substrate, as the lava is both catalyst and substrate in one; and this process works without any "wet" chemical steps.

The geological aspect of this reaction is also quite interesting: if a carbon source is present, carbon nanotubes and fibres can be formed on minerals at relatively moderate temperatures. Volcanoes produce gases such as methane and hydrogen. Could these forms of carbon already have been generated on earth millions of years ago? Hydrogen, carbon oxides, and metallic iron are also present in interstellar space – could these little tubes and fibers be produced in space?

Orginial publication; Dang Sheng Su et al.; "Natural Lavas as Catalysts for Efficient Production of Carbon Nanotubes and Nanofibers"; Angewandte Chemie International Edition 2007.

▶ www.fhi-berlin.mpg.de

Coming up in issue 3/2007

- Challenges in the power plant business
- Operational excellence at API sites
- Increasing reliability while reducing maintenance costs

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