PUMP engineer

Volume 5, Issue 3, May 2007

COVER STORY

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Cover
Enjoying strong growth, Tycon Alloy Industries is expanding its main manufacturing plant

COVER STORY 16

The quest for energy

That the world's energy needs are ever increasing is common knowledge. In the past this demand came largely from the "developed" nations and their desire to consistently improve their standard of living. More recently, however, we have seen that "new, emerging economies" such as China, India, and Brazil are rapidly following in the well-trodden footsteps of the industrial giants by also massively increasing their demand for energy sources. Current conservative predictions show us, for example, that China will surpass the energy needs of the whole of North America within the next twenty-five years. Moreover, within the last few years we have become widely aware that energy resources are not as inexhaustible as we had come to think. Exploration fields for oil and gas continually move into deeper, more inaccessible, inhospitable and hazardous environments and oil sands, which until recently were thought of as being uneconomically exploitable are now, through vastly rising prices, suddenly very viable. A further factor influencing energy demands in recent times has also been the desire of many countries to limit their energy needs from politically unstable regions of the world so that their economies cannot be threatened by the politics of others. Such was the desire behind President Bush's recent State of the Union address when he called upon "America to produce twenty per cent of its energy needs from renewable resources" while corn-based ethanol and other bio-fuels would also be used to displace some of America's reliance on imported oil. Toward these ends the US administration has proposed spending $2 billion dollars on 'cellulosic' ethanol such as wood chips, municipal waste and plant stems and another $1.6 billon on research and development. Further, the Democratic majority in the House of Representatives would one-up the President by spending about $15 billion to double automobile fuel efficiency, expand ethanol distribution and build more mass transit.

Reasons behind the decision-making towards ethanol development are energy independence and environmental concerns. However, regardless of the motive, there is a very significant lobby stating that ethanol could alleviate oil supply crunches whilst, at the same time, diminishing carbon dioxide emissions to put less pressure to climate change.

In 2005 the global market for bio-fuels was 13 billion gallons – less than 2% of global transportation fuel consumption. On the side of ethanol, however, is that production costs for ethanol can be as low as $1.10 a gallon which makes it very competitive with gasoline when crude oil is around $50 a barrel. Detractors of ethanol contend that the amount of energy it takes to convert corn to ethanol produces less energy and more emissions than if oil is just refined and combusted. In addition, in 2005 13% of the US corn crop was used to make ethanol, creating shortages and pushing up the prices of products using corn as a feedstock. A further detractor is that in Brazil, where sugarcane is presently cultivated on a massive scale to produce ethanol, the burning of crop-fields to enhance harvesting has led to the country currently holding the dubious position of third highest emitter of carbon dioxide in the world.

Whatever the results of the debate it appears that ethanol as a fuel is here with us to stay, as you can also read from James Chater's article on page 36. Already in the US there are 112 ethanol plants with another 76 already under construction. Dealing with the emissions produced from its production will be only one of the challenges facing industry during the coming years.

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Projects

Pharmaceuticals growth

Sandoz Canada has announced that it will invest USD 80 million in its Boucherville facilities as demand for its generic sterile injectable pharmaceuticals continues to grow in Canada and around the world. The USD 80 million investment includes the construction of a second manufacturing site; the expansion of the drug development laboratory, purchase of laboratory equipment and expansion of the quality control laboratory; new manufacturing equipment for the existing manufacturing plant; and the acquisition of additional land and building adjacent to the head office.

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The Netherlands: pipe vessel contract

China-based Yantai Raffles Shipyard Ltd has won a USD 78 million contract to build a flexible fall pipe bulk carrier for Dutch dredging, offshore and marine construction company, Van Oord. The company says the new vessel is designed as a bulk carrier and can alternatively be operated as a DP flexible fall pipe vessel to carry out subsea rock installation, including the stabilization, protection and covering of cables, pipes and flow lines; free span correction; upheaval buckling prevention; and filling in holes around platforms, structures and rigs. The vessel, measures 175m long, with a 26m beam and an operating draught of 10.7m. It has accommodations for 52 and has a maximum working depth of about 2000m. Built to ABS and Bureau Veritas standards, the vessel is contracted to operate in European waters, but will be capable of operating worldwide, Yantai Raffles says. Delivery is expected in 4Q 2008.

Papua New Guinea: pre-FEED study of LNG project

Santos has announced that it has entered into an agreement with ExxonMobil, Oil Search and Nippon Oil to jointly progress a detailed pre-FEED study of a standalone LNG project based on the Hides gas field in Papua New Guinea. Under the terms of the Cost Sharing Agreement, the pre-FEED study will evaluate technical and commercial merits of developing a 5.0 to 6.5 million tonne per annum LNG facility, targeting first cargos in the 2012 to 2013 timeframe.

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UK: hydroelectric plant

Scottish and Southern Energy has applied to Scottish ministers for consent to build a new 2.5MW hydroelectric power station on the Allt Coire Chaorach, near Crianlarich, Scotland. The utility said that the plant, which will be located approximately 8km to the east of Crianlarich, will produce enough electricity to supply 1750 homes. The submitted proposal is for a "run-of-river" scheme, with no storage of water.

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Malaysia: petroleum hub project

Mott MacDonald has been appointed by Asia Petroleum Hub Sdn Bhd (APH), to provide engineering designs and procurement and construction management services for a GBP 220 million petroleum terminal to be built on a man-made island in Mukim Serkat Daerah Pontian, near the port of Tanjung Pelepas, Johor, Malaysia. The petroleum hub will be owned and operated by APH, a subsidiary of KIC Oil & Gas. Mott MacDonald's project team has been briefed to design the hub with facilities to receive, store, blend and distribute petroleum products including break-bulk facilities for fully laden vessels up to 350,000dwt. It is envisaged that the island will be connected to the mainland by a bridge and will have around 950,000m3 product storage capacity with seven fixed berths for vessels up to 150,000dwt and a single point mooring system for ULCC's (Ultra Large Crude Carrier). The designs will also include tanker truck loading facilities for inland distribution, loading bunker barges as well as coasters for offshore bunkering and loading product carriers for trading and third party storage. In addition, services for the blending of fuel oil and gasoline are to be incorporated in the plan for the terminal to enable production of different grades of fuel oil and unleaded gasoline. The terminal is expected to be one of the largest, privately owned fully integrated petroleum terminals when fully operational in 2009.

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North Sea: underwater installations

Hydro has awarded a contract worth over NOK 1.2 billion to FMC Technologies for underwater installations to the Vega and Vega South fields in the North Sea. The deliveries comprise six crosstrees and three manifold modules with associated protection frameworks and systems for control and well maintenance. The underwater installations will be built at FMC's facilities in Kongsberg in Norway and Dunfermline in Scotland. The main deliveries are planned for April 2009. The Hydro-operated Vega and Vega-South fields are due to start production in the fourth quarter of 2010. The gas and condensate fields Vega and Vega South lie in 380m of water in blocks 35/8 and 35/11 about 80km west of Florø in Sogn and Fjordane. The finds are distributed between the licenses PL 248 Vega (Vega North and Vega Central) and PL 090C Vega South. The plan for development and operation was submitted to the authorities in December last year. Recoverable reserves are estimated to be 18 billion standard cubic meters of gas and 26 million barrels of condensate. At peak production, seven million cubic meters of gas and 25,000 barrels of condensate will be produced per day.

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Russia: pipeline

The Russian industry and energy ministry wants to build the second leg of a new oil pipeline to Europe bypassing Belarus and Poland in order to reduce Russia's dependence on transit countries. The ministry said that the proposed pipeline, which will have an annual capacity of 80 million tonne, will run from the Russian town of Unecha, near the Belarusian border, to the Primorsk terminal bordering Finland. It will be the second leg of the Baltic Pipeline System, which will pump Siberian oil from Russia to Germany across the Baltic seabed and on to the rest of Europe and the USA. The new pipeline will connect Unecha with the oil terminal in the Baltic port of Primorsk though Velikie Luki, allowing Russia to stop pumping oil to Europe via the Druzhba pipeline. It would also increase the capacity of the port at Primorsk to 150 million tons per year.

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China: crude oil pipeline

The plans to build a crude oil pipeline from Lanzhou to Chengdu, have been disclosed by the Development and Reform Commission of Sichuan Province at Chengdu on 6 April 2007. A feasibility study report of the project is expected to be completed by the end of this year. Oil resources in the western region will be transported by the crude oil pipeline to Chengdu and will connect to the planned 200,000bpd oil refinery in Pengzhou. The pipeline will span approximately 1000km. Pengzhou's refinery is located at a petrochemical base, 42km NW of Chengdu. According to the agreement signed between China National Petroleum Corp. (CNPG) and the Government of Sichuan Province in Beijing on 8 March 2007, the project is to be jointly invested by CNPG (75%) and the Sichuan Province (25%). The refinery is currently undergoing a feasibility study, together with an 800,000tpa ethylene facility to be built at the same time. Completion is expected at the end of 2010. According to the plan, the total investment for the Lanzhou-Chengdu Crude Oil Pipeline Project will be USD 465 million.

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Spain: undersea pipeline

Gaz de France is involved in the Medgaz project to build a 210km long undersea pipeline between Algeria and Spain. From 2009, when the project is due to be completed, the pipeline will carry around 8 billion cum of natural gas a year.

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Clean power from coal

Pulse, a privately run energy company based in Queensland, Australia, has signed a USD 260.32 million agreement with Chongqing Coal Group, a state owned coal company based in Chongqing Municipality (West China), to build and jointly own and operate four clean power plants at coal mine sites in Chongqing Municipality.. According to the new agreement, Pulse will develop four 60MW power stations in Chongqing Municipality that use technology developed by Australia's Commonwealth Scientific and Industrial Research Organization to burn low concentration vent air methane to produce clean energy. Greenfield refinery

Brazil: subsea system contract

Petrobras has awarded Cameron a USD 127 million contract for subsea systems for the offshore Brazil Gas Production Anticipation Plan (Plangas). Under the contract, Cameron will provide 22 subsea christmas trees, control systems, and related equipment. The trees will be manufactured in Cameron's facility in Taubate, Brazil. Delivery and installation is slated to begin in 2Q 2008, with additional deliveries of subsea trees and equipment to continue through 2009. Petrobras has also awarded a USD 50 million contract to Aker Kvaerner for 18 subsea christmas trees under the current frame agreement. The scope of work comprises 18 dual bore subsea christmas trees designed for 2000m water depth. The trees will be from Aker Kvaerner's subsea facility in Curitiba and will be deployed offshore Brazil.

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Deepwater offshore acreage

BHP Billiton has announced that it has expanded its Petroleum exploration portfolio with the addition of an deepwater offshore acreage in Malaysian waters. Petronas, Malaysia's national oil company, awarded the Company two offshore blocks, Block N and Block Q. The blocks are located approximately 175km offshore from Kota Kinabalu, the state capital of Sabah, in water depth ranging from 1600 to 2800m. In contracts signed with Petronas, BHP Billiton holds a 60% ownership interest in both blocks and is Operator. Petronas Carigali holds the remaining 40% interest. The awarding of the blocks is based on an exploration program to be undertaken by BHP Billiton over a seven year period. It includes seismic acquisition, reprocessing and exploration drilling in the blocks. Petronas Carigali are carried by BHP Billiton during the exploration program.

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India: gas pipeline project

Reliance Industries (RIL) has drawn up investment plans of up to Rs 8000 crore in the proposed 1100km gas pipeline from Kakinada in Andhra Pradesh to Howrah in West Bengal. The pipeline will connect West Bengal to RIL's discoveries in the Krishna-Godavari and Mahanadi-NEC basins. Additional investments ranging up to Rs 5000 crore may be made in setting up city gas distribution infrastructure in Kolkata, Howrah, Hoogly, Midnapore and Burdwan. The company plans to produce 80 million metric standard cum per day of gas from the KG basin and is working out development plans for discoveries in the Mahanadi-NEC block.

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Saudi Arabia: steam turbine orders

Elliott Co. has won several contracts for its YR steam turbine packages to be installed in various petrochemical facilities at Al-Jubail City, Saudi Arabia. Elliott will provide three single-stage steam turbine skid packages, including a speed reducing gear and lubricating oil system, for the Saudi Methanol Co. AR-RAZI V plant. The company also will deliver five steam turbines to Sipchem for the Jubail Acetyls Project, including a single-stage 204KW turbine to drive a centrifugal feed gas compressor, a 1100KW single-stage turbine to power a boiler feedwater pump, and three multi-stage steam turbine packages to drive cooling water pumps. Additionally, Elliott will build five 1000KW steam turbine skid packages to power boiler-forced draft fans for a new ethane/butane cracker project at the Saudi Kayan Petrochemical complex now under construction. Elliott also will supply two additional turbines, one producing 1960KW and the other 3130KW, to drive the cracker's boiler feedwater pumps.

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Akzo Nobel invests

Akzo Nobel is to spend EUR 250 million on building two chemicals plants in China, the first confirmed investments in a new multi-site being established by the company in Ningbo. As announced last October, a 50 hectare plot has been reserved within the Ningbo Chemical Industry Zone (NCIZ) and the two new facilities - for the manufacture of ethylene amines and chelating agents - will be the first to be constructed on what will be one of the biggest sites for the company's activities in the world. Work will begin once the relevant approvals have been obtained from the Chinese authorities. The chelating agents plant is expected to start up in 2009, followed by the ethylene amines factory in early 2010.

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China: hydroelectric power plant

Myanmar has signed a memorandum of understanding with two Chinese firms to build a hydropower plant on the Thanlwin river in the NE of the country. The agreement to build the Upper Thanlwin hydropower project was signed between Myanmar's junta and China's Farsighted Investment Group Co. Ltd and Gold Water Resources Co. Ltd. The 2400MW plant in northern Shan State, about 430mi north of the country's largest commercial center Yangon, is one of several dam projects planned on the Thanlwin river. No timeline for project completion has yet been announced.

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Uruguay: possible LNG regasification terminal

Petrobras is studying the possibility of building a LNG regasification terminal in Uruguay to meet the country's huge peak gas needs, Petrobras Chief Executive Jose Gabrielli declared.

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UK: subsea tide energy farm

Lunar Energy, a Scottish renewables company, has joined forces with E.ON to develop a subsea tidal stream power farm off the west coast of the UK within the next two years. The proposed scheme will use tidal streams - fast-moving currents created by rising and falling tides - to turn an array of eight massive turbines, each more than 20m high and sited on the sea floor up to 120m below the surface. The underwater power system will be capable of generating up to 8MW, enough power to supply 5000 homes.

Power and water for Dubai

Dubai's state-utility has invited bids for initial contracts to build the world's largest power and water plant in the emirate to meet soaring demand, according to a government official. International engineering companies have until 10 June to bid for the first of contracts to advise on the construction of the Hassyan power and seawater desalination plant. The project, also known as station "P", will be developed in two phases with a combined capacity of 3000MW and 200MIGD of desalinated water. Hassyan, to be built in Jebel Ali, located 40km from central Dubai, could cost more than USD 4 billion to develop based on plants recently tendered in the emirates.

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Hydroelectric power station in Nigeria

The construction contract for the 2600MW Mambilla Plateau Hydro power station in Taraba State has been awarded to China's Gezhouba Group Corp. (CGGC) and China Geo-Engineering Corp. The minister of energy, Dr Edmund Daukoru, said that the engineering design phase of the USD 1.4 billion dam project was currently underway and that construction would soon start, but he then struck a note of caution saying that the project would take five to six years to complete. Chinese sources say that the project could take up to seven years to complete construction and the total cost could be USD 2.5 billion. Mambilla would be Nigeria's largest hydroelectric power plant and China's largest hydro project in Africa. Nigeria's hydropower potential will see about USD 2 billion invested by Aqua Energy (Haugesund, Norway) over an eight year period and a further USD 2 billion over ten years. The company will refurbish the run-down dams located in Shiroro and Kainji in Niger and will build ten hydro power stations in the first phase, as well as run the 950MW Zungeru power plant on a build-operate-transfer basis. The company will also build hydropower stations in many locations in the country in line with the national renewable energy master plan. The new stations will be small "hyper modern" plants generating between 400kW and 50MW. The projects will be executed along selected rivers and small dams and will also provide clean water by building water treatment plants using Aqua's proprietary technology. No time span for the completion of these projects has yet been released.

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India: hydroelectric project

Patel Engineering Ltd has announced that it's JV with Gammon Ltd has bagged a INR 806 crore order for the 434MW Rampur hydroelectric project from the Satluj Jal Vidyut Nigam Ltd. Satluj Jal Vidyut Nigam Ltd is a JV between the government of India and government of Himachal Pradesh. The project is located on the river Satluj in Shimla and Kullu districts of Himachal Pradesh. The project work involves construction of a 15km long head race tunnel, a 140m deep surge shaft and power house on the right bank of river Satluj near Village Bael in district Kullu. The project will be completed in the next 54 months.

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POSM at Ningbo

China Petroleum Chemical Corp. (Sinopec) and Lyondell Chemical Co. (Houston, Texas) will jointly invest USD 576 million to build an ethylene epoxypropane/styrene (POSM) chemical factory in Ningbo, China. Total investment of the project will be USD 576 million. The project is expected to be commissioned at the end of 2009.

– CALENDAR –

12 – 14 JUNE 2007
GO Expo
Gas and Oil Exposition
Calgary Canada
Contact: +1 (403) 209-3563

13-15 JUNE 2007
Oil & Gas Asia 2007
The 11th Asian Oil, Gas & Petrochemical Engineering Exhibition
Kuala Lumpur, Malaysia
www.oilandgas-asia.com

19-22 JUNE 2007
MIOGE 2007: 9th Moscow International Oil & Gas Exhibition
Moscow, Russia
Contact: veronica.zhuvagena@ite-exhibitions.com
www.mioge.com/conference

26-28 JUNE 2007
Pumps, Valves And Pipes Africa
Johannesburg, South Africa
Contact: +27 11 783 7250/1/6/9

11-14 JULY 2007
Pumps & Systems China 2007
Shanghai, China
Contact: +65 6534 3588

4-7 SEPTEMBER 2007
Offshore Europe/Oil & Gas
Aberdeen, Scotland
Contact: +44 20 8439 8890

10-13 SEPT 2007
Turbomachinery Symposium
Houston, Texas
Contact: +1 979-845-7417

25 - 26 SEPT 2007
19th International Conference on Fluid Sealing
Poitiers, France
Contact: 44 1234 750422

5-7 OCTOBER 2007
Industrial Pumps, Valves & Systems Trade Fair
Hyderabad, India
Contact: +91 22 2410 2801-02-03-04

13-17 OCTOBER 2007
WEFTEC 2007
San Diego, USA
Contact: +1 703 684 2441

15-18 OCTOBER 2007
Pumps 2007
Moscow, Russia
Contact: : +1 495 105 3482

17-18 OCTOBER 2007
Valve World Asia Conference & Expo 2007
Shanghai International Convention & Exhibition Center, China
Contact Donald Wiedemeyer on:
Tel: + 31 575 585 282

30 OCT - 1 NOV 2007
Chem Show
New York, USA
Contact: +1 203 221 9232

30 OCT – 1 NOV 2007
SPE Oil & Gas Exhibition
Jakarta, Indonesia
www.jcc.co.id/

6-8 NOVEMBER 2007
Stainless Steel World Conference & Exhibition 2007
Maastricht, the Netherlands
Contact Donald Wiedemeyer on:
Tel: + 31 575 585 282

6-9 NOVEMBER 2007
Inchem Tokyo
Tokyo, Japan
Contact: +81 3 3434 1391

For more details about these and other events, see the calendar on Pump Engineer's website, www.pumpengineer.net. Information about upcoming events can be submitted to Mr James Chater, News editor, on Tel: +31 575 585 289, Fax: +31 575 511 099, or E-mail: j.chater@kci-world.com.

Market predicts pump increase

According to new analysis from Frost & Sullivan, North American Reciprocating and Rotary Vacuum Pumps Market, predicts demand for reciprocating and rotary vacuum pumps in North America will grow from USD 484.5 million in 2005 to reach USD 584.2 million in 2012. According to Frost, a lack of innovative products has compelled manufacturers of reciprocating and rotary pumps to compete on prices. However, Frost says manufacturers are working to stem this trend by offering engines that are more energy efficient, as well as by offering improved customer care from the time of initial contact to even after installation. Manufacturers are also promoting their products' lower servicing and maintenance requirements, as well as sophisticated controls and diagnostic systems. Frost says some participants are also marketing the reduced size of their equipment as a significant product benefit. As a result, Frost & Sullivan says dry rotary pumps are becoming increasingly popular in end-user sectors where high purity is a requirement, such as hospitals, pharmaceutical facilities, laboratories, and certain chemical-processing environments. Meanwhile, reciprocating vacuum pumps have a reputation for optimum efficiency throughout the lifetime of the equipment, which considerably reduces maintenance needs. As a result, Frost says the aerospace and defense sector have contributed greatly to the growth in demand for this pump network.

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SPX pumps help Severn WTW

Process engineers at a Severn water treatment works (WTW) are benefiting from accurate chemical dosing, reduced maintenance and reliable operation thanks to the replacement of rotor and stator pumps with peristaltic technology. The peristaltic pumps, supplied by Watson-Marlow Bredel were installed at Bamford Water Treatment Works (UK) as part of a project to optimise performance at the site. The WTW at Bamford, near the historic Derwent Water Reservoir, pump 160 megalitres of water per day. Water from the works enters a large aquaduct, which flows down from North Derbyshire through Nottingham into Birmingham. An integral part of the water treatment process at Bamford is the addition of lime slurry to control the pH of the water. The process control engineers at Bamford WTW opted for a range of Watson-Marlow Bredel SPX hose pumps to handle the lime dosing. The larger SPX40s and SPX32s are situated at the north end of the site where the dosing demand is greatest. The smaller units, including the SPX10's, SPX15's are used at the south end of the plant. The SPX25's are used later in the system, when the pH is increased to between 8 and 9 for the removal of manganese.

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Flowserve chooses Chairman

Flowserve Corp., a global provider of fluid motion and control products and services, has announced that Thomas E. Ferguson has been chosen as Chairman of the Board for the Hydraulic Institute for 2007-2008. Ferguson serves as President of Flowserve Pump Division, and was recently promoted to this chairmanship at the Hydraulic Institute's 90th Annual Meeting in San Antonio (USA).

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Grundfos Alldos enjoys strong participation at IWEX 2007

Since becoming part of Grundfos over two years ago, the Alldos and Grundfos product portfolios have continued to become more integrated, a process that will continue in 2007 with all products being co-branded Grundfos Alldos. The strength of Grundfos Alldos was already very much evident at the recent IWEX show.

In terms of dosing products, the centre of attention on the Grundfos Alldos stand at IWEX was the new, large DME dosing pumps rated to 940 lph and the DDi/209 Digital Dosing pumps with integrated Flow Monitor. Grundfos Alldos remain front runners in dosing technology, reliability and easy operation. With the new, large DME pumps, the Digital Dosing™ range covers most dosing needs with only nine models capable of supplying from 2.5 ml/h to 940 lph. There was also plenty of interest for the recent acquisition by Grundfos Alldos of Proton Water Services Ltd, a UK based manufacturer of electro-chlorination equipment for the onsite generation of sodium hypochlorite solution using brine.

In addition to the above equipment, Grundfos Alldos also displayed chlorine dioxide generators for legionella prevention, Conex instruments for residual chlorine analysis within potable water and pool water treatment, co-branded dosing pump range and dosing systems.

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Valve World Asia Show

The Valve World Asia Conference & Exhibition 2007 will be held in The Shanghai International Convention & Exhibition Centre, Shanghai, China, on October 17th & 18th 2007. Following on to the huge success of past Valve World Conferences and Exhibitions, the Valve World Asia Conference & Exhibition 2007 promises to be a valuable meeting point for valve professionals from all over the world with a special emphasis on recent developments in China. Piping and valve professionals from West & East can update their knowledge of valve applications in a variety of industries with a clear focus on the chemical, petrochemical, power generation, oil & gas and process industries. For further information: please visit www.valve-world.net or turn to page 57.

Pump manufacturing facility

Flowserve Corp., a global provider of fluid motion and control products and services, has opened its new pump manufacturing facility in Coimbatore, India. Mr Lewis Kling, President and CEO of Flowserve inaugurated the plant, at a ceremony in Coimbatore on 12 April. The facility will support the company's existing Indian operations and provide pump products, for the oil and gas, power and chemical industries.

The 100,000 square foot pump facility was built on 14 acres at an investment of USD 8.5 million. The new facility will nearly double Flowserve's production capabilities for single stage, multi-stage, barrel and vertical engineered and industrial pumps. The 200-person management and engineering staff at the operation will also provide total pumping solution services and support to the region.

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A definitive guide to pool water chemistry

A new book is now available that is a unique reference tool for pool plant operatives, trainers, consultants, technical and maintenance engineers as well as industry students. Introduced in the UK by Gaffey Technical Services Ltd and ALLDOS Ltd, a Grundfos Company, *Basic Chemistry for Pool Water Quality Management* provides a wealth of information on the chemistry, chemicals and processes used in modern pool water treatment.

As well as an introduction to disinfection chemistry, the book covers information about the issues of pH and redox, disinfection methods, coagulation and corrosion, It also includes question and answer exercises throughout so readers can test and develop their knowledge. Andrew Gaffey, sales director at Gaffey Technical Services Ltd comments, "We discovered the book in Germany, where it is widely used by students and operatives. As we didn't have anything as concise as this in the UK, we worked with Tosh Singh, Managing Director at Alldos Ltd to have the book translated, updated and published in English."

Andrew continues: "I'm sure anyone involved in swimming pool operation at any level will find it very useful - especially those who specify pH/disinfection and dosing methods, and evaluate their suitability with different supply water characteristics. At the moment, operatives and engineers tend to get limited teaching on chemistry, yet it is very important in pool water maintenance. Significant damage or maintenance costs may result in pools where water quality is not understood and controlled.The new book will provide valuable information to help avoid the pitfalls that lead to poor water quality control, incorrect selection of chemicals and the corrosive damage that can occur to the pool building and plant."

Priced at GBP 18, the *Basic Chemistry for Pool Water Quality Management* book can be obtained from either ALLDOS (tosh@alldos.com) or Gaffey Technical Services Ltd (info@gaffey.co.uk).

Safeguarding quality at Caprari

Caprari presents the "Original Caprari Quality" anti-counterfeiting hologram, seal, security strap and spare parts packaging: symbols that stand for safety, reliability and sophisticated technologies from an enterprise that possesses over 60 years of experience in the world of water.

This project aims to assure Caprari's demanding customers that the products they have purchased are original and of high quality, essential aspects for those who need to come up with advanced solutions and obtain exceptional performances along with high efficiency and economic running.

A silver coloured hologram with Caprari's brand name and the three-dimensional images of the three product lines - Deep clear water - Clear surface water - Waste and drainage water - will be affixed to some of the product lines at first, and will then be gradually used for the whole range of pumps and motors. After the assembly, the products will be packed and shipped with either the green coloured "Original Caprari Quality" security seal or strap.

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Seadog ocean-wave pump

Currently being tested in the Gulf of Mexico, the Seadog ocean-wave pump, developed by Minnesota-based energy technology company Independent Natural Resources Inc. (INRI), captures energy from ocean swells or waves to pump seawater to a land-based holding area or water tower, where the water can be returned to the ocean through hydroelectric turbines. In addition, because the device pumps water to a reservoir, it can store salt water or desalinated fresh water in the form of potential energy to generate power on demand, even if the current wave regime during a particular period is too low to generate power. The pump uses buoyancy to convert wave energy to mechanical energy. The main components are a buoyancy chamber, buoyancy block, piston assembly, piston shaft, piston cylinder and intake and exhaust valves. In the water, the buoyancy block floats within the buoyancy chamber, moving up and down with the waves. The buoyancy block is connected to the piston shaft, which moves the piston assembly through the piston cylinder. During recent testing off the coast of Surfside, Texas, a single Seadog pump experienced waves from 6in to 6ft and consistently pumped a range of 15,000 to 40,000 gallons of seawater per day. INRI says the technology is capable of generating an average of 755MW of hydroelectric energy for every one-square mile pump farm, assuming ocean swells averaging at least 9ft. With swells of at least 5ft, the farm could generate approximately 242MW.

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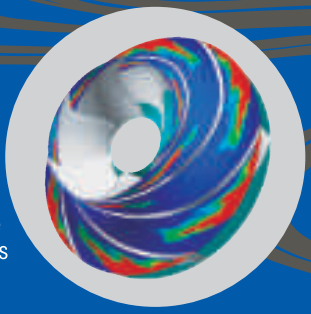

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Hamilton Sundstrand deal

Stephen G. Oswald, president of Hamilton Sundstrand's Industrial group and John Dudley Kelly, president and majority shareholder of Dosatron International SA, have signed the final acquisition of Dosatron International SA, France, by Hamilton Sundstrand, a division of the American group United Technologies Corp. Dosatron International was until now a privately held company. The transaction has been subject to regulatory approval, since Dosatron will become part of Milton Roy, one of Hamilton Sundstrand's three industrial companies. John Dudley Kelly will stay at the command of Dosatron as managing director and will closely work on the integration and development process with Jean-Claude Pharamond, Milton Roy. The Dosatron Company will continue to operate under the name Dosatron.

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Verder acquires

The Verder Group and Samuel Hodge has announced that they have reached an in principle agreement under which the Verder Group will acquire 100% of the shares in Autoclude Ltd. Autoclude designs and manufactures peristaltic pumps, mainly for the OEM and the laboratory market. The company has distributors in many countries and has an extensive product range which covers flow rates from 1ml/min to 23L/min, which are used in a diverse range of markets, e.g. the medical and the beverage dispensing industries.

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Mono Widethroat W range pump

Mono Pumps have enabled geothermal drilling company Sintec Environmental (Lancashire, UK) to get on the move with their new mobile site support system. Sintec, specialise in geo-thermal drilling, and installing and grouting of ground source vertical and horizontal heat sources, for heat pump installations. They have designed and manufactured a multipurpose trailer which can mix and inject grouting media or alternative products into chosen cavities, anywhere on site. Once the mobile system is in-situ and drilling of an exploratory hole is almost complete, a mixer combines the bentonite/cement grouts to form bentonite slurry. This is then transferred by the W Range pump to the holding tank ready for injection into the hole within a matter of minutes. The rotary action of the positive displacement pump generates pressure at any speed and does not require centrifugal force or high rotational speeds to operate. As the pump does not rely on any centrifugal action for its operation, there are no large changes in fluid velocity. The Widethroat pump design is suitable for delivering a steady flow of viscous materials, which benefit from the slow running speeds and gentle handling made possible by the progressing cavity pump action.

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ITT elects VP

ITT Corp. has announced that the Board of Directors has elected Gretchen McClain, 44, as a Vice President of the Company. Ms McClain was recently appointed President of the Fluid Technology Group, effective 1 April 2007. She joined ITT in 2005 as the President of Residential and Commercial Water.

SPX sells Contech business unit

SPX Corp. has announced that it has entered into a definitive agreement to sell its Contech business unit to Marathon Automotive Group LLC, a company formed by Marathon Asset Management LLC, for USD 146 million in cash. Contech, based in Portage, Michigan, USA, has annual revenues of USD 300 million and was reported as a discontinued operation at the end of the third quarter of 2006. The sale is subject to customary closing conditions, including receipt of regulatory approvals. The transaction is expected to be completed in the second quarter of 2007.

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Pumps for SRWP

At the end of February, KSB Aktiengesellschaft, Frankenthal (Germany), received the order to supply pumps for the Southern Regional Water Pipeline (SRWP) in Australia. Thirteen pump units, to be divided among five pumping stations, will be used to pump fresh water through a 120km long pipeline linking Camerons Hill in Brisbane's western suburbs and Gold Coast. In order to build this water transport system with as few pumping stations as possible, the system is operated at a higher system pressure than usual. KSB, therefore, has to modify the pump casings for the high pressures and subject the finished pump units to extensive pressure testing. The most powerful drive motors of the pumps to be supplied have a 2700kW rating each. The maximum flow rate per pump is in the region of 2000ltrs per second. The Southern Regional Water Pipeline is designed to service the growth in the residential and commercial water demands of Brisbane, Ipswich, Logan, Beaudesert and the Gold Coast.

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Stainless Steel World Event

The 5th biennial Stainless Steel World Conference & Exhibition 2007 will be held November 6th until November 8th , Maastricht , the Netherlands. Following on from the success of previous Stainless Steel World events held in both Europe and The United States of America , The Stainless Steel World Conference & Exhibition 2007 promises to be the most important industry event of 2007 bringing together corrosion and materials professionals from the global market place. This unique event offers an excellent opportunity to meet with both suppliers involved in all stages of production, materials and services of the industry to the engineers, end users and decision makers of the future of the stainless steel industry. Diversity of global knowledge from exhibitors, visitors and conference delegates will expand the understanding and knowledge necessary for future industry growth.
For further information:
www.stainless-steel-world.net.

Siemens to provide USP Technologies

A leading pharmaceutical company has chosen Siemens Water Technologies to supply a turnkey USP (United States Pharmacopoeia) Purified Water system upgrade for its biotechnology laboratory in Puerto Rico. The company is adding an additional system to the two systems already supplied by Siemens in 2003. The one point one million dollar project will begin operation in April 2007. When the pharmaceutical company built the laboratory, Siemens Water Technologies provided a USP Purified Water system consisting of two treatment trains operating in parallel. Each automated train includes pretreatment equipment and a reverse osmosis (RO) system followed by a continuous deionization system. The use of these hot water sanitizable technologies allows the pharmaceutical plant to take well water and reduce the conductivity, total organic carbon, and bacteria levels to those required to validate the system as USP Purified Water. Recently, when the plant's demand for high-purity water doubled, the company decided to expand the two existing treatment trains and also add a third, virtually identical, train, to the first two trains. The system upgrade will increase the total flow rate capacity from 80 gallons per minute to 150 gallons per minute and is designed for seamless integration into the existing system.

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New HI board of directors

The Hydraulic Institute (HI) has announced its 2007 - 2008 Board of Directors and Officers during a general session of its 90th Annual Meeting held recently in San Antonio, Texas, USA. The new officers are: Tom E. Ferguson, President of Flowserve Pump Division, Irving, Texas as Board Chairman; John Miersma, Executive Vice President of Iwaki America Inc., Holliston, Massachusetts, as President; David G. McKinstry, Vice President of IMO Pump, Monroe, North Carolina as Vice President, Technical Affairs; and William E. Waltz, President of Pentair Water Pump Division, and Delavan, Wisconsin as Vice President, Member Services. The HI Board recently approved a new Mutual Cooperation Agreement with Europump, a federation of 18 national pump associations in Europe – renewing an agreement signed in 1996 and approved a new agreement with the Fluid Sealing Association, focused on a new HI Mechanical Seal Guideline and associated training courses.

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Heating system modernization

Between December 2005 and February 2007, KSB Aktiengesellschaft, Frankenthal (Germany), delivered some 750 pumps, 1700 valves and numerous accessories for modernizing the district heating system of the Romanian city of Constanta. The municipal services modernized the entire system with the financial backing of the European Union. The KSB equipment was supplied in several partial shipments. The waste heat produced in a nearby power station is transferred to the water in a battery of heat exchangers. The water is then pumped in large, insulated pipes to several distribution stations in the city. There, Etaline variable speed circulator pumps match pump performance to the fluctuating demand for heat. The order also included high-pressure pumps type Movitec which transport the hot water to the various floors of several blocks of flats.

ABB assists water project

Twenty-seven ABB ACS 6000 medium voltage variable-speed drives with a total rated power of 198MW, along with input transformers and large AMC 1000 motors, were chosen for Phases I and II of the Ras Laffan common cooling water project. Phase one of the project is complete, comprising nine drives rated at 7050kW each. Design of Phase II is underway. The project is designed to provide vital cooling water drawn from the sea for the power plant, LNG trains and petrochemical facilities at Ras Laffan Industrial City. Phase I of the cooling water facility was commissioned in August 2003, and now pumps 308,000cum of water an hour, to cool six industrial sites. Phase II is scheduled for completion in 2008, and will pump an additional 525,000cum of cooling water to three more sites.

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Flowmeters to Czech Republic

Krohne has supplied ten Optimass Coriolis flowmeters for installation at a blast furnace in the Czech Republic. The instruments are being used in applications to measure the density and mass flow of slurry. The Optimass flowmeters are being used in two processes; first on circulation pumps where they help to optimise the conveyance of slurry. The second is on the feed to centrifuges where the slurry density needs to be accurately controlled for efficient operation. Optimass flowmeters are installed on the pressure side of the circulation pumps and provide two independent measurement outputs. A density reading is taken and used to help optimise the flow of the slurry while a mass flow reading helps to monitor the condition of the pump (which can wear because of the abrasive nature of the slurry) and also to compile slurry data. On the feed to the centrifuges, the Optimass flowmeters help to maintain the density of the slurry at 1200kg/m - the level required for optimum efficiency. The instruments provide a signal, which is used to control the addition of water and again to monitor the pump condition. Krohne's Optimass flowmeters have a single straight-tube design and will operate in low-flow/high-density applications without introducing significant pressure drop.

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THDC and NPCIL JVs

Tehri Hydro Development Corp. (THDC) has announced that it has signed a MoU with Nuclear Power Corp. of India Ltd (NPCIL) to jointly develop pumped storage schemes and other hydel projects. THDC will provide technical expertise and NPCIL will provide financial assistance for any projects taken up jointly by them under the agreement. THDC and NPCIL are already looking at pumped storage schemes in the power deficit State of Maharashtra.

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Pump turbine test successful

Under attendance of the operator Verbund-Austrian Hydro Power AG, model tests for the Limberg II-pump turbine were successfully completed in Voith Siemens Hydro Corporate's Technology facilities in Heidenheim, Germany. The 240MW pump turbine's optimum design posed an engineering challenge as the unit's head for turbine resp. pump operation will vary between 288 and 436m, depending on the water level of the huge storage lakes that feed the units from a reservoir capacity of more than 80 million cum. Limberg II will serve as an addition to the existing Kaprun group of hydro power stations and will more than double their currently installed capacity. With its two units, the Limberg II power station will supply round about 10% of electricity to Austria's grid during peak operation times. Both units will mainly be operated to balance the load changes in the grid and to ensure safe and stable grid operation. The contract value for Voith Siemens Hydro amounts to EUR 33 million. The first unit will be commissioned at the end of 2011.

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Clyde Pumps incorporates Weir Pumps Glasgow

On Tuesday 8th May 2007, Jim McColl announced the acquisition of Weir Pumps (Glasgow) from The Weir Group plc. The GPB 100 million funding package for the deal includes debt and working capital facilities provided by HBOS plc (Halifax Bank of Scotland). As a result of this transaction, the diverse portfolio of technologies, process knowledge and expertise generated by Weir Pumps will be incorporated into a newly created company, Clyde Pumps Ltd.
Commenting on the acquisition, Jim McColl said, "I am delighted to welcome Weir Pumps (Glasgow) into our portfolio of companies. Over two centuries the business has demonstrated that it has an outstanding track record of designing innovative pumping solutions for customers across a wide range of industries. We believe that this heritage, complemented by a highly skilled workforce, will provide us with a strong platform to significantly grow both market share and profitability."
Full story: see page 49

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Chemi-safe safety system

ISS Safety has recently been awarded a contract to supply its "Chemi-safe" safety system into the Southern Water Eastry Waste Treatment plant near Deal, in Kent (UK). Working with sub-contractors and valve suppliers, ISS was given the task of project managing the design and installation of the system. "Chemi-safe" is designed to ensure dangerous chemicals used in the treatment of sewage and wastewater are prohibited from leaking or spilling into the water table during the loading process. The ISS "Chemi-safe" system removes human error via the use of trapped key interlocks. "Trapped Key Interlocks" force the operator through a predetermined operating sequence ensuring that dangerous shortcuts and human error cannot cause environmental harm. "Chemi-safe" forces the tanker driver to divert the bund drain valve to a storage tank prior to the opening of the dosing cabinet door, ensuring if a chemical spill occurs it will be safely captured in the underground storage tank and not find its way into the water table.

Concentric expands

Concentric plc, a manufacturer of oil, fuel and water pumps for medium to heavy diesel engines, has opened a full-scale manufacturing facility in Suzhou, China, mid-way between the two major industrial centres of Shanghai and Wuxi. The new factory started oil pump production in March 2007 following the installation of facilities that were completed at the end of 2006. The plan is to manufacture a full range of oil, water and fuel transfer pumps for both the Chinese domestic market and Concentric customers globally. In addition the company will also manufacture integrated front cover assemblies and lubrication pumps for transmission and reciprocating compressors. Total area of the new complex, including administrative block and factory buildings, is approximately 40,000 sq ft. It is equipped with a wide range of assembly and test equipment, all of which is automated or semi-automated and poke-yoked, to ensure that product leaving the factory is defect-free. All equipment has been sourced locally to ensure a competitive market position and the whole plant benefits from a total preventative maintenance and continuous improvement regime.

CNC machines will be added in late 2007 when the plant starts to manufacture fuel pump, ensuring the tight tolerances that are required to achieve the most exacting design criteria.

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Sulzer appoints

At the annual general meeting of Sulzer Ltd, shareholders approved all board proposals. Dr Leonardo Vannotti stepped down as chairman of the board and Dr Ulf Berg was elected to the board of directors. Seven-hundred and ninety-seven shareholders attended the 93rd annual general meeting, representing 31.03% of the share capital. The shareholders approved the 2006 annual report, annual accounts, consolidated financial statements, and appropriation of net profit. A dividend of CHF 23 per share was set (previous year CHF 14). Board members Louis R. Hughes, Hans Hubert Lienhard, and Luciano Respini were confirmed for another three-year term of office. Ulf Berg, CEO of the corporation until 3 April 2007, succeeds Leonardo Vannotti as chairman of the board. Ton Büchner is the new CEO of Sulzer. Ton Büchner successfully managed the division Sulzer Pumps over the last years and has been with Sulzer for 13 years.

ISH 2007 concludes

The ISH 2007, the international trade show focused at technologies found in the HVAC and sanitary industries, held in Frankfurt March 6 through 10, 2007, has come to a successful conclusion with a record number of visitors: 215,000, 20% more than the previous edition of ISH. ITT, exhibiting at pavilion 9 had an area of almost 200sqm, displayed its most representative range of products for this segment, including the New Z6 Series of Lowara submersible electric pumps for 6in wells, a drainage pumping system featuring Flygt drainage pumps and other Lowara pumping systems controlled by frequency converters such as Teknospeed and Hydrovar®. Hydrovar®, the new generation frequency converter by Lowara, is an electronic pump control system designed to enable substantial energy savings.

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ABB aids water management

Up to 700 AquaMaster electromagnetic flowmeters from ABB are being installed as part of the transfer of responsibility for Ministry of Defence (MOD) water and wastewater assets to C2C Services, a consortium comprising Severn Trent Services and Costain. The transfer of water services to C2C is part of Project Aquatrine, under which three contracts have been awarded to private sector partners. The C2C contract covers the north, east and south east of England, and includes existing wastewater treatment works, water treatment plants, pumping stations, and sewerage and water distribution systems on 1500 MOD sites. The C2C deal is the largest water and wastewater PFI project in Europe, valued at over GBP 1 billion over its 25year term.

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Siemens equips waterworks

Siemens Water Technologies has received an order from Wasserwerke Dinslaken GmbH worth EUR 3.1 million to equip the company's waterworks in Voerde-Löhnen, Germany, with electrical and automation systems and instrumentation for a nanofiltration plant. The project of the Siemens Industrial Solutions and Services Group (I&S) will be concluded in August 2008. For the new filtration plant, which is being built in close proximity to the existing installation, Siemens I&S is installing the electrical equipment and instrumentation. The order includes installation of the power supply and distribution systems as well as erection of a stand-by generating unit for maximum fail-safety.

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Hayward Tyler appoints

Neil Langdown has been appointed General Manager of Hayward Tyler Group's UK Services Division. Neil Langdown, a chemical engineering graduate, brings a wealth of experience in the pump industry sector to the Services Division, having previously worked at Armstrong Pumps and Weir Pumps. Heading up a team of 50 staff, Mr Langdown will provide direction and management for the Services business unit as it continues to meet its mid to long-term objectives in the UK and the rest of the world.

HERMETIC and LEDERLE announce merger

HERMETIC-Pumpen GmbH is on the path to expansion. The growth in orders and in the number of global framework agreements in all of HERMETIC-Pumpen GmbH's areas of business activity, which emerged in 2005, continued in 2006. The order income in 2006 increased about 32.7%.

Glad to accept these forward-looking challenges, the company has already implemented some first steps by increasing production capacity and by investing EUR 3 million in modern manufacturing technologies and production processes. In qualitative and synergy terms, the decision of both companies, HERMETIC-Pumpen GmbH and LEDERLE GmbH Pumpen- und Maschinenfabrik, to merge their operations with effect from 1 March 2007 puts a gloss on this strategic direction.

The bundling of common experience and activities in HERMETIC-Pumpen GmbH is in line with this consistent and customer-oriented direction. With a higher level of vertical manufacturing integration and expansion of capacity, the company is in a position to offer state-of-the-art technology and premium quality for an extended product range from a single source. In future HERMETIC-Pumpen GmbH can supply clients with centrifugal, displacement and vacuum pumps and systems in a hermetic finish, with a choice of canned motor, magnetic drive or also mechanical seals.

The Sales, Technical Office and Project Purchasing departments of LEDERLE will in future form the vacuum and displacement pumps business unit within HERMETIC-Pumpen GmbH, under the management of Mr. Christian Dahlke.

Contacts both at the headquarters in Gundelfingen and at German and international sales branches will remain the same. The change will not affect existing contracts and agreements.

ADVERTISERS' INDEX

With a company motto of "casting a better world" Tycon Alloy Industries has set its sights high. The company, which specialises in the production of metal castings and providing related technical services, is implementing ambitious plans to expand its market share, production capacity and product range. Located in Hong Kong and Shenzhen, China, Tycon services both Eastern and Western markets and effortlessly bridges the gap between these two spheres with an ease its competitors can only envy. With a keen focus on quality and flexibility the company is seizing upon a period of strong growth to fuel expansion at its main manufacturing plant. Pump Engineer visited Tycon at its headquarters in Hong Kong to find out how this company is setting the international pump market alight.

By Joanne McIntyre

Tycon: casting a better world

"Our flexibility to operate in both the East and West truly sets us apart from the competition. Hong Kong, where Tycon's parent company, Fong's Industries Co., Ltd. is listed on the stock exchange, has traditionally been a cultural melting pot and continues to be an ideal location for setting up our headquarters" explains Mr. Frederick Chan, Sales Director of Tycon Alloy Industries.

Tycon is actually a 'dual identity' enterprise with operations in both Hong Kong and Shenzhen, mainland China. "This gives us increased flexibility when trading with foreign companies, which are best serviced through our Hong Kong office, while Chinese customers can utilise Tycon Shenzhen to take advantage of local tax requirements" says Mr. Chan. "It's all about offering the best possible service and cost efficiency for our customers."

An aerial view of the foundry at Shenzhen, China.

Another major benefit is that Hong Kong has a legal system which is very similar to most European countries and the US, so copyright and intellectual property rights are well protected. "It's important our clients realise that their designs are in safe hands. All of our contracts are signed under the protection of Hong Kong law so our customers never need worry about copyright issues. Their ideas are safe with us. This is clearly an important issue in the pump industry, particularly when dealing with exclusive designs," Mr. Chan affirms.

Currently celebrating its twelfth anniversary, says Mr. Chan: "Our core business is stainless steel casting. Although Tycon has made over 10,000 different types of castings since 1995, we have ended up with a strong focus on casting components. We've reacted to strong demand in the market for stainless steel castings for all sorts of applications so this is where we have directed our attention."

Ambitious expansion

Tycon is investing heavily in an ambitious expansion plan which has been accelerated following explosive growth in 2006. "Last year we approved USD 6 million to fast-track our expansion plans," says Project Engineer Mr. Tim Chen. "By June this year our capacity will reach 600 tonnes per month at the Shenzhen plant, 90% of

which is dedicated to stainless steel casting. The expansion plan covers the foundry, machining, human resources and the computer systems. While the Shenzhen plant originally incorporated both sand and investment casting, we are now moving the sand casting to another building on the same site. New buildings will greatly increase the available space on site, expanding by 38% from 27,000 m2 to 35,000 m2. While this is a substantial expansion, we are also planning to build a brand new machining shop to centralise all machining in one location," says a proud Mr. Chen.

Investments are not restricted to the creation of more space, as 19 new CNC machines will be installed at the Shenzhen plant, further expanding the company's state-of-the-art machining capabilities. In addition Tycon is investing strongly in man-power to boost their capacity: from a staff of 650 in 2005, numbers for the entire Tycon group rose to 1,100 by the end of 2006 and will continue to increase as more staff is recruited, mainly from Hong Kong.

About one third of Tycon's production capacity is dedicated to the pump industry, with that percentage increasing gradually. The company's most important markets geographically are Europe - which accounts for over 60% of sales - and the USA which is Tycon's leading export destination country. Comments Mr. Chan: "Europe and the US are the two leading pump manufacturing regions. We are witnessing a trend for rapid growth in the US and the fact that we sell directly to pump manufacturers makes this a very important market for us."

Tycon has ambitious plans to increase its market share in both Europe and the US. "The economy in general is flourishing for us," says Mr. Chan. "Most applications which require pumps are enjoying strong growth; waste water, ethanol projects in the US, oil and gas, marine and power generation including nuclear."

While any major Chinese manufacturer is a potential client for Tycon the company recognises that developing a quality–focused share in the local market will take some time. Mr. Chan: "The domestic market is booming and it will have to adopt the same quality principles as the western world so we're sure we will see our market share here grow too."

Maximising potential

One of Tycon's strengths is that it is capable of producing very complicated castings. "Many pump components are difficult to cast, especially impellers," continues Mr. Chan. "We are able to produce high quality, smooth surfaces which are critical to get the required performance out of a pump. Our customers are very impressed with the quality of our impellers. The superior quality

State-of-the-art testing facilities are used to guarantee the highest quality to comply with all recognised international standards.

of our castings means that several customers have actually been able to revise their catalogues and performance indexes because we have been able to provide a better impeller than they had before. They brought us their own design, which we have been able to improve on during manufacturing so they could revise their specifications. Essentially we are able to deliver better components than they could get before so they are able to increase the performance index of their whole pump assembly. This produces the obvious benefit in that the pump components they buy from Tycon are more cost effective."

The company has wide experience in all sorts of pumps including centrifugal, diaphragm, submersible, piston and gear types. "Tycon produces a very wide range of pump parts in different materials that customers can choose from. The range of material grades means our pump components can be found in a variety of industries: we are currently working with a company to develop pumps for the nuclear industry which is one of the most demanding applications," notes Mr. Chan.

Flexibility also means providing the extra services that customers require, for instance machining components. "Our on-going investments in sophisticated equipment is just one way that we can add more value to our products," says Mr. Chen. Our castings are not only very precise, we also provide added services such as machining to ensure that the product dimensions will meet – or even exceed – the customers requirements."

In addition to a range of material choices Tycon also offers clients two types of castings; sand casting (resin sand) and investment casting (lost wax). Mr. Chen explains: "For some pump component castings it is more cost effective to use investment casting, whereas for larger components it is often more cost effective to use sand casting. We can also cover a huge size range, from 0.5 to 500 kg castings. We have recently commissioned a new furnace which will enable us to cast pieces weighing up to 1000 kg, an investment which will help us to serve the market – and particularly the power generation industry - even better. Basically Tycon Alloy is a one-stop shop able to offer the dimensions, material choice and complementary services that our customers demand. However we are constantly seeking to further improve. For example, our colleagues at the Shenzhen plant are about to take delivery of a new five-axis machining centre capable of working on pieces measuring in excess of 1000mm."

Guaranteed quality

As casting quality is without doubt a key determinant for the performance of any pump, Tycon has invested heavily in both time and money on testing. "European customers are always concerned about the quality of products coming from the East. Personally, I like to compare casting with cooking; you need good ingredients to make good dishes" explains Mr. Chan with a smile. "We are fortunate in that we have access to very good ingredients, by which

Inside the machine shop at the foundry in Shenzhen, China.

Seeking to constantly improve, Tycon invests in quality equipment such as this four-axis machine centre.

I mean scrap metals. One of our sister companies, Fong's Steels Supplies Co., Ltd., is able to keep us amply supplied. This enables us to closely monitor the quality of the scrap we use, affording us better raw material control than others. We know exactly where our material is coming from. Another advantage is that this is a secure source, allowing us to offer significantly shorter delivery times; we seldom suffer from a shortage of raw materials."

During the casting process Tycon has many controls in place and is very particular about controlling the quality of its products. The Shenzhen plant for example has a spectrometer which can test a wider array of metal and non metal elements which means it can make a diverse range of products. In addition, the company is continually improving its casting ability and providing an increasingly precise casting service. Comments Mr. Chen: "We have reached the stage where our casting service is so precise that very little work needs to be done to the component afterwards, which reduces costs for the client by avoiding further machining."

Without doubt, the price/quality ratio is an important element when customers make their final purchase decisions. According to Mr. Chan, the Tycon policy is therefore to provide a higher quality product, and so put itself in a better position than its competitors. "Tycon is able to produce better quality than many of our Chinese competitors due to the emphasis we put on testing, examination, and quality to ensure we get the ideal price/quality ratio," he concludes.

While Tycon enjoys a solid reputation for making castings in conventional varieties of stainless steels such as 316 and 304, it is responding to increased demand for more complex materials by making a range of duplex and nickel based products. Mr. Chan explains more: "A recent addition to our range is an aluminium copper alloy which is highly suitable for marine applications. Pump applications are becoming more demanding and environmental issues have become more important, therefore material requirements are becoming more stringent and pumps must be able to work in increasingly difficult environments. Conventional stainless steel may not be suitable for the job so we have to turn to duplex or nickel based alloys instead. Tycon is meeting these requirements by expanding its use of higher grade alloys."

At the end of the interview, an upbeat Mr. Chan is quick to point out that it is Tycon's ability to consistently provide high quality products that keeps customers returning to them time and again. "It is imperative to maintain our quality to meet our customers' demands. Customers will only keep coming back if a company can demonstrate that it can maintain the quality of its products."●

Facts & Figures

Name:	Tycon Alloy Industries (Hong Kong) Co., Ltd
Product Range:	Cast products in stainless steel, carbon steel, duplex, nickel alloy; .... experienced in centrifugal, gear, submersible, diaphragm and piston pumps, & semi/full pump assemblies.
Staff:	1,300
Locations:	Hong Kong and Shenzhen, China.
Key Markets:	Power generation, marine, oil and gas, chemical, textile, food processing, medical

Mr. Frederick Chan enthusiastically explains about Tycon Alloys' investment plans to Mr. Sjef Roymans, Editorial Director of Pump Engineer.

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Five minutes with…

…Mr James Wee

Mr Wee, your business card indicates you work at Shell Canada's "Scotford Upgrader" near Fort Saskatchewan, Alberta, Canada. What kind of facility is that exactly?

Basically, the upgrader helps extract oil from the oil sands. That is a growing business in Canada right now, with several companies looking to enter the market or expand their existing operations. More specifically, the Scotford Upgrader uses hydrogen-addition technology to upgrade the high viscosity "extra heavy" crude oil (called bitumen) from the Muskeg River Mine into a wide range of synthetic crude oils. A significant portion of the output of the Scotford Upgrader is sold to the Scotford Refinery. Both light and heavy crudes are also sold to Shell's Sarnia Refinery in Ontario. The balance of the synthetic crude is sold to the general marketplace.

And what is your job?

I am a Rotating Equipment Specialist, one of three at the facility. Additional colleagues include three Machinery Engineers, as well as pump experts at Shell's CRC in Calgary from time to time.

What is the predominant pump type at the plant?

That would probably be the centrifugal pump design. We have both single-stage and multi-stage pumps, and a high proportion of them come from Flowserve. We do of course have some high energy centrifugal pumps, notably Nuovo Pignone from Italy.

The primary processing unit, including the atmospheric vacuum unit, and the residue hydroconversion unit, is an important part of the upgrading process.

You mentioned that oil sands is a growing business. Are there any plans to extend the Scotford Upgrader?

Most certainly! We currently have a capacity of 160,000 barrels per day. Plans call for three additional expansions, each rated at 100,000 bpd. The first expansion should be on-stream by 2011. So that is good news for suppliers.

What types of challenges do you have in your work?

To start with, the materials we pump can be very viscous. Add in the high pressures and temperatures, and that can be a major challenge for the mechanical seals. So we are working very closely with the vendor to find the best solutions. For example, that can mean optimising the O-ring and design, or finding materials that are best compatible with the media, etc.

Fort Saskatchewan sounds very remote: is it hard to find replacement parts?

No, not really. We are close to Edmonton, which is a hub for the spares and services industry.

Fort Saskatchewan also sounds very cold. Is that a problem at all?

Absolutely! We have to cope with extreme temperature, which can vary from minus 35 degrees C in the winter to plus 35 degrees C in the summer. To combat the cold, we insulate and heat-trace much of the equipment located outside, which includes pumps. We also carefully select our lubricants, typically synthetic types for lubricating our pumps.

Sir, thank you for your time.

IPUS 2007 breaks records

Held from 5-8 March 2007 at the George R. Brown Convention Center, the 23rd International Pump Users Symposium (IPUS) attracted a record number of people. The IPUS is billed as the world's leading fluid handling equipment conference, and it certainly drew in a good crowd of around 2,000 industry professionals, keen to see the latest technological advances. In line with its successful format, the 23rd IPUS offered short courses, lectures, tutorials, discussion groups, case histories and, of course, a focussed exhibition, with around 140 exhibiting companies. Pump Engineer had our own booth, from where we bring you this inside report. See also the following pages for specific information about the Technical Sessions and the Exhibition.

By David Sear and Judith Wanjala

Bill Davidson, Senior Product Manager, Enertech, dropped by the Pump Engineer booth, where he discussed developments in the nuclear power business (and Enertech's pump capabilities!) together with Judith Wanjala.

The economy may or may not be tough right now, but pump professionals continue to see merit in an annual meeting of the stature of the IPUS. Why else would over 600 people sign up for the Symposium Technical Sessions, and many more join them to visit the concurrent Exhibition? In fact, the Exhibition boasted several product launches. These included the PIPE-FLO Professional 2007 Program from Engineered Software and EnviroGear, a revolutionary new sealless gear pump from PeopleFlo Manufacturing. Other companies making product launches included Junty Industries (an ISO9001 certified supplier of wear parts and sealing products for the fluid and gas control industry) as well as NIKKISO Pumps America (suppliers of canned motor pumps, boasting three levels of API-685 compliance).

Well presented

The Technical Sessions continue to provide an attractive, action-packed programme, comprising short courses, lec-

tures, tutorials, discussion groups and case histories. These covered everything from reliability improvements, composite wear rings, cavitation, rotordynamics, electronic data exchange, pipe strain, etc. With around 35 separate sessions, it is of course impossible to give a complete overview of everything that took place. However, the mix of events that Pump Engineer saw were well thought-out, well presented and definitely well-received. With such a high proportion of hands-on engineers in the audience, there was also a refreshing number of questions for the various speakers, often leading to highly informative information exchanges. The audience really quizzed presenters on their materials, what tests had been done, what the specific results of the actions were, whether the results had any real financial benefit, etc. Also clear from the accents of the various questioners is the broad appeal of the IPUS, with people attending from not just across the USA, but from countries as far afield as China, Australia, the UK and India.

International

The Exhibition provided visitors with a good selection of the companies active in the pump and pump related industry. The show has also long transcended the boundaries of the USA, drawing increasing numbers of overseas visitors and exhibitors. For example, Junty Industries, who make the long journey from China. Junty is well-known as a quality manufacturer of wear resistant components for the fluids handling sectors. Their products, made of materials such as ceramics and tungsten carbide, are found in equipment such as pumps, valves and mechanical seals. Says Managing Director Mr Brian Deng. "This is the fourth time Junty has exhibited at the IPUS, and we find it to be a good show. We certainly get lots of attention from the pump manufacturers, who are important clients for us. We are here to develop long-term business relations, based on the quality of our products. In fact, in our small way, we want to change many people's conception of Chinese manufacturing: we make good quality products at very competitive prices needed by OEMS and the aftersales market."

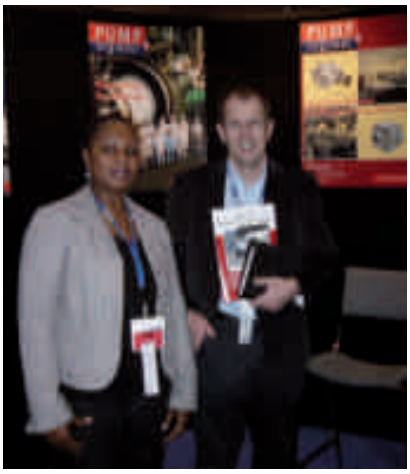
Rumours

Finally, what would a meeting place like the IPUS be without rumours and debate about future challenges facing the pump industry? Pump Engineer is therefore indebted to all those who spoke freely with us about their views, visions and indeed concerns about how upcoming challenges might or might not be met. These ranged from multiphase pumping (and the on/going research necessary as platforms move into deeper and deeper water), the construction of many new ethanol plants across the USA (apparently being built to tight budgets, so there may be future pump maintenance and reliability issues) and finally pumps for secondary hydrocarbon recovery, such as from oil shale and oil sands (here it seems there is plenty of finance, but it remains important not to underestimate the considerable technical challenges pump-wise, especially regarding reliability). You can be sure Pump Engineer will keep you informed!

IPUS 2008

The next International Pump Users Symposium is scheduled for April 21-24, 2008, at the George Brown Convention Center, Houston, Texas. For info: http://turbolab.tamu.edu.

The 2007 event was sponsored by the Graphite Metallizing Corporation, John Crane Inc, Metrix Instrument Company and Pumps & Systems Magazine.



John Morton (Marketing Manager EAA at John Crane) was another visitor with some interesting insights into the "nuclear renaissance".

A well-known face: the Hydraulic Institute's Bob Asdal, who told us: "The Hydraulic Institute is proud to announce a new mechanical seals applications guide, the work product of a dedicated committee of seal and pump manufacturers."

Brian Deng, Junty Industries. "The IPUS is a good show for us. We manufacture a wide range of wear resistant components and have a world-wide client base, including many pump makers, repair shops, distributors, etc."

Strong Technical Sessions at the IPUS

The lectures, tutorials, short courses, discussion groups and case studies that comprise the symposium element of the IPUS are a great platform for peer-to-peer exchange, and also where newcomers can learn much in a short time from seasoned hands. Speaking to attendees, Pump Engineer gathers that much of the information presented is highly useful in the day-to-day running of plants, and has value for both operators as well as specialist engineers. Whilst it is simply impossible to report on everything that took place, the following images will hopefully give a good flavour of the sessions, as well as the viewpoints of several presenters and attendees.

So why should managers be aware of cultural issues? If you had attended Chuck Lyons' Case Study, then you would know why this issue can have a big impact on the outcome of maintenance work.

Robert Aronon, Marty Russek and Brian Boulden had prepared an excellent presentation entitled: 'Driving pump reliability forward with advanced composite wear rings'. Their lecture was a fine example of how the supply and user sides can co-author papers with real content.

The Fluid Sealing Association (FSA) and the Hydraulic Institute (HI) joined forces to present a short course on 'Fundamentals of mechanical seals'.

Ken Burkhardt and Tryg Dahl ready to lead a tutorial entitled 'Electronic data exchange in the pump industry'.

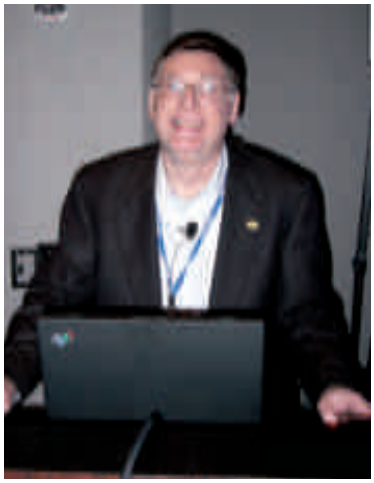
Taking part in the Technical Sessions was Dow's Joseph Vargas, who said: "I have a special interest in sessions about sealless pumps. Our facility is aiming to reduce or even eliminate emissions entirely. That could mean replacing centrifugal pumps with canned models. It would be a major undertaking, but we are committed to protecting the environment."

Westcan is both a manufacturer and an engineering company, serving the pulp & paper industry in particular, said Manager Mr Kristo Naudé. "I am a first-time visitor, specifically interested in learning about vertical turbine pumps. A local wastewater treatment plant has had a host of problems with them since being commissioned in the late 90s. This has been a great place to acquire both information and contacts to help resolve their issues."

Asked what he had particularly enjoyed, Alton Creech (from the Dow facility at Freeport) commented: "I found the discussion group on pump reliability as well as the session on electric motor lubrication very worthwhile. It may sound a mundane topic, but there was lots of good detail and extremely useful, practical information."

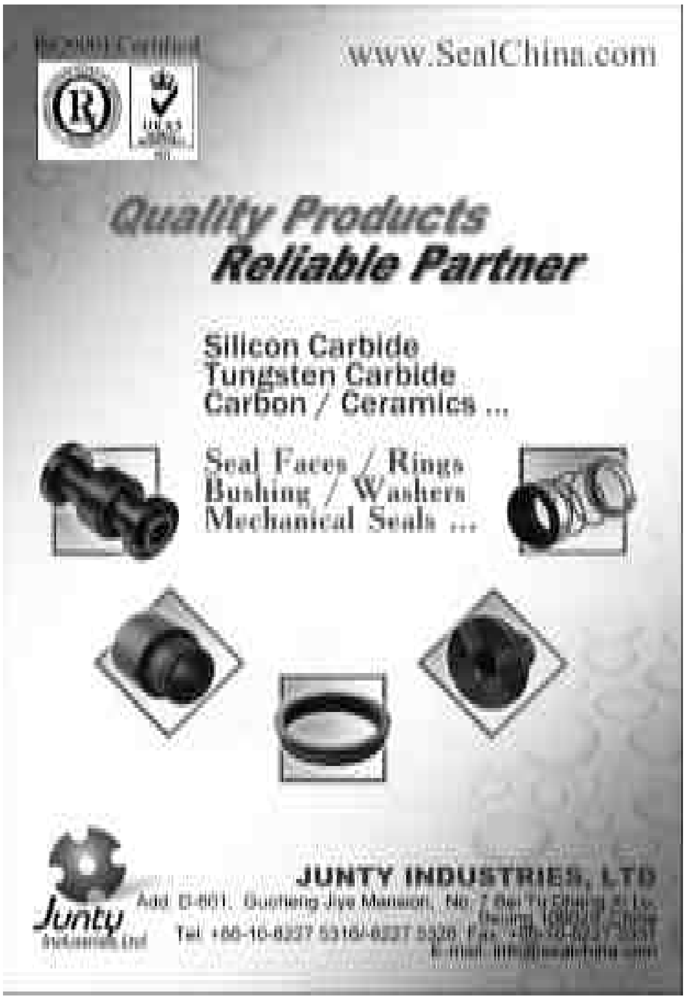
Working for ExxonMobil, Ms Holly Streety was attending the technical sessions for a couple of days. She had just attended a class on pump vibration, where "the slides certainly had a lot of detail and were very informative."

Michael Volk presented a short course on 'Fundamentals of centrifugal pump and system interaction'. Asked about the objective, he commented: "The course will provide an understanding how a centrifugal pump interacts with the system. Every system is dynamic, therefore the point of operation can change, so the pump may be operating in a healthy or unhealthy state. An understanding of such issues will help system designers and operators, leading to reduced maintenance and reduced energy consumption."



Chevron's Bob Heyl warming up to present tutorial 7 on 'Multiphase pumps'. "In the oil and gas industry, multiphase pumping is here to stay. My aim is to give attendees a real sense of what multiphase pumping is and how to use it," he said.

'Positive displacement pumps' was the topic of short course 5. A mixture of classical and hands-on elements gave attendees a good understanding of how this pump type functions. Photo shows popular presenter James Brennan in action.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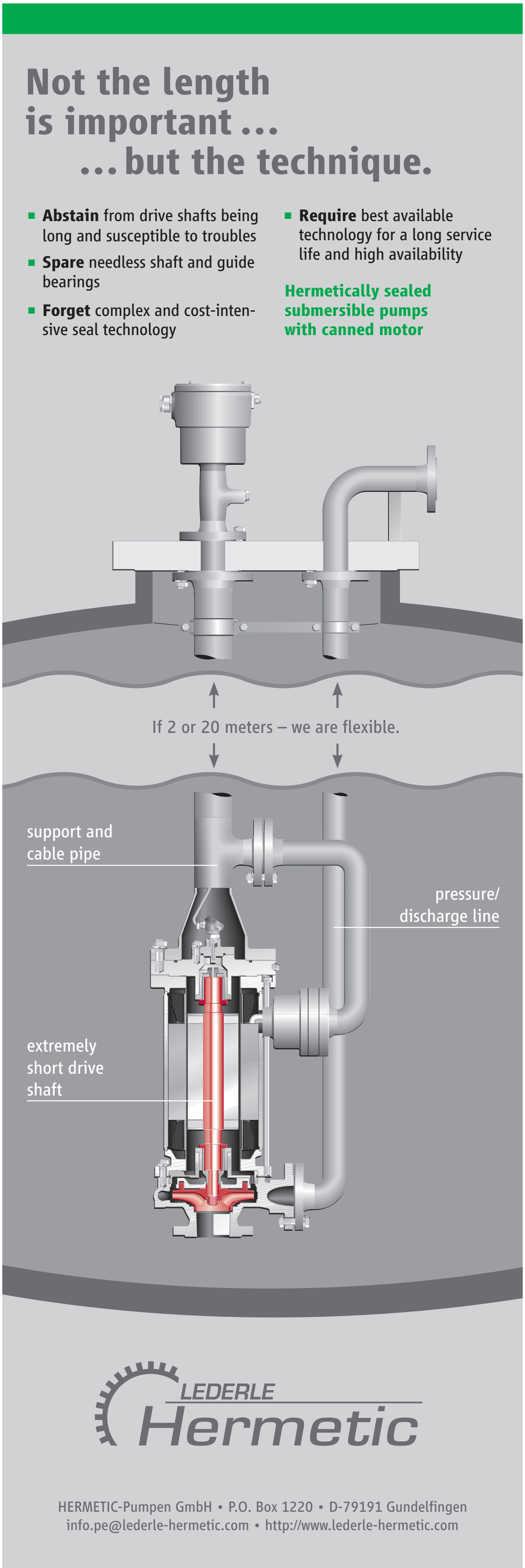
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Debbie Martinez points out key features of a Sulzer MSD horizontal axial-split multi-stage pump.

Ruhrpumpen Inc's VP-Marketing Marcelo Elizondo explained about his company's API vertical process pump 'VLT'.

IPUS 2007 Exhibition in Pictures

One of the two pillars which constitutes the IPUS is an exhibition, dedicated to pumps and pumping systems. From our own Pump Engineer booth, in Aisle 700, we would describe traffic as generally brisk, but with a few slower times. However, the people that did visit seemed genuinely interested in the pump industry. As well as talking to passing visitors (who quickly snapped up all the boxes of courtesy copies we had shipped out), we also took time to walk the floor, checking out some of the other exhibitors. This modest selection reveals just the tip of the iceberg of the many products and services on offer.

Jim Lapaczonek, INPRO/Seal Company, discussed the merits of permanent bearing protection for rotating equipment such as pumps.

At the DuPont Elastomers booth, Russell Schnell, Richard Romero and Thomas Kaseler (left to right) discussed the introduction of the Kalrez® Spectrum™ 6380 perfluoroelastomer, said to be very interesting for applications in the Gulf Coast, USA, that encounter hot amines, strong acids, hot water/steam, and oxidising media, etc.

Preston Campbell explained that Penn Valley were first-timers at the IPUS, looking to show the oil and gas industry the benefits of their pumps for heavy solids handling. "With a track record in municipal applications, and suitable for medium and low pressures, these pumps require very little maintenance yet give a long service life."

Sundyne has invested significantly in sealless technology, providing industry with reliable, safe, and low maintenance pumps offering emissions containment.

The clear message from Trevor Garton and Darren Cherry (on right) was to check out the latest parts at spectromparts.com.

Southeastern Manager Jim Heiman explains all about Dickow's PRM API 685 pump, which is ideal for the petroleum industry.

Lederle Hermetic's Nicolaus Krämer said: "We are proud and excited to announce the development of a 700 HP, 6000V canned motor pump. First orders are expected soon!"

LEWA's CMS, or condition monitoring system, was attracting major interest, according to Thomas Bökenbrink. "As it checks for disturbances, the CMS helps owners reduce maintenance costs and increase uptimes," he noted.

Weir meets demand for variable speed pumps, says VP Industrial & International Sales Steven Osborn (on right).

Pump doctor's surgery

Have you got a problem with your pumps? Do you need a solution for your system or advice about an application? If you have tried everything and those nagging troubles still remain, then perhaps our pump doctor can give you the sound and practical advice you need. Just drop him a line at pumpdoctor@hmdpumps.com for some partial advice.

Looking beyond the obvious

Examples of various unusual causes of pump failures

Many articles and examples have been published illustrating the usual causes of centrifugal pump failures. However much insight is to be gained by evaluating and understanding unusual causes of pump failures.

Centrifugal pumps provide reliable, proven solutions for moving liquids from one process to another. However, the failure of any machine can be expensive, time consuming and is usually avoidable. The examples shown below are intended to illustrate causes of pump failures that were not obvious at the onset of the analysis, and so hopefully give insight to you the reader and so help you in the future.

Example 1

Several pumps supplied pumping coolant to an air-conditioning test rig, which consisted of a series of piping loops, one of which was a low-flow bypass recirculation loop. This loop was intended to protect the pump when the flow demand from the system dropped to zero, to prevent the pump running at shutoff.

However, the pump operated satisfactorily until it ran in bypass mode through the recirculation loop. In this condition the pump started to cavitate, with subsequent vibration and bearing problems. The customer then operated the spare pump with the same end result.

Investigation at site resulted in the discovery that the manually opened ball valve in this bypass loop had been left fully open, so when running in bypass mode the system losses were so low the pump ran out to end of curve.

The most expeditious and convenient means for the customer to protect against a repeat of this occurrence was by fitting an orifice in this bypass system. The orificed system resistance caused enough head loss (by artificially steepening the open-valve pump H-Q curve), to restrict the flow to a value that did not result in cavitation.

Although this was an inefficient way of limiting the pump open-valve flow, the low frequency of operation and the low installation costs suited this customer for this particular application, as manual control of the ball valve could not be relied upon.

Example 2

A customer was faced with repeated pump failures in a high ambient pump application handling a very volatile light hydrocarbon with a low specific heat. An unreliable water cooling supply resulted in the cooled double mechanical sealed Plan 53 system to occasionally overheat, resulting in liquid vaporization and subsequent failure and leakage across the mechanical seal faces.

The customer decided to utilise a sealless solution based on a high integrity metallic nickel alloy containment shell. In this instance it was imperative to limit the energy input to the pumped liquid. By selecting a soft-start solution, the shroud loss heat input was limited to extremely low values, with the added benefit that no ancillary cooling systems (water or ambient air) were required.

This reliable high integrity solution fulfilled the customers' requirements regardless of ambient conditions.

Example 3

A series of pumps on an unloading application operated satisfactorily until the tankers were emptied by about 90%. In winter the tankers could be emptied entirely. However in the high ambient temperatures of mid-summer the tankers carrying the lightest hydrocarbons could not be emptied, as the pumps would cavitate.

All traditional investigations showed that, even at the height of summer, this should not occur. Even detailed system loss calcula-

About the pump doctor

Ian James is the Engineering and Technical Manager at HMD Sealless Pumps Ltd. As part of his daily activities he provides engineering support in the area of design, sales, marketing, training, after-sales, and customer support. He has also developed in-house design and stress analysis guides for major pump components and has co-authored several technical papers, including the "Variable Speed Pumping Guide" for both the BPMA and Europump/HI. Mr. James is a member of the BPMA Technical Committee, ASME-B73 Committee and was a member of the ISO/TC 115/SC 1 Working Group which produced the ISO Sealless Pump specification- EN-ISO-15783. Over the past thirty-five years he has worked in the process, chemical, pharmaceutical and heat transfer sectors at several major pump manufacturers.

tions showed that this should not been a problem. Clearly there were factors that were not evident to the casual observer.
A detailed investigation of the suction piping system upstream of the pump suction, showed that the piping losses were much higher than anticipated. Further investigation showed that some 6 months earlier the piping connecting the tanker to the pump had been re-routed which in itself should not have been a problem. However the previous gate valve had been replaced with a globe valve.
The much higher losses of this globe valve had been the cause of the problem. Particularly during hot summer months, when ambient temperatures increased the liquid vapour pressures to levels where the higher friction losses of the globe valve caused cavitation/vaporization at the pump suction.
Reverting to the previous gate valve cured the problem, as the friction losses were much lower.

Example 4

Some years ago a customer contacted HMD for assistance with a system problem that resulted in previously very reliable pumps failing in an unusual manner. The pumps appeared to be suddenly suffering from cavitation, although system loss calculations appeared to show adequate NPSH margin.
Although we are renowned pump manufacturers rather than system designers, we gladly offer customers advice on system problems.
This particular customer had had several years of reliable service with pumps on refrigerant applications until just after a system shutdown and revamp, where problems occurred on some system applications.
Detailed investigation of the changes made yielded some interesting facts. This was a batch process, and to extend the process operation, during the shutdown changes had been carried out on the suction vessel feeding the pump. Investigation and the understanding of these changes proved critical to understanding of the nature and cause of this problem.
The changes made during the shutdown were:

1. The inlet connection to the tank was routed to a higher elevation, from the side of the tank to a position two metres higher towards the top of the vessel.
2. The pressure of the tank's nitrogen pressure blanket had also been increased.
3. Also, in an effort to extend the batch process times, the low-level switch alarm position was lowered to a lower elevation in the side of the vessel.

These factors, when considered with the knowledge that the tank design did not include any anti-vortexing plates in the outlet leading to the pump, set the scene for the failure mode the customer was seeing.... together with pointing the way towards the solution. The problems only occurred towards the end of this extended batch process, when the tank liquid levels were at their lowest.
Investigation showed that at the lowest tank levels the liquid was free-falling at a sufficient height to caused frothing. This was exacerbated by the fact that the liquid had an affinity for absorption of nitrogen, and the lack of pre-swirl anti-vortex plates in the tank made matters worse by providing the very conditions that allowed a gas laden liquid to be fed to the pump suction. So what had appeared to the operator to be a sudden cavitation problem, was in fact caused by the effect of the gas laden liquid.
By making a number of changes the customer cured the problem. These included lowering the inlet point slightly to the next lowest connection, fitting anti-vortex plates at the tank outlet, and slightly increasing the low-liquid level alarm set point.

I will provide further examples of unusual failures in later issues.

Uniting safety with

Interview with Mr Esa Jurvakainen, pump expert at a nuclear power plant

Comprising two separate units (NPP1 and NPP2), the TVO nuclear power plant on the west coast of Finland is designed to meet base-load electricity demand in Finland. Throughout its history, one of TVO's key objectives has therefore been to ensure a high long-term capacity factor. This is achieved by maintaining a high technical and safety level at the plant and by focusing efforts on the continuous improvement of the staff's professional competence. In fact, TVO's operating reliability is demonstrated by the average capacity factor, which for the past ten years has exceeded 95%. That's well above the 84% global average capacity factor for nuclear power plants. Intrigued how the plant achieves such a high figure, Pump Engineer met up with TVO's pump expert, Mr Esa Jurvakainen.

By David Sear

If you took the time to walk around the TVO nuclear facility on the island of Olkiluoto (on the south-westerly tip of Finland), you would probably find about 1,000 pumps. And you'd probably find that all of them were operating as expected. In their own way, these pumps are contributing to the impressive average capacity figure of 95% set by the plant for the past ten years.

These pumps are one of the work areas for Mr Jurvakainen, who is proud of TVO's operational achievements and indeed its safety record. When it comes to keeping the plant's pumps in good working order, he therefore takes a typically Finnish approach: always considered, always rational and always focusing on the long-term. Take seals for example, which are probably responsible for most of the pump issues identified at the site. In many cases, replacement is a simple affair, and Mr Jurvakainen is happy to let the maintenance department schedule the repair work. However, if the incidence of failure increases, or unexpected problems occur, then Mr Jurvakainen sets out with determination to find the root cause of the failure and to identify long-lasting solutions. Mr Jurvakainen: "Most of our pumps are fitted with single seals, although of course there are some glandless pumps, for example Safety Class 1 reactor internal pumps, and reactor shutdown cooling pumps in Safety Class 2 are also sealless. Right now I am looking at seal failures on some of the boiler feed pumps (pumps supplied by KSB). We have seen increasing seal failures since 2003. Our belief is that the combination of three factors is causing electrical corrosion. These are (i) the high suction pressure of above 20 bar, (ii) the seal face

performance

speed which exceeds 45m/s and (iii) low conductivity of sealing water."

Different angles

In an interesting twist, it appears that the problem of electrical corrosion is far more prevalent in NPP1 than NPP2. This was quite a surprise for engineers at TVO, as the pumps in both facilities are in principle the same. Says Mr Jurvakainen: "The divergence might be explained by the differences in the impellers. In NPP2, all the pumps have been retrofitted with so-called third-generation impellers. These are the largest possible size that can be fitted, and enable us to run the plant using just three pumps, with one on stand-by. So we may fit these impellers to the pumps in NPP1 as well, although the first likely opportunity will only be in 2010."

As well as looking at the impact of the impellers, TVO is also working with various seals suppliers who in some cases are also running their own tests. At this stage, Pump Engineer understand that a comparison test is being run by fitting seals from Burgmann and Crane to opposite shaft ends of a single pump, and that a gas seal from Flowserve is also seen as a possible alternative. However, the solution could in fact come from a completely different angle, indicates Mr Jurvakainen: "In Germany, I understand they are adding ammonia to the seal water as a way to reduce electrical corrosion. Another option could be to fit brushes to the pump shaft. However, that would be a difficult technical modification, so we would have to work very closely with the pump supplier – KSB in this case – to ensure this type of job was done properly."

Pump modifications

Although of course major re-builds or changes to the pumping system are not projects to be undertaken lightly, TVO does already have an excellent track record of successful implementation. This spring, for example, last modifications were made to the safety system cooling water pumps, originally supplied by Ahlstrom in Finland (pump line since acquired by Sulzer). TVO's engineers were asked to increase the flow of cooling water from these vertical pumps, which are also used to provide cooling water

Pumps at TVO

- Total pump population around 1000, with approx 12 pumps in Safety Class 1, 20 in Safety Class 2 and 20 in Safety Class 3. The majority are therefore found in non-critical areas.
- Pump in Safety Class 1 fitted with continuous vibration monitoring systems; other pumps checked frequently using portable equipment.
- Pump use is dictated by the appropriate Finnish Nuclear Authority Codes. Pumps in non-critical areas are covered by sound engineering practices.
- During outages, many pump suppliers (such as KSB) provide maintenance technicians who work under the direction of a TVO staff member.

TVO has an excellent track record of successfully implementing major re-builds or changes to various pumping systems.

About Olkiluoto 3

Location:	Olkiluoto, Eurajoki, Finland
Reactor supplier:	AREVA NP
Reactor's country of origin:	Germany/France
Reactor type:	Pressurized Water Reactor (PWR)
Turbine supplier:	Siemens AG, Saksa
Plant's net electric output (approx):	1 600 MW
Net efficiency (approx):	37%
Total volume of buildings:	950 000 m^3
Construction start-up schedule:	spring 2005
Electricity generation start-up:	2010.

Concrete pouring of the Olkiluoto 3 approx. 60 hours

to the emergency diesels. As the original designs had already been provided with the maximum size of impeller, it was decided to modify the pumps with parts taken from a sister pump design, and then refit to the original mounting plate. Comments Mr Jurvakainen: "We modified the four pumps, plus the reserves, at both units and have hence managed to increase flow by some twenty to thirty per cent. This modification was actually less expensive than fitting completely new pumps, as that would have entailed changing the base-plates, modifying the connecting pipework, etc."

Cavitation

Further changes are being considered to some of the other key cooling water pumps, and in particular those which supply water to the condensers. These are wet-pit pumps, supplied again by Ahlstrom. These modifications could increase the volume of flow by 10%. Mr Jurvakainen: "The project started when we identified a minor cavitation issue, which we naturally wanted resolved. Sulzer performed a computer analysis model using CFD calculations. They came up with a re-designed impeller, which would solve the cavitation. A side effect was that with the new design we could increase the rotational speed from 325 rpm to 360 rpm and hence increase flow output. Of course, that could also mean making changes to the motors, impellers, shaft diameter, etc." Currently, Mr Jurvakainen indicates that Sulzer is considering running tests using small-scale models of both the original and the new impeller designs. These have provisionally been scheduled for September or October this year. He comments: "Of course, if we increase the speed, the cavitation problem could also crop up again, so the new impeller design must be good. Modifying a pump always involves a certain risk, so open discussions about operating points, etc, with the manufacturer are a must. They know best how the pump and technical systems will operate under normal and emergency conditions. Therefore good relationships are essential. After all, of course we want to run an efficient plant, but in a nuclear facility safety must have the absolute priority." ●

Modifying can be cheaper than buying new pumps

About Mr Jurvakainen

Mr Jurvakainen studied mechanical engineering and vibration mechanics at a university in Finland. He started his career as a vibration/noise measurement engineer at a shipyard before transferring to TVO in 1988.

He is now a senior engineer within the plant engineering department, which has sections for mechanical engineering, electrical engineering and civil engineering. Key work areas for Mr Jurvakainen are pumps, diesel generators and mechanical engineering. His main focus is to maintain the operational availability of the two nuclear units (NPP1 and NPP2), and to provide engineering support for the new unit (NPP3) currently being built.

Mr Jurvakainen's work with pumps includes assessing changes/re-designs to existing equipment or alterations in the operating set points. In that respect, he is active in engineering, but may also be involved in specification and procurement activities.

Asked about highlights, Mr Jurvakainen says it is extremely rewarding to discuss engineering problems and find solutions, although he emphasizes that in Finland engineers rarely work in isolation and that high value is placed on teamwork.

turbine table started on 26.4.2007, lasting

About TVO

Teollisuuden Voima Oy (TVO) is a private electricity generation company owned by Finnish industrial and power companies, to which the company supplies electricity at cost price. The company owns and operates two nuclear power plant units on the west coast of Finland in Olkiluoto, in the municipality of Eurajoki. In addition to the nuclear power plant, TVO is a shareholder in the Meri-Pori coal-fired power plant.

The decision to construct a nuclear power plant with a capacity of ca. 660 MW was made by the Board of Directors of TVO in 1970. In 1972, the Swedish company Asea-Atom (now Westinghouse Electric Company) was chosen as the plant supplier. The construction of Olkiluoto 1 (OL1) started in the winter of 1974, and electricity generation started in September 1978. Olkiluoto 2 (OL2) was first connected to the national grid in February 1980. At present, both units operate at a net capacity of 860 MW, and together generate some 16% of all electricity consumed in Finland. Olkiluoto plant has operated very reliably for more than 25 years now, with the capacity factors of both units at an international top level almost throughout the operation of the plant.

Sugar cane leaves can be used to make ethanol.

The coming of ethanol: what are the implications for pumps?

America's Midwest is booming, thanks to the current rise in demand for ethanol made from corn and other organic materials. Ethanol plants are multiplying – and so is demand for pumps needed for ethanol production, transportation and storage.

By James Chater

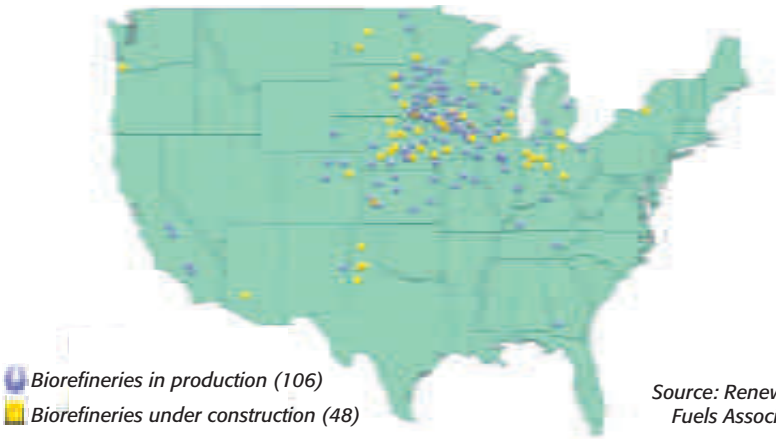
"Gasoline is going – alcohol is coming… All the world is waiting for a substitute to gasoline. When that is gone, there will be no more gasoline, and long before that time, the price of gasoline will have risen to a point where it will be too expensive to burn as a motor fuel. The day is not far distant when, for every one of those barrels of gasoline, a barrel of alcohol must be substituted."

Given the current surge in demand for ethanol in the United States, one could be forgiven for attributing the quote above to, say, an Iowa farmer, circa 2007. In fact these prophetic words were spoken by Henry Ford, in an interview of 1916.

Background

Ethanol has been around for as long as the motor car, but interest in this clean, renewable biofuel has waxed and waned in tandem with the price and availability of the substance that it is supposed to replace, gasoline. For decades cheap oil from the Middle East meant that ethanol was not economically viable, but when oil prices soared in the 1970s, the attractions of developing a substitute to oil imported from unstable regions became more obvious. In that decade the Brazilian military

Map showing location of ethanol refineries in the USA



Biorefineries in production (106)
Biorefineries under construction (48)

Source: Renewable Fuels Association

government developed a programme to replace oil imports with ethanol made from home-grown sugar cane. When the price of oil slumped in the early 1990s, ethanol once again took a back seat in advanced industrial countries.

Today, however, geopolitical tensions, higher oil prices and concerns about carbon emissions have revived interest in ethanol world-wide. Production is currently led by Brazil and the United States. Canada and Central and South American countries are also ramping up production; South Africa, the Philippines, China and the UK are among those countries beginning to show an interest. The United States is just one of many countries that have introduced subsidies, tax breaks and legislation to increase the use of renewable fuels in automobiles.

Husky Energy's ethanol plant under construction in Lloydminster, Saskatchewan, Canada. The facility, which officially opened in September 2006, is the largest of its kind in Western Canada and will produce annually at peak production 130 million litres of ethanol and 134,000 tonnes of Distillers Dried Grain with Solubles (DDGS).

Pros and cons

The economics of ethanol are difficult to calculate with any precision, and are clouded by political factors. President George Bush has famously remarked that the USA is "addicted" to imported oil, and doubtless the current craze for the substance in the USA has patriotic overtones, offering "freedom from foreign oil" and boosting the rural economy. Critics argue that ethanol subsidies are pork-barrel politics; that using corn to make ethanol simply inflates the corn price and consumes resources that should be used on food production; that corn cultivation harms the environment by encouraging deforestation and the use of fertilizers and pesticides; and that ethanol refining consumes more energy than it creates. Advocates respond by pointing out that other forms of energy, such as oil, are also subsidized; that oil refining is also energy-intensive; and that technological developments currently under way will meet all the environmental objections. With respect to the last point, one process that shows particular promise, though still at the testing phase, is cellulosic ethanol. Cellulose is the main component of plant cell walls and the most common organic compound on earth, so its use could well lead to a significant expansion in the amount and variety of organic materials available for the production not only of ethanol but also a whole host of chemicals, relieving pressure on food sources.

One obvious factor in the economic equation is the oil/corn price ratio. The higher this climbs, the more it favours ethanol production. If the oil price stays above USD 40 a gallon, most experts agree, ethanol production is economically viable. Leaving short-term economic factors aside, however, and factoring in the cost of sending troops to the world's most unstable regions to police oil supply routes, it could easily turn out that further development of biofuels is the most economical as well as the most sensible course of action.

Production and distribution

Ethanol is produced through a process similar to brewing beer: by fermenting any carbohydrate-rich biomass such as starch, sugar and cellulose. In practice the most common raw materials currently used are wheat, corn and soya (in North America and other temperate regions) and sugar cane (in tropical regions such as Brazil). The raw material is fed into a hammer mill and crushed into a fine powder. It is mixed with water, where enzymes go to work to convert the starch into sugar. The mash is then cooked to reduce the

Safety first

Ethanol is highly toxic, so the need to prevent leaks is paramount. It is also more prone to contamination or loss of product, for instance through contact with water. The choice of pump sealing system is therefore crucial for safety and product integrity. Researching this topic, Pump Engineer found an interesting Sulzer Pumps brochure on their website (Sulzer Pumps for Fermented Ethanol Applications) which stated: "In ethanol production reliable shaft sealing of pumps is a crucial factor. Sulzer Pumps choose the right seal - whether that means Dynamic seal, single or double mechanical seals, or conventional gland packing – for every specific application in ethanol production".

amount of bacteria. After the mash has been cooled it is transferred to fermenters, where yeast is added to convert the sugar to ethanol and carbon dioxide. In the final stages the alcohol is vaporised to separate it from the other elements in the mash, then condensed and purified to form 100 per cent pure alcohol. The ethanol is then blended with a 5 per cent denaturant such as gasoline to prevent it from being sold as drink.

Ethanol is not transported by pipeline, one of the reasons being that any water that penetrates the pipeline would be absorbed by the ethanol, diluting the mixture. It has therefore to be carried by road, water or rail, which in effect restricts its use to local markets. Ethanol is usually added to gasoline in proportions of 5 to 10 per cent (E5, E10) to improve its octane rating. Increasingly, however, cars are being produced or modified to accept a blend of 85 per cent ethanol and 15 per cent gasoline (E85); in some diesel engines, E95 is used.

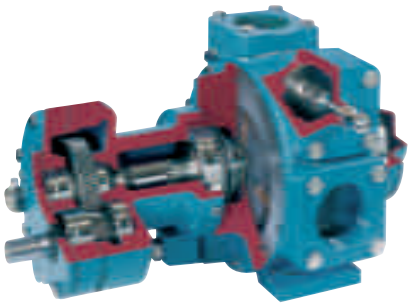
Pumps for ethanol

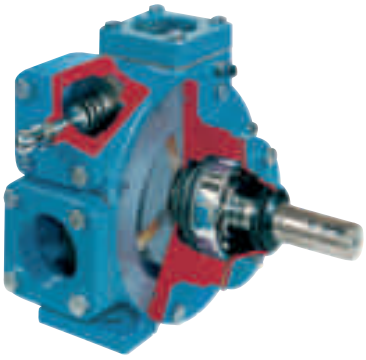
To gain an insight into the types of pumps and materials suitable for ethanol production, we spoke to Blackmer's Product Manager, Mt Scott Jackson. He said: "The most commonly used Blackmer pumps in the ethanol and biodiesel applications are the ProVane® PV, GX, X and TXS model pumps. The ProVane® PV, GX and X models are for base mounted, electric motor drive, in-plant applications and TXS for truck mounted PTO or hydraulic drive applications. All these pumps are constructed with cast iron components, Duravane non-metallic vanes and Blackmer mechanical seals, and have been recently upgraded to allow for compatibility with ethanol and biodiesel. The pump upgrade was to a higher grade Fluorocarbon (FKM) elastomer that has a broader range of compatibility to allow the pumps to be used with all grades and blends of ethanol and biodiesel." He further added that Blackmer has no special stainless steel or special alloy metal parts or components in these pumps and that the upgrade was to the elastomers only. "Experience has shown the sliding vane pumps to work very effectively in these applications because of the suction lift and line clearing capabilities. Many customers are adopting the attitude: 'Better Get Blackmer'," he said.

He also added an interesting sidenote, namely that whilst Blackmer does offer a variety of stainless steel pump designs - sliding vane, eccentric disc, and centrifugal - most customers have chosen to use the cast iron pumps due to the cost savings when compared with stainless steel pumps.

Outlook

Although recent falls in the price of petroleum may be causing some short-term uncertainty in the ethanol business, in the longer term the industry is likely to be sustained by political and environmental factors, and by the enhanced possibilities offered by cellulosic ethanol. It therefore remains a market to which pump suppliers should pay close attention. ●





Recent pump developments

• LVP pump series

Viking Pump's new LVP series offers among the highest pressures available for thin liquids in a rotary PD pump. This series offers hard silicon carbide bushings and tungsten carbide coated shafts as standard. With capacities to 160GPM, these pumps have applications throughout the CPI and ethanol and biodiesel production.

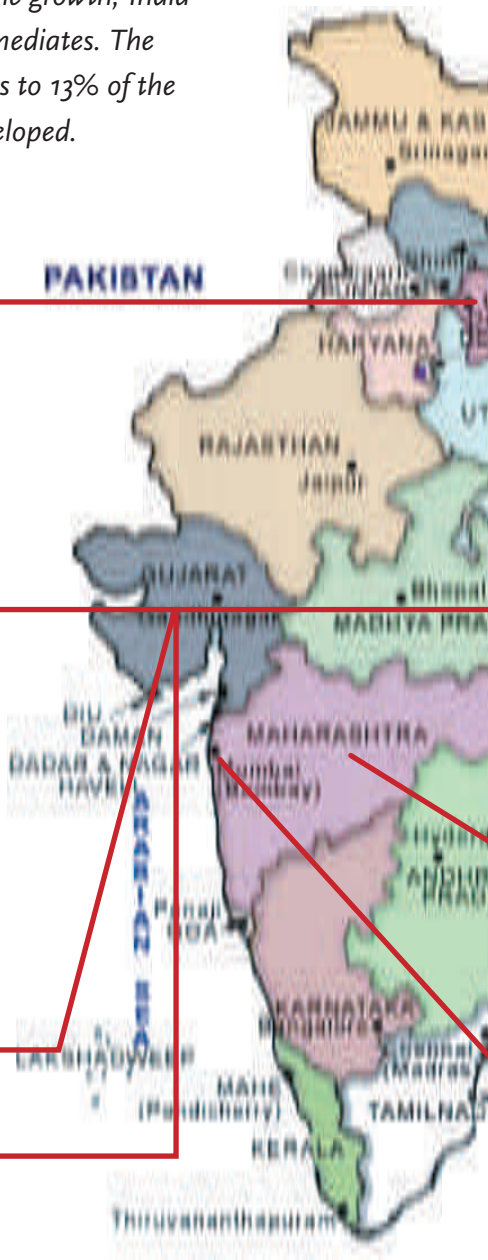
• Pumps for bio-diesel duties

CDR Pumps has recently completed the final phase of delivering a substantial order for metallic magnetic drive pump units for a new bio-diesel production plant in France. CDR Pumps has manufactured a total of 27 UTS-B stainless steel pumps, all ATEX rated and mounted on individual base-plates. The CDR Pumps range particularly lends itself to the bio-diesel production process, manufacturing chemical process pumps capable of safely handling potassium hydroxide and ethanol, the main hazardous ingredients, which both carry their own set of long term pumping challenges.

To read more about these and other ethanol-related stories, please visit www.pumpengineer.net, and type in "ethanol" in the search field.

Chemical projects

In the early 1990s India was a net importer of chemicals. Today, because of the implementation of many large scale petrochemical plants and because of the tremendous economic growth, India is a net exporter in sectors like bulk drugs and pharma, pesticides, dyes and intermediates. The chemical industry is still one of the fastest growing sectors in India and contributes to 13% of the country's GDP. To facilitate this growth a large number of projects are being developed. Pump Engineer provides you with an overview of some of these projects.



Zandu Pharma reports progress on new project

Zandu Pharmaceuticals has reported progress on its new project coming up in Uttaranchal. The project involves setting up a new plant at Uddamsingh nagar in Uttaranchal to manufacture Ayurvedic churn and granules. With the commissioning of the new plant, the total production capacity will be increased by 50%. The project is estimated to cost Rs.250 million. As of January 2006, the project is under implementation and the plant is expected to go onstream in April 2007.

GNFC plans touline di-isocyanate unit

Narmada Chematur Petrochemicals, a subsidiary of Gujarat Narmada Valley Fertilisers is planning to set up a new unit to manufacture touline di-isocyanate (TDI) at its fertiliser complex in Gujarat. The proposed plant will have a capacity to manufacture 50,00 tpa of TDI. TDI is is an aromatic di-isocyanate and is produced for reaction with polyols to form polyurethanes. The project is estimated to cost Rs.11,000 million. As of January 2007, the PSU is in the process of signing an MoU with state Government.In addition to this, the company is also planning invest Rs.1,400 million to set up methane production facilities and is in talks with Lyondell to set up a JV to manufacture acetic acid.
The acetic acid project is still in the conceptual stage.

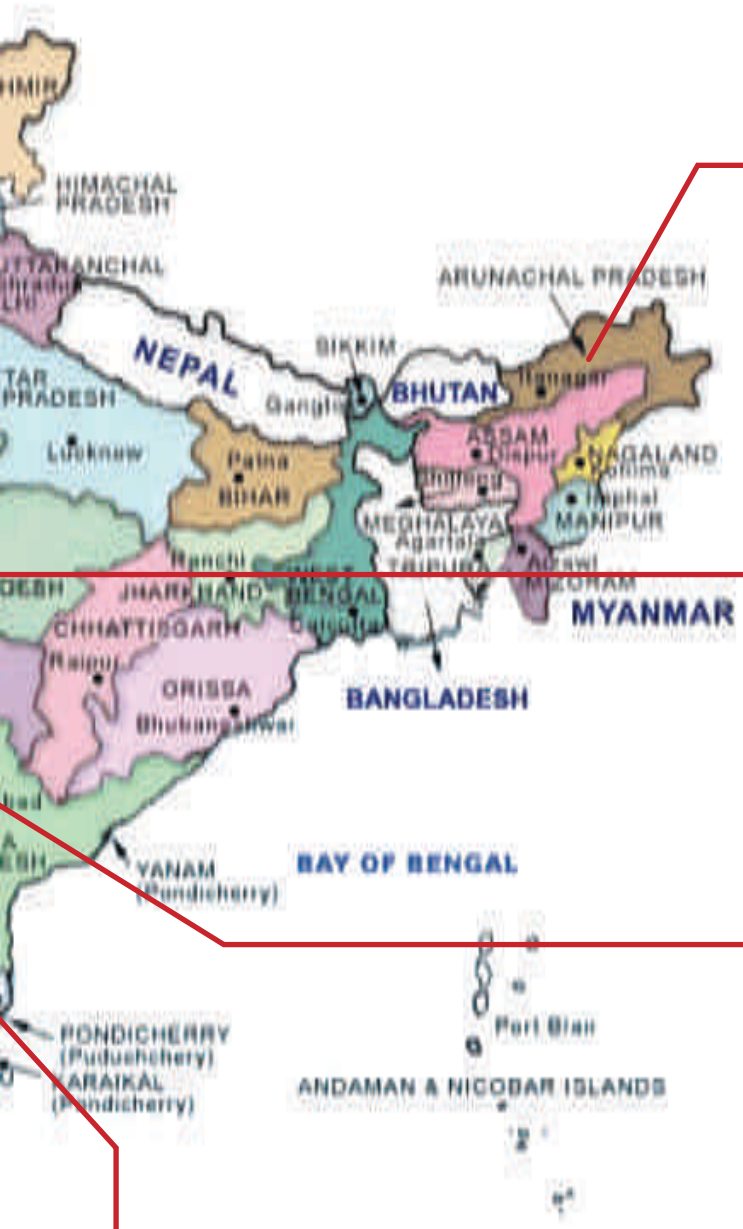
Nirma plans expansion programme at its Porbandar unit

Nirma, a leading manufacturer of detergent chemicals, is planning to take up an expansion programme at its plant at Porbandar in Gujarat. The project involves increasing the capacity of caustic soda plant from the present 200 tpd to 240 tpd and setting up a pure water plant with an investment of Rs.3,500 million and revamping the soda ash plant to a capacity of 1,200 tpd with an investment of Rs.3,000 million. As of February 2007, the project is still in the planning stage and the company has just signed an MoU with the state government of Gujarat.

Perstorp Chemicals to take up boiler fuel conversion

Perstorp Chemicals is planning to take up boiler conversion project at its plant in Vapi in Gujarat. The project consists of two phases wherein phase one involves investment to convert existing residual fuel oil fired boilers by retrofitting extended furnace to facilitate manual briquette firing in 8 TPH boiler. During the second phase the project activity involves installing a new 14 TPH boiler. The plant currently produces formaldehyde and pentaerythritol.

in India



Bhagirada Chemicals to expand capacity

Bhagirada Chemicals and Industries is planning take up an expansion programme at its pesticide unit at Cheruvukom-mupal, Ongole Mandal in Prakasam district of AP. The project involves increasing the capacity of Chlorpyriphos, Chlorpyri-phos Methyl, Imidacloprid, Triclopyr Butoxy Ethyl Ester and Fluroxypyr from 950 tpa to 3,200 tpa. The project is estimated to cost Rs. 183 million. As of January 2007, the project has received clearance from ministry of environment and forests.

Hindalco to double Dahej DAP capacity

Hindalco Industries, a part of Aditya Birla group, through Birla Copper unit is planning to take up an expansion programme at its Dahej fertilizer complex. The project involves increasing the DAP capacity from the present 4 LTPA to 9 LTPA, phosporic acid plant from 1.8 LTPA to 3.6 LTPA and setting up a 60 MW captive power plant. The project has been estimated to cost Rs. 8000 million. As of January 2007, the company is planning to sign an agreement with the state government of Gujarat to implement the project.

Pharma Base to set up new plant

Pharma Base India is planning to set up a new bulk drug unit in Maharashtra. The plant will manufacture Glucosamine Hydrochloride (60 MPTA) and Glucosamine Sulphate.2 KCI (84 MPTA). Total capacity of the plant shall be 144 MT/month. Chitin obtained from shells of prawn/shrimps/crabs etc. shall be attached to the steam boiler and HCL and crystallized to get Glucosamine Hydrochloride which shall be reacted with Potas-sium Sulphate to produce Glucosamine Sulphate.2 KCI. Stacks shall be attached to the steam boiler and HCL recovery plant to absorb gas fumes. The project is estimated to cost Rs.200 million.

Sandoz to expand bulk drug capacity

Sandoz is planning to take up an expansion at its bulk drug unit in Navi Mumbai. The project involves expanding the capacity of Cephalosporin from 35 tpa to 50 tpa , manu-facture of Carbapenems (6 tpa) and manufacture of penems (62,500 units/day).As a part of the project, On-line solvent recovery plant with 95 % recovery will be installed. The scrubbers will be provided to the reaction vessels to scrub vent gases. All the solid waste generated will be sent to CHWTSDF, Taloja, Raigad, Maharashtra for incineration by M/s Mumbai Waste Management Ltd. (MWML). The project is estimated to cost Rs.600 mil-lion. As of December 2006, the project has received clearance from ministry of environ-ment and forests.

Peristaltic metering pump or diaphragm metering pump – how to choose?

In this article, the author reviews key parameters that can influence the choice between a peristaltic metering pump or a diaphragm metering pump. Factors under discussion include the fluid, the pressure, control capability and required maintenance.

By Bill McDowell, Sales Engineer, Blue-White Industries

RELIABILITY

Reliability can be defined as the probability that an item will perform a required function, without failure, under stated conditions for a stated period of time.

As a young boy, I delivered newspapers every day. I learned very quickly that if the customers did not receive their newspapers by a certain time, the phone in my house would ring. For my father, this was a very effective diagnostic tool and measure of my reliability – as well as a periodic pain in the neck. Our lives are filled with examples of both reliable and unreliable systems. The key to a reliable metering pump system is to determine which parameters affect the system's reliability and employ the most reliable solution for each of these parameters. In this article, I will explore the differences between peristaltic and diaphragm metering pumps and how those differences can create challenges or solutions in an individual system.

SYSTEM PARAMETERS

There can be as many definable parameters in a specific system as there are required functions. Although it would be impossible to identify all possible parameters in this article, the four basic metering pump system parameters are listed below. We can analyze each of these parameters with respect to a diaphragm and peristaltic metering pump system and compare their effect on the reliability of the overall system.

1) Fluid
2) Pressure
3) Control capability
4) Required maintenance

FLUID

Chemical resistance - users must be careful that **all** of the components are resistant to the chemical being injected.

Peristaltic pumps will not damage delicate fluids.

Diaphragm pumps (Figure 1) typically employ a large number of 'wetted' components:

•Suction strainer with check valve - typically includes a filter screen, valve body, check valve/ball, rubber seal/seat, and a metal spring.
- Suction tubing or piping.
- Pump head with inlet/outlet valves – includes a pump head, valve bodies, check valve/balls, rubber seal/seats, and usually (depending on the manufacturer) metal springs.
- Discharge tubing or piping.
- Injection fitting with check valve - typically includes a valve body, check valve/ball, rubber seal/seat, and a metal spring.

Peristaltic pumps (Figure 2) employ much fewer 'wetted' components:
- Suction tubing or piping.
- Peristaltic pumping tube – typically includes the inlet and outlet fittings.
- Discharge tubing or piping.
- Injection fitting with check valve - typically includes a valve body, check valve/ball, rubber seal/seat, and a metal spring.

Un-dissolved solids – peristaltic pumps are extremely effective in pumping fluids with un-dissolved solids. These 'dirty' fluids, or 'slurries,' tend to clog the valves in a diaphragm pumphead.

Outgassing – some fluids tend to release absorbed or occluded gasses when subjected to a vacuum or changes in temperature. Examples of this effect are noticeable in chemicals such as chlorine and hydrogen peroxide. Diaphragm pumps often loose their prime and fail when gasses build up in the pump head area. Peristaltic pumps are capable of pumping both fluid and gas and therefore cannot loose prime.

Shear stress – some fluids can be adversely effected by the forces created during the pumping action. Diaphragm pumps can damage delicate fluids, particularly if the pump employs a high velocity stroke action such as in a solenoid type pump. Peristaltic pumps utilize a gentle squeezing action that will not damage these types of fluids.

Temperature – as with chemical resistance (above), users must be careful that **all** of the pump components are resistant to

Fig. 1: Exploded view of a diaphragm pump. Characteristics include the pulsing action and the many components.

the temperature (both high and low) of the chemical being injected. Rubber and metal components are typically of the most concern. Peristaltic pump outputs and pump tube life are adversely affected by the fluid temperature; high temperatures will reduce pressure capability and suction lift, low temperatures will affect tube life expectancy and suction lift. Diaphragm pumps are typically capable of higher temperature ranges.

PRESSURE

Injection pressure – peristaltic pumps used in metering applications are typically limited to maximum discharge pressures of 125 psi, but they easily prime under maximum pressure, can inject into a vacuum without the need for metal spring loaded valves and their output volume does not change due to changes in the system pressure. Diaphragm pumps can typically operate at much higher system pressures but require the addition of metal spring loaded valves to resist siphoning, are difficult to prime against system pressure and their output will vary with changes in the system pressure.

CONTROL

Remote adjustment – the output volume of both diaphragm and peristaltic pumps can be controlled remotely. Peristaltic pumps can be controlled by varying the speed of a DC motor or by cycling an AC gearmotor. Diaphragm pumps can be controlled by varying the speed of a DC motor, cycling an AC gearmotor or if solenoid driven, by 'pulsing' the solenoid.

Because they lack a forward and backward 'stroke,' peristaltic pumps offer the benefit of near continuous injection of chemical – even when the motor speed control is reduced to very low speeds (see Figure 3). When reduced to a low motor speed or low pulse frequency, the output of a diaphragm pump will result in intermittent chemical injection.

External communications – both peristaltic and diaphragm pump manufacturers now offer many output communications methods for connections to PLCs, remote user interfaces and ancillary pumps and equipment.

Diagnostics - both peristaltic and diaphragm pump manufacturers offer a variety of diagnostics systems including flow verification sensors, tube failure detection systems, diaphragm detection systems, motor on sensors, motor speed sensors, etc. These systems typically provide relays and/or contact closures for alarm outputs.

MAINTENANCE

Service interval – it is generally thought that diaphragm pumps require less frequent service than peristaltic pumps. While this may be true in certain applications, it is certainly not true for all applications. Generalizations such as this often result in an unreliable metering pump system – and late night service calls. The

Diaphragm pumps can operate at much higher system pressures

fact is that the service interval required for a specific metering pump system is directly dependent on the individual parameters of that particular system. The entire system is only as good as its weakest link and the more links in the system, the more chances that something will go wrong.

Pump system parameters including diaphragm wear, chemical attack on seals, solids/dirt accumulation on valves, pump tube life expectancy, motor bearing life, etc. should be evaluated with an eye toward potential failure and a suitable maintenance schedule should be developed to maximize the reliability of the sys-

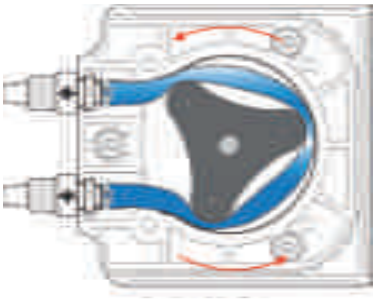


Fig. 2: Cross-section of a peristaltic pump. Characteristics include the progressive squeezing action and the small number of components.

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Engineered for life

tem. The user should be careful to avoid designing a system with inherent unreliability, such as attempting to pump dirty gaseous fluids with a diaphragm pump, or operating a peristaltic pump continuously at excessively high pressure.

Since both types of pumps require an injection/check valve fitting, suction tubing/piping and discharge tubing/piping (diaphragm pumps require an extra suction strainer/valve assembly to aid in maintaining their prime), the difference in pump types from a maintenance standpoint boils down to the peristaltic pump tube versus the diaphragm head/valve assembly.

Life expectancy – when sized and specified for the application, and properly maintained, the *reliable* life span of both peristaltic pump tubes and diaphragm head/valve assemblies can be measured in years.

About the Author

Bill McDowell is a Sales Engineer with Blue-White Industries. He has been with Blue-White Industries for over 22 years and has also held the position of Project Engineer and Director of Engineering. Bill resides in Garden Grove, California with his wife Jana and their two children Jillian and Sean.

For additional information, contact Blue-White Industries via sales@blue-white.com or www.blue-white.com

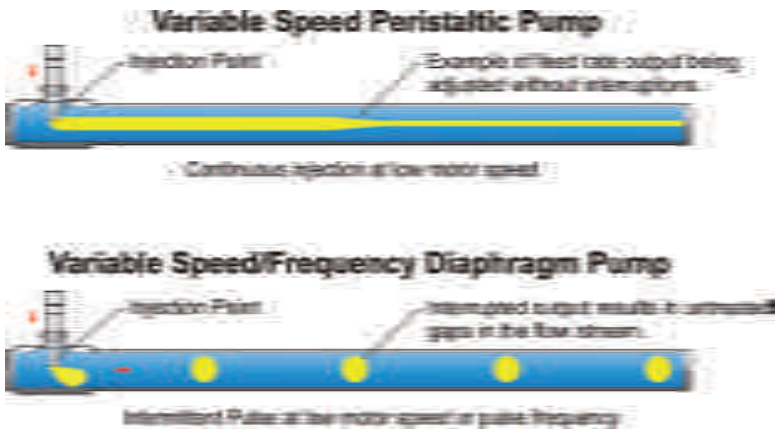


Fig. 3: Comparing the effect of low motor speed on the output of both peristaltic and diaphragm pumps.

Conclusion

Both diaphragm and peristaltic metering pumps have proven themselves in a multitude of commercial, industrial and municipal chemical metering applications. However, each pump type has its strengths and weaknesses (see Table 1). A quick review of the required system parameter requirements can guide the user in selecting the best pump type for the specific application. ●

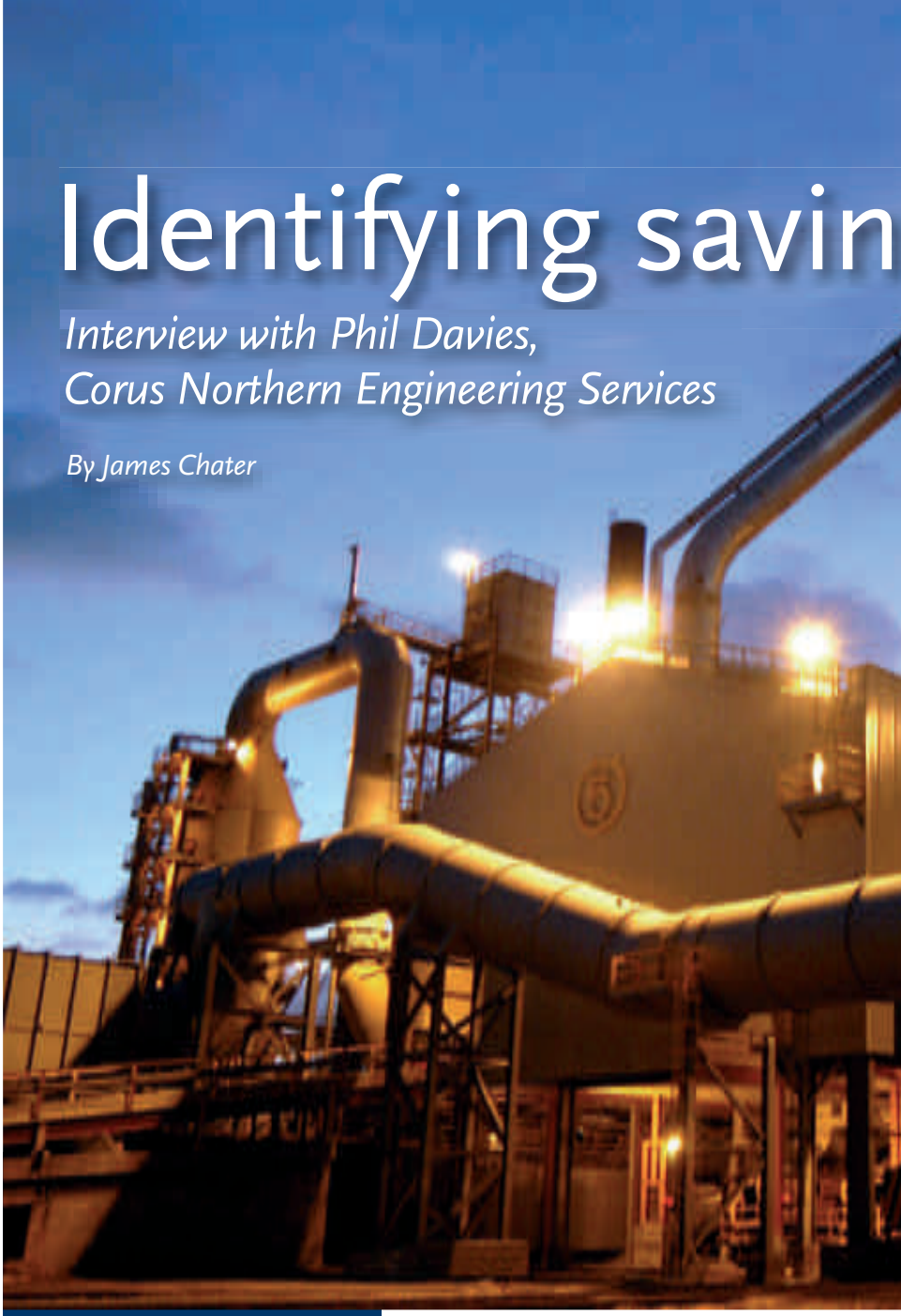
Parameter	Peristaltic pump	Diaphragm pump
FLUID		
Chemical resistance	▪ Fewer components to be attacked. ▪ Few pump tube material options.	▪ Many components to be attacked. ▪ Many component material options.
Un-dissolved solids	▪ Excellent – no valves to clog.	▪ Poor – valves can clog causing failure
Outgassing	▪ Excellent – automatically primes.	▪ Poor – difficult to prime
Shear stress	▪ Excellent – will not damage fluid.	▪ Poor – can damage delicate fluids
Temperature	▪ Limited range – pump tubing is affected by high and low temperature.	▪ Extended range – effect of temperature on the diaphragm is minimal.
PRESSURE		
Injection pressure	▪ Limited discharge range - <125 psi typical. ▪ No change in output due to changes in system pressure.	▪ Extended discharge range - >125 psi typical. ▪ Large change in output due to changes in system pressure.
CONTROL		
Remote adjustment	▪ Excellent - steady dispersion of chemical at very low output with speed adjustment.	▪ Good - intermittent dispersion of chemical at low outputs.
External communications	▪ Excellent	▪ Excellent
Diagnostics	▪ Excellent – tube failure and flow verification alarm systems available.	▪ Excellent - dfiaphragm failure and flow verification alarm systems available.
MAINTENANCE		
Service interval	▪ Service required at regular intervals.	▪ Service recommended at regular intervals
Life expectancy	▪ Excellent	▪ Excellent

Table 1: A comparison of the strengths and weaknesses of the peristaltic and diaphragm metering pumps.

Identifying savin

Interview with Phil Davies, Corus Northern Engineering Services

By James Chater



Mr Davies, what is your current job description and responsibilities?

I am tasked with identifying areas within Corus where financial savings can be achieved by targeting pumps and associated systems. I co-ordinate the UK Pumps Team, and we are looking for savings within the following parameters: integrated maintenance, unacceptable asset life identification and rectification, spares reduction and energy efficiency improvements.

What projects are you working on at the moment?

We are currently investigating individual pump systems ranging from small circulating pumps up to 2MW power station feed pumps. We are concerned predominantly with high-power pumps of 90kW or greater due to the pump numbers involved and the greater savings that are possible on the larger units.

The larger projects involve complete system evaluation and purchase of new pump sets to match the required system curve. We are heavily involved in scale pit pump renewals in South Wales. These are extremely arduous duties where the reduction in efficiency due to wear can increase the annual running costs dramatically.

Another area of investigation is the installation of variable speed drive systems on areas of plant that have non-continuous cooling requirements, such as run-out tables, slab spray systems, coil cooling etc. The aim is to reduce the speed of the pump when no steel is present and then ramp back up as the steel approaches the cooling section. In this way, and because power reduces by a cube law in proportion to the speed of centrifugal pumps, the annual power consumption, and hence cost, can be dramatically reduced.

Can you describe your day-to-day activities?

Luckily, I don't really have a typical day, except that everything is focused on pump improvements in whatever shape that may be. My activities vary from attending site meetings conducting system analysis, hands-on flow rate evaluation and pump efficiency testing, and attending supplier meetings, to writing reports or analyzing pump quotes or system information.

What kinds of pumps are you currently working with or procuring?

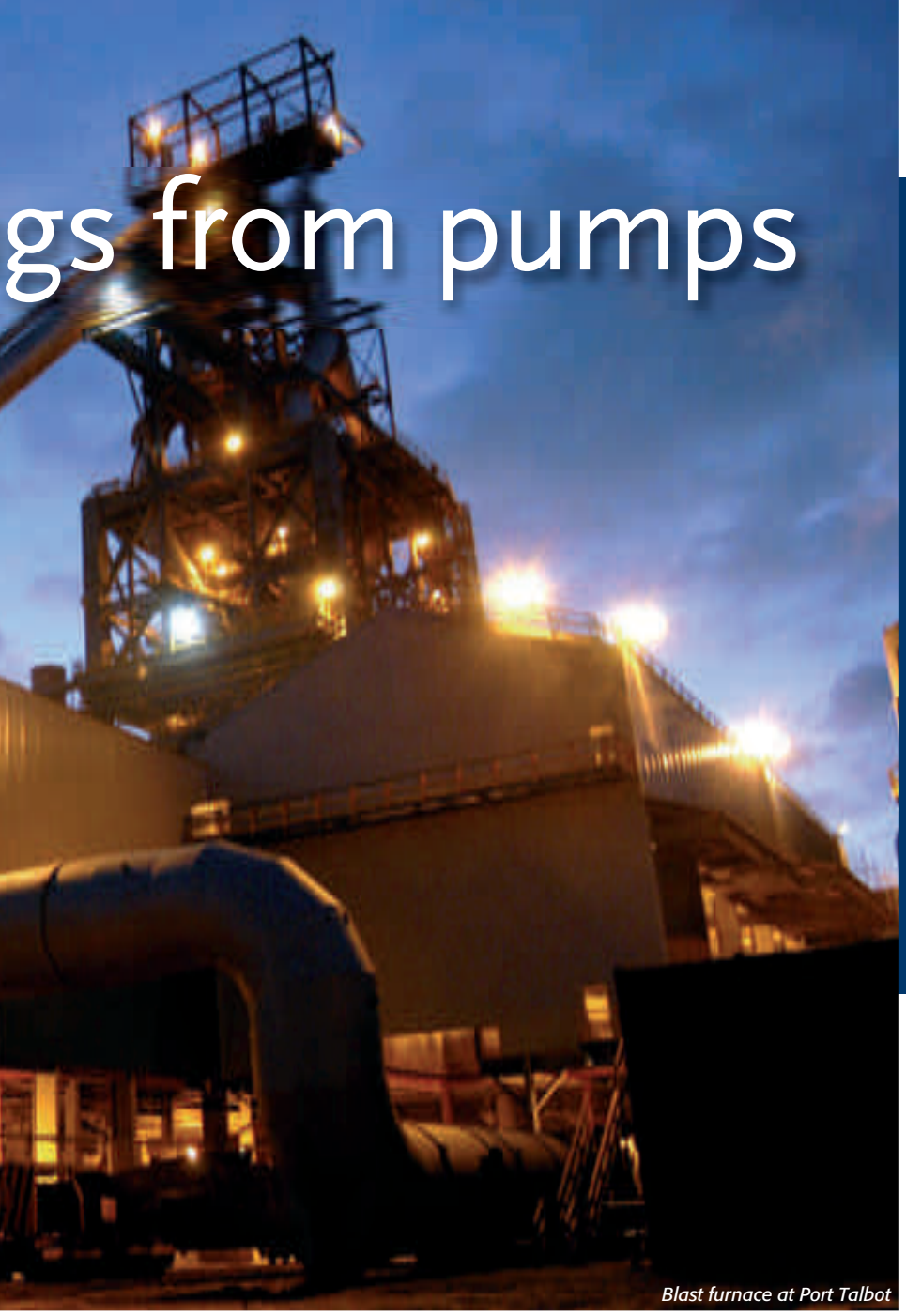
The workhorse of the steel industry is the centrifugal split case pump, and the vast majority of our work revolves around that design. Other pump designs can vary from small multi-stage pumps, far larger boiler feed multi-stage pumps to positive displacement oil pumps.

The pumps can be horizontal or vertical in orientation and can be pumping water from clean potable right through to highly abrasive scale pit water. The aim is to procure the pump with the right material for each individual job to provide the longest

About Phil Davies

Phil Davies is Pumping Systems Engineer for Corus Northern Engineering Services. He completed a degree in Chemical Engineering before commencing work as a Technical Engineer for Stork Pumps. This developed into External Technical Sales and management covering the north of England and Scotland. Phil then moved to AESSEAL, spending four years as a Technical Sales Engineer before moving to his current position at Corus.

gs from pumps



Blast furnace at Port Talbot

About Corus

Corus is an international company, providing steel and aluminium products and services to customers world-wide. The company employs around 47,300 people, with manufacturing operations in many countries and major plants located in the UK, the Netherlands, Germany, France, Norway and Belgium.

With an annual turnover of GBP 9 billion, the company comprises four divisions: Strip Products, Long Products, Distribution & Building Systems and Aluminium. It also has a global network of sales offices and service centres.

Corus was formed on 6 October 1999 through the merger of British Steel and Koninklijke Hoogovens.

Recent news: Corus is now part of Tata Steel, following a USD 12 billion acquisition. The acquisition creates a company with a pro forma crude steel production of 27 million tonnes in 2007, making it the world's fifth largest steel producer with 84,000 employees across four continents. For details, please visit www.corusgroup.com.

lifetime between failure at the lowest life cycle cost.

What do you like best about your job?

I suppose I would have to say the diversity. As I cover the UK I get to travel to all the plants, see the different processes, meet different engineers with varying problems and challenges and attempt to resolve them and improve the process efficiency.

What do you consider your biggest challenges?

Convincing engineers to spend a portion of their budget in order to save energy on pumping equipment, which can be a hidden benefit to the local area engineer. It gives great satisfaction though when the engineer "buys into" the proposed solution and can see the long-term benefits in terms of both energy saving and the resulting longevity of the pump asset.

What are you looking for in pump manufacturers?

To become far more of a "partner" with Corus and help us achieve our goal of moving towards world-class status within pumps. To be more innovative in terms of finding ways to increase the life of the pump and reduce the energy cost.

What changes in pump manufacture would you like to see?

My hopes would be somewhat at odds with a pump manufacturer for fairly obvious commercial reasons. I would like to see more pump sizes within a given range so that for each duty there is a corresponding pump with an efficiency of around 90 per cent! I would also like to see more components held to reduce the lead time on a split case pump. Unfortunately my wishes would be extremely cost-prohibitive for suppliers and hence unlikely.

A more achievable potential improvement would be the reduction of clearances within the pump, using new hard-wearing low-friction materials to increase efficiencies.

What changes do you foresee in the industry in the next five to ten years?

Cost reductions in as many areas as possible to reduce the finished steel product price in order to maintain competitiveness within the world market.

More integrated contracts in order to reduce both cost of overhaul and effect on the plant, while at the same time increasing the mean time between failure and pump availability. ●

Pump design and manufacture to continue in Glasgow

The launch of Clyde Pumps (incorporating Weir Pumps Glasgow)

In 1871, two brothers, George and James Weir, founded the engineering firm of G. & J. Weir. From their Cathcart works on the south side of Glasgow, Weirs quickly established a reputation for inventing pump and valve technologies that were utilised successfully on ship engines, oil pipelines, desalination plants and power stations across the world.

On Tuesday 8th May 2007, over 135 years after the Weir brothers founded their business, Jim McColl announced the acquisition of Weir Pumps (Glasgow) from The Weir Group plc. The GPB 100 million funding package for the deal includes debt and working capital facilities provided by HBOS plc (Halifax Bank of Scotland). In order to minimise the uncertainty hanging over the business and the workforce it was extremely important to complete the deal in a very tight timescale.

As a result of this transaction, the diverse portfolio of technologies, process knowledge and expertise generated by Weir Pumps will be incorporated into a newly created company, Clyde Pumps Ltd.

Strong platform for growth

Commenting on the acquisition, Jim McColl said, "I am delighted to welcome Weir Pumps (Glasgow) into our portfolio of companies. Over two centuries the business has demonstrated that it has an outstanding track record of designing innovative pumping solutions for customers across a wide range of industries. We believe that this heritage, complemented by a highly skilled workforce, will provide us with a strong platform to significantly grow both market share and profitability."

He continued: "Weir Pumps (Glasgow) has an impressive reference list of customers and we look forward to working with them in order that we may continue to support them with innovative solutions to their pumping requirements. Our strategy for the business going forward is to continue full scale pump manufacturing including both new equipment and spare parts. Initially this will be from the existing Cathcart plant. We will invest in a modern manufacturing plant in the Glasgow area, including a world class test and development facility. The plan is to have the new facilities ready by the end of March 2009."

Immediately following this breaking news, Pump Engineer's Jorge Fontes travelled to Glasgow to hear further details from Robin Tait, Marketing Services Manager (on right). He confirmed that the whole workforce in Glasgow was excited by the opportunities that lay ahead, and said he looked forward to talking to existing and prospective clients. Mr Tait can be reached on phone +44 (0)141 308 2237, or email r.tait@weirpumps.com. For further information, please visit www.clydepumps.com

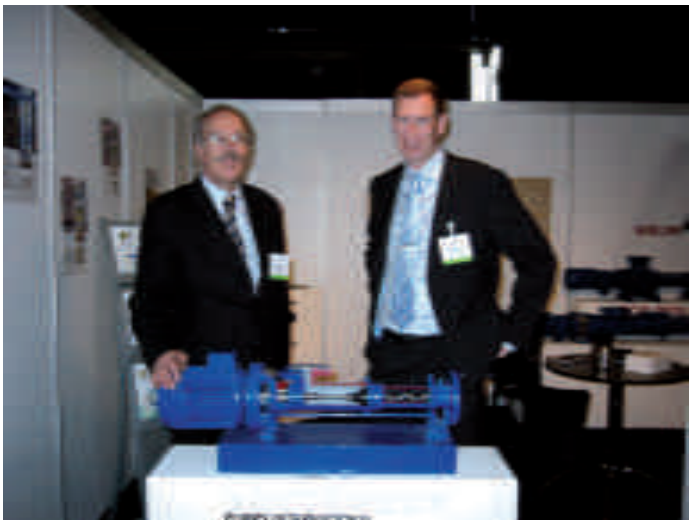
A Clyde Pumps Duoglide two stage split case pump getting final inspection before leaving the factory. These pumps feature many advanced features that deliver best in class efficiency and reduced through-life costs.

Centre of excellence

As a result of the current strong order book, the company has a healthy workload for the next two years, confirmed Mr McColl. "With a confident vision of the future we will be working hard to build on this strong order book growing the business through organic growth and add on acquisitions."

The new company will take responsibility for all existing employees. Mr McCall: " Our vision for the acquired business is to be a centre of excellence in Pump Technology, Hydraulic Design and Engineering. We aim to employ the best designers and engineers, re-establishing this business as a world leader in the markets in which it operates. We are excited by the opportunity this transaction has created and are committed to working with the employees at Cathcart to develop a successful, innovative, market leading business based in Scotland."

Jim McColl has built Clyde Blowers into a portfolio of companies with a combined turnover of around GBP 600 million operating in 21 countries throughout the world. "Clyde Pumps (incorporating Weir Pumps Glasgow) looks forward to moving ahead to deliver even greater value to our customers," he concluded.



Mr Barend Buytenhek (on left) and Mr Sebastiaan Buytenhek head up a family business noted for its customer focus. "We help you seven days a week, 24 hours a day, with full service and spare parts for eccentric screw pumps. Our speciality is in solving pumping challenges for viscous, thick fluids."

At the Flux stand, Pump Engineer's Jorge Fontes (on left) took the opportunity to learn about barrel, tank and container pumps from Mario Doornenbal and Philip Overbergh.

easyFairs FLUIDS

Held on 18 and 19 April in Ahoy, Rotterdam, the Netherlands, the inaugural easyFairs FLUIDS trade show was designed as an efficient meeting point for buyers and sellers active in the broader fluids market. Dropping in on the opening day, Pump Engineer discovered that the show is regional in character, and had attracted around a dozen standholders in the pump category. We asked them about their products, their markets, and their expectations for the future.

Visitors looking for pumps for chemical applications got a clear message from Marcel Gielink, of Gielink Chemical Resistant Products. "We are very proud to sell pumps from CP-Pumpen AG, who make probably the best pumps in the world."

The SSP rotary lobe pump for highly viscous products is perfect for applications in chemicals, food and pharmaceuticals, according to Gardner Denver Area Sales Manager Mr Arie Jan Wiersema.

Saer Pompen is known for both a range of small pumps for garden applications as well as larger industrial pumps, for water, seawater, offshore, etc, said Mr Jansen. "We have seen a lot of interest in our industrial pumps in cast iron, stainless steel and bronze."

When Pump Engineer asked about exciting products at the Distrimex stand, Mr Michel Jansen immediately took us to see pumps made in Holland, under the BBA Pumps label. "These pumps are known as far afield as Australia and the USA, amongst other countries," he commented.

in Rotterdam

Johnson Pump displayed several pumps to good effect. "These products are ready for further growth in the petrochemical industry," noted Mr Peter Merle, Director.

Spin Pompen drew lots of attention with a working model. Said Mr Emile Koster: "This multifunctional pump is ideal for foodstuffs, being self-priming, with run dry ability, low shear, sealless, EHEDG and ATEX compliant. As we can provide several top-line makes, our real strength is our package ability and the fact we can advise on and provide the optimum pump for each application."

Visitors to the ProMinent booth could benefit from two specific areas of expertise, said Mr Martijn Scheepers (on left) and Mr John van der Westen. "Everyone knows our dosing pumps, but we also have an API 675 pump range, the Orlita model, which is ideal for offshore use."

Asked why Sterling's liquid ring vacuum pump is ideal for the food, dairy and semi-conductor industries, Division Manager Industries Mr Paul Roobol said: "This pump is simply the best valve for your money. It is low maintenance, easy to sterlize and easy to maintain."

About easyFairs

For more information, please visit www.easyfairs.com

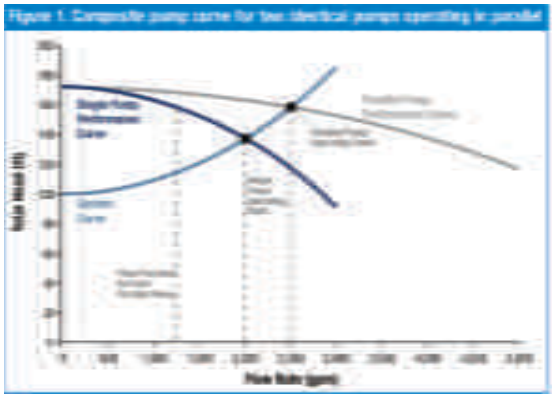
Optimize parallel

In the eighth in a series of articles developed for the U.S. Department of Energy by Lawrence Berkeley National Laboratories, the Alliance to Save Energy, Washington State University, and the Hydraulic Institute, Pump Engineer brings you a succession of energy tips aimed at providing your company with a more competitive business advantage through strategic, broad-based energy management and pump system performance optimization.

When multiple pumps operate continuously as part of a parallel pumping system, there can be opportunities for significant energy savings. For example, lead and spare (or lag) pumps are frequently operated together when a single pump could meet process flow rate requirements. This can result from a common misperception - that operating two identical pumps in parallel doubles the flow rate. Although parallel operation does increase the flow rate, it also causes greater fluid friction losses, results in a higher discharge pressure, reduces the flow rate provided by each pump, and alters the efficiency of each pump. In addition, more energy is required to transfer a given fluid volume.

PARALLEL PUMPING BASICS

Designers can expand the operating range of a pumping system by specifying parallel pumping configuration (see Figure 1). A greater increase in flow rate will be seen when adding a parallel pump to a static head-dominated system. Parallel pumps can be staged and controlled to operate the number of pumps needed to meet variable flow rate requirements efficiently.



The total system flow rate is equal to the sum of the flow rates or contributions from each pump at the system head or discharge pressure. Parallel pumps provide balanced or equal flow rates when the same models are used and their impeller diameters and rotational speeds are identical. When possible, recommended design practice is to have parallel pumps moved from beyond Best Efficiency Point (BEP) at low system flow rates (fewer pumps operating) to the left of BEP at the highest flow rate. An ideal scenario will allow the pumps to have the highest possible average operating efficiency for the overall flow rate vs. time profile. Dissimilar pumps may be installed in parallel, as well, as long as the pumps have similar shutoff head characteristics and/or are not operated together continuously unless provisions are made to prevent dead-heading.

APPLICATIONS

In general, parallel pumps provide good operating flexibility in static head-dominated systems, but are not nearly as effective in friction-dominated systems. It is advisable to avoid operating two pumps in parallel whenever a single pump can meet system requirements. One

Hydraulic Institute (HI).
Hydraulic Institute, the largest association of pump producers in North America, serves member companies and pump users worldwide by developing comprehensive industry standards, expanding knowledge by providing education and training, and serving as a forum for the exchange of industry information. In addition to the ANSI/HI pump standards, HI has a variety of resources for pump users and specifiers, including Pump LCC and VSP guidebooks, "7 Ways To Save Energy" training program and more. To download FREE executive summaries of HI's "Pump Life Cycle Costs", "Variable Speed Pumping", and an index to ANSI/HI Standards, visit www.Pumps.org and www.PumpLearning.org.

Pump Systems Matter™ (PSM).
Developed by the Hydraulic Institute, PSM is an educational initiative created to assist North American pump users gain a more competitive business advantage through strategic, broad-based energy management and pump system performance optimization. PSM's mission is to provide end-users, engineering consultants and pump suppliers with tools and collaborative opportunities to integrate pump system performance optimization and efficient energy management practices into normal business operations.
PSM is seeking the active support and involvement of energy efficiency organizations, utilities, pump users, consulting engineering firms, government agencies, and other associations. For more information on PSM, to become a sponsor, or to download PSM's FREE Pump System Improvement Modeling Tool™ (PSIM), an educational tool designed to show pump systems engineers how modeling tools can reduce cost and conserve energy, visit www.pumpsystemsmatter.org.

Energy tips: pumping systems Energy tips: pumping systems Energy tips: pumping systems Energy tips:

pumping systems

exception is certain storage applications with time-of-day energy rates or high "peak period" demand charges. Also, be sure to consider the amount of energy consumed by multiple pumps in contrast to the amount consumed by a single pump with adjustable speed drive control. Multiple pumps should be selected with head-versus-capacity performance curves that rise at a constant rate when these pumps approach no-flow or shutoff head.

Some efficient, high-head/low-capacity, centrifugal pumps used in process industries have "drooping " pump performance curves. These pumps supply peak pressure at a certain flow rate, and the pumping head decreases in approaching no-flow conditions. Identical pumps with drooping head-versus-capacity curves should not operate in parallel at variable flow rates under conditions in which capacity requirements can approach zero.

EXAMPLE

A split-case centrifugal pump operates close to its best efficiency point while providing a flow rate of 2,000 gallons per minute at a total head of 138 feet. The static head is 100 feet. The pump operates at an efficiency of 90% while pumping fluid with a specific gravity of 1. With a drive motor efficiency of 94%, the pumping plant requires 61.4 kW of input power. When an identical parallel pump is switched on, the operating point of the composite system shifts to 2,500 gpm at 159 ft of head (see Figure 1). Each pump now operates at 80% efficiency while providing a capacity of 1,250 gpm.

Although the fluid flow rate increases by only 25%, the electric power required by the pumping system increases by 62.2%:

P_2 pumps = 0.746 kW/hp x (2,500 gpm x 159 ft)/3,960 x 0.8 x 0.94
= 99.6 kW

For fluid transfer applications, it is helpful to examine the energy required per million gallons of fluid pumped. When a single pump is operating, the energy intensity (EI) is:

EI_1 = 61.4 kW/2,000 gpm x 60 minutes/hour x million gal/10^6 gal
= 512 kWh/million gallons

When both pumps are operating, the EI increases as follows:

EI_2 = 99.6 kW/2,500 gpm x 60 min/h x million gal/10^6 gal
= 664 kWh/million gallons

When both pumps are operating in parallel, approximately 30% more energy is required to pump the same volume of fluid. The electrical demand charge (kW draw) increases by more than 62%. If the current practice or baseline energy consumption is the result of operating both pumps in parallel, pumping energy use will decrease by 23% if process requirements allow the plant to use a single pump.

REFERENCES

Control Strategies for Centrifugal Pumps with Variable Flow Rate Requirements, U.S. Department of Energy Pumping Systems
Tip Sheet #12, 2006.
Pump Systems Matter, www.PumpSystemsMatter.org

Suggested actions:

- Consider operating the minimum number of pumps that the system requires at any given time; one exception might involve off-peak pumping to storage tanks.
- Evaluate and compare multiple-pump scenarios to single-pump systems with adjustable speed controls.

U.S. Department of Energy (DOE).

DOE's Industrial Technologies Program (ITP), through partnerships with industry, government, and non-governmental organizations, develops and delivers advanced energy efficiency, renewable energy, and pollution prevention technologies for industrial applications. ITP has launched the **Save Energy Now** initiative to help the nation's manufacturing facilities continue to thrive during a time of diminished energy supplies and rising costs. As a part of this initiative, ITP is sending DOE Energy Experts to the nation's most energy-intensive manufacturing facilities to conduct Energy Savings Assessments.

See www.eere.energy.gov/industry for additional information on DOE's energy efficiency activities. BestPractices emphasizes opportunities for savings in plant systems such as motor, steam, compressed air, and process heating systems. BestPractices is a part of the Industrial Technologies Program, and offers a variety of resources addressing ways to reduce energy and maintenance costs in industrial process systems. This includes training workshops, software tools, a series of sourcebooks, case studies, tip sheets, and other materials, including several which focus on opportunities in pumping systems. For example, the Pumping System Assessment Tool (PSAT) aids in the assessment of pumping system efficiency and estimating energy and cost savings.

For more information, please contact:
EERE Information Center, 1-877-EERE-INF
(1-877-337-3463),
www.eere.energy.gov/industry/bestpractices.

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DL submersible pump range

Lowara has made further advances in pump technology with the launch of its new DL range of electric submersible pumps. The range consists of the following: DLC (Channel impeller); DLV (Vortex impeller); DLS (self-cleaning impeller); and the DLG (Grinder impeller). Each pump is of cast-iron construction with combinations of silicon carbide, ceramic and nitrile rubber seals, and can be installed in tanks, specially-made pump chambers, municipal sewer systems and many other environments. The DL replaces the FDL, FDLV and FDLT series of submersible pumps.

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Moyno 500 Grinder pumps

The new Moyno 500 Grinder pumps offer constant, uniform, non-pulsating flow that provides low shearing action for minimum degradation of shear-sensitive materials and low velocity capabilities for effective pumping of viscous fluids. Features of Moyno 500 Grinder pumps include: suitable for OEM applications; compact and lightweight design for installation flexibility; self-priming; quiet operation; and low maintenance with replaceable carbide cutting tips. Typical applications are: marine septic systems; campground and recreational area wastes; bilge oil transfer; domestic, industrial and public sewage handling installations where gravity flow mains are above the sump or are in remote locations; and laboratory testing.

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Switch pump gets plastic float

The single switch pump up/pump down liquid level switch from Harwil Corp. has been improved with the addition of a foam filled plastic float giving the switch greater buoyancy in low specific gravity liquids. The L-21N (Noryl) and the L-21VCR (for corrosive liquids) are custom manufactured with a choice of four level spans of 1, 2, 4,or 5" between high and low set points. The closed cell, plastic, foam filled float, alleviates nuisance switching induced by turbulence or wave action. Electrical connection options include special switch contacts for dry circuit interface with computers.

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HV635 rotary piston vacuum pump

HullVac Pump Corp., a manufacturer of industrial high vacuum pumps and pumping systems, has announced the release of their next generation rotary piston high vacuum pumps. These pumps offer increased pumping speed in a small footprint and also reduce maintenance needs associated with harsh applications. Design features include all metal exhaust valves, a large oil sight port with visual oil flow indication and caged hinge bars that extend operating life. The new HV635 is designed to fit into a multitude of industrial applications.

MFlow 200 mass flowmeter

The new MFlow 200 mass flowmeter from Armstrong Optical uses a miniaturised adaptation of the well-proven anemometric principle. The micro-machined sensor, manufactured by the Axetris Microsystems Division of Leister Process Technologies of Sarnen in Switzerland, has been designed to offer sensitive and accurate measurement of mass flow. The sensor couples a well-established measurement methodology with the benefits of micro-technology, this has resulted in a sensor that delivers linearity and temperature compensation, high sensitivity and easy to integrate electrical output signals (both analogue and digital). A "starter kit" package is available for evaluation that includes the MFlow 200 mass flowmeter, interface module, MFlow View software, all cabling and a power supply.

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Mag-drive pumps improved

Sundyne has unveiled its new and improved features for the Ansimag sealless magnetic drive, non-metallic line of pumps to increase reliability and improve environmental factors for the chemical processing and steel manufacturing industries. Sundyne now manufactures the fully encapsulated drive with new moulding technology and materials to improve pump inner drive chemical resistance. The reengineered impeller design will increase the Ansimag K+ pump line's flexibility and reliability for the most demanding chemical process applications. These magnetically driven impellers are less subject to corrosion and can handle extremely caustic chemicals and solvents in temperatures of up to 250F. Sundyne also improved the exterior of their Ansimag magnetic drive sealless pump line with powder coating. This significantly increases pump life even with exposure to the harshest chemical environments. In addition to serving chemical and water processing industries Sundyne also has a family of API process pumps, medium duty pumps, sanitary pumps, as well as high-speed compressors that fill a wide range of purposes, including hydrocarbon processing, power generation, food and chemical processing industries.

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VFD for wastewater pumps

In co-operation with ABB, ITT Flygt has developed a range of VFDs, which with their unique Flygt software, are specifically tailored for wastewater pumps. A Flygt VFD features: boost system reliability – reduce stresses on electrical and hydraulic systems; improve process control – match flow and head to system requirements; gain greater flexibility – optimize dimensioning in new and retrofit installations; and save energy – adjust pump speed to system demand. To reduce the risk of clogging the ACS550 is supplied with a special program that has been developed to help keep impellers clean. A selection of pre-settings reduce the number of parameters needed to be handled by more than 90%. When the ACS550 senses an increase in load that exceeds a preset value, it triggers a cleaning sequence The ACS550 can communicate with other pump controllers such as Flygt's FMC and can interface with different SCADA systems, including Flygt's AquaView.

Twinro W125 and W225 pumps

Plenty Mirrlees Pumps, a SPX Process equipment company, has developed a solution for the bulk transfer of Tall Oil using its new Twinro W125 (125m3/hr) and W225 (225m3/hr) pumps. These electric motor driven pumps are used for unloading cargo ships to storage tanks. The Tall Oil, which is produced from Scandinavian trees, is a product currently being introduced to UK industries as a new bio-fuel having low environmental emissions. The Twinro is a positive rotary twin screw pump developed primarily for the bulk transfer of liquids. Twin screw pumps are fully self-priming and their air/vapour handling characteristics make them suitable to applications involving tank and line stripping. The pumping element consists of two contra-rotating shafts from which right hand and left hand epicycloid screw shapes are accurately machined. The screw set conveys the fluid being pumped from each end and out through the centre. The screw shafts are carried in roller bearings at the drive end and ball bearings at the non-drive (gear case) end. The driven (lower) screw is synchronised from the driving (upper) screw by a pair of hardened and ground timing gears.

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RTP20 Series pumps

Viking Pump has released a new addition to its high-speed rotary transport pumps, the RTP20. The RTP20 (1.0ltr/rev) is built with all the features of the RTP30 (1.28ltr/rev) design. The series' tri-lobe design, customizable per customer specifications, is compact and light-weight and features removable feet and multiple mountings for vertical or horizontal adaptation. Flexible for a variety of operational needs, the RTP20 series is also available with ACME threaded or tri-clamp ports as well as many other port connection types. Both the RTP20 and RTP30 series efficiently fill rotor voids, allowing for faster and quieter operation on viscous liquids. In addition, with a longer sealing land at rotor tips, the series provides enhanced efficiency when working with lower viscosity products.

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Men water pumps expands

Flowserve is expanding its family of Men water pumps to the North American market. This North American expansion allows Flowserve to offer comprehensive worldwide availability of all Men sizes in both frame-mounted and close-coupled configurations. The Men single-stage, end-suction pumps deliver maximum mechanical and hydraulic flexibility, and are designed to provide performance in a variety of water services. These areas include water supply, water treatment, irrigation, drainage, filter cleaning, water circulation and HVAC. The Flowserve Men is constructed with a one-piece bearing frame that is available in three sizes to ensure parts interchangeability among pump sizes and configurations. Operating parameters include: flows to 800m3/h, heads to 140m, pressures to 16bar and temperatures from -10C to 140C.

AquiferTest Pro v.4.1

Waterloo Hydrogeologic Inc., a Schlumberger Water Services Company (SWS), has released its AquiferTest Pro v.4.1. The latest version of this popular software package, available for graphical analysis and reporting of pumping test and slug test data, now includes more functionality and features requested by users. Designed by hydrogeologists, it expands available solution methods and improves communication with groundwater dataloggers. It now incorporates several high-demand analysis methods with increased functionality, allowing hydrogeologists to expand the scope of analysis, including Theis recovery, Cooper-Jacob, and Boulton analysis methods, as well as quick direct import of .MON files from Diver dataloggers and the ability to display statistics of the automatic fit, show quality of the fit, export to .txt or .xls file formats, and copy or print.

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Combipro centrifugal pump

A specification which meets the latest API 610 requirements, a fully integrated design of motor, baseplate and accessories, along with hydraulic performance, are among the key features of the CombiPro range of process pumps, available from JP Pumps (a division of the SPX Process Equipment Operation). The Combipro centrifugal pump is suitable for fluids transfer in refineries and petro-chemical applications and is designed to provide trouble-free operation under most process conditions. The range provides models which operate at system pressures of up to 35bar, capacities up to 350m3/hour, heads up to 160m and operating temperatures ranging from -30C up to +350C. Part of the Johnson Pump CombiSystem, the Combipro is a modular concept of single stage end-top centrifugal pump family which all share the same basic hydraulic design and offer interchangeability between parts and sub-assemblies. The seal chamber is designed to fit all types of seals, especially API 682 cartridge seals. The pump is mounted on a sturdy welded steel baseplate with reinforced pedestals and bracket support, conforming to API 610. CombiPro pumps are supplied with a choice of 3 different types of impeller, closed, semi-open and half-open.

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New Delta pump at IWEX

The new Delta precision dosing pump from ProMinent Fluid Controls was at the centerpiece of their water treatment equipment display at IWEX 2007 (1-3 May, Birmingham, UK). The Delta pump features an "optoDrive" controlled solenoid drive system, which provides flexible dosing capabilities including continuous dosing. Also on show were the Dulcomarin II series of water treatment controllers, including the Dulcomarin II Dulco-Net which uses a bus connection to dosing pumps and sensors, bringing a unique distributed modular control capability with the ability to simultaneously control the key parameters for water quality for up to 16 different processes. The display also included examples from the comprehensive ProMinent portfolio of ozone generators, chlorine dioxide generators, reverse osmosis systems and UV disinfection products, as well as custom-built water treatment packages.

Pro-Flo metal pump

Wilden has announced the availability of the new 13mm Original™ Series gas powered Pro-Flo X™ metal pump. Designed for oil and gas industries, this new pump has been tested and certified by CSA International to be used in applications where compressed natural gas is the energy source and the driving force of the pump. Included with this product is the Pro-Flo X™ air distribution system (ADS) with the Efficiency Management System (EMS). The patent pending EMS™ optimizes the new Pro-Flo X™ ADS to specific operating parameters. As with other Pro-Flo X™ models, the EMS allows the user to select an optimal balance between flow and efficiency.

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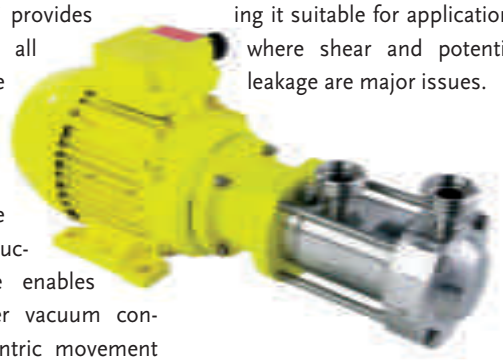
ETN-L pump

CDR Pumps has extended its ETN-L range of close-coupled magnetic drive pumps, with the addition of a new larger size. The ETN-L 70 is available with either polypropylene or ETFE lining material to safely handle corrosive and toxic liquids used within industry. The ETN-L pump is suitable for tanker and chemical unloading applications. The new pump provides an option for increased flows, which in itself also lends itself for new applications such as waste treatment and effluent treatment plants. The pumps are fully ATEX certified and are available with different bearing configurations including ceramic, PTFE and silicon carbide for use in applications with small solids present.

Blackmer Mouvex pump

AxFlow has a new addition to its range of Blackmer Mouvex eccentric disc pumps in the form of the Micro C. A seal-free eccentric disc pump, the Micro C is a low maintenance, compact pump offering leak-free performance. Offering flow rates from125l/h - 500l/h, the three model range is ATEX certified and is able to maintain a constant flow rate at a given viscosity throughout its pressure range. Developed for the dosing and transportation of both thin liquids and viscous products, the Micro C provides high accuracy at all times due to the full contact and self-adjustment of the piston and cylinder. The pump's high suction performance enables self-priming under vacuum conditions. The eccentric movement pump consists of a cylinder and a pumping element mounted on an eccentric shaft. As the eccentric shaft rotates, the pumping element creates chambers with the cylinder. This has the effect of increasing the size of the intake port and drawing fluid into the pumping chamber. The fluid is transported to the discharge port where the size of the pumping chamber decreases. The action squeezes the fluid out into the discharge pipework. However, its action is far more sensitive making it suitable for applications where shear and potential leakage are major issues.



New drop-in aluminum pump

Wilden Pump & Engineering Co. has launched its new 76mm centre-ported Advanced™ Series metal pump, designed as a direct drop-in for 76mm Original™ Series applications. This is a suitable pump when greater product containment and higher flow rates are desired with minimal changes to existing plumbing. For simplicity of installation in current applications, this pump comes with a bolt-down footprint that matches current Advanced™ and Original™ Series metal pumps. The fluid connections for this new configuration match the current Original™ Series metal pumps. This new centre-ported Advanced™ metal pump comes equipped with either a Pro-Flo® or Pro-Flo V™ air distribution system. The pump is available with aluminum-wetted materials and a wide variety of elastomer options to meet customer's material needs. Some of the features include: inlet and discharge manifold connections that match the 76mm Original™ Series pumps; a footprint that is consistent with 76mm Advanced™ and Original™ Series metal pumps; and inlet and discharge orientation that is consistent with current 76mm Original™ Series Pro-Flo® and Pro-Flo V™ metal pumps.

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FRX Series SS pumps

For 2007 MP Pumps Inc. is introducing the latest edition to its stainless steel family of pumps, the FRX Series. A surname for fractional horsepower, the series consists of 6 models the FRX 50, FRX 50-R, FRX 75, FRX 75-SP, FRX 100 and the FRX 125 available in five sizes ranging from 1/2" to 1-1/4" NPT intake. The series will be supplied with both AC and DC motors for the FRX 50 and FRX 75 and an AC 56J frame for the FRX 100 and FRX 125 sizes. The available AC motors range from1/2 thru 11/2hp with DC motors being offered in both12 and 24 volts. The FRX series features all investment cast 316 stainless steel construction with a polyphenylene sulphide (PPS) offering in the 1/2"size. All MP Pumps stainless steel pumps are available from stock delivery for fractional to over 40hp. The complete lines of end suction or self-priming pumps are constructed in 316-cast stainless steel for maximum fluid compatibility and corrosion resistance. The FRX, Chemflo and Flomax stainless steel pumps can be driven by electric motors, engines, hydraulic motors or as MP Pumps' unique "Pumpak", which allows the user to provide their own driver. MP Pumps 316 stainless steel pumps are suitable for applications that don't require ANSI, API or sanitation construction and the associated costs.

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Micro C-Series pumps

Blackmer has designed its new Micro C-Series pump, as part of the Blackmer C-Series pump family, with clean-in-place technology. This design feature allows the pump to be drained, flushed and cleaned without disassembly. Micro C-Series pumps utilize the same design as the larger Blackmer C-Series pumps, but have been specifically developed for transferring small doses in continuous applications. Micro C-Series pumps are available in three models: MC500 - flow rate of 0.1gpm to 2.2gpm at 72.5psi maximum pressure MC250 - flow rate of 0.05gpm to 1.1gpm at 145psi maximum pressure MC125 - flow rate of 0.03gpm to 0.6gpm at 217.5psi maximum pressure. The Micro C-Series pump includes many of the design benefits available in the larger C-Series pumps, including: seal-less construction; self-priming, draining and the ability to run dry for short periods of time; high volumetric efficiency while maintaining minimum agitation, low shear, slip, and internal velocities.

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Series 720 peristaltic pump

Watson-Marlow Bredel has launched its 720 Series peristaltic pump. The newest addition to the Watson-Marlow Bredel family, the 720 Series peristaltic pump allows for production speed and flow control for high-capacity throughput. The 720 Series is designed for accurate metering and dosing of corrosive, abrasive and sensitive fluids, and is suitable for the contamination-free transfer of acids, paints, oils, inks, dyes or waste slurries found in industrial, chemical, and applications in the pulp and paper, printing, and food processing markets. The 720 Series provides low shear and non-contacting pumping with minimal downtime. The 720 Series includes single channel flows up to 8.8GPM and 17.6GPM through two individual tubes, as well as a choice of analog or digital control. Available in a NEMA 4X wash-down case, the pumps also feature LoadSure tube elements.

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RTP series pumps

The new RTP Series of pumps from AR North America sets a new standard for delivery of consistently high pressure ratings. The RTP Series delivers from 7.9 to 10GPM at 7250PSI. Spinning at 1000RPM, this 24mm sold shafted pump series features a newly designed brass manifold (patent pending). Inlet thread is 1/2"F, and discharge thread is 3/4"F.

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C

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D

Dawson Downie Lamont, UK,	+44-1592-775-577
Dickow Pumpen KG; Germany	+49-8638-6020
Dosapro Milton Roy; France	+33-2-32-68-30-00

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EagleBurgmann Industries UK LP; UK	+44-1926-417-600
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F

FELUWA Pumpen GmbH; Germany	+49-6594-10-0
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G

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I

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	+1-717-509-2200
ITT Richter ChemieTechnik GmbH; Germany	+49-2152-146-0

J

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K

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M

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Viking Pump, Inc.; U.S.A.	+1 319 273 8430

W

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Finder Pompe		●			●			●		●							●							●
Hermetic Pumpen					●										●		●	●						
ITT	●				●	●	●	●	●	●	●	●		●	●	●	●	●		●	●	●	●	●
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