Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEWS

Produced by Engineers Media, Engineers Australia's publishing company, for the IChemE in Australia and the Chemical College of Engineers Australia. The statements made or opinions expressed in this newsletter do not necessarily reflect the views of Engineers Australia or the Institution of Chemical Engineers in Australia.

EDITOR: Dietrich Georg – dgeorg@engineersmedia.com.au

The Kleen Energy Systems powerplant in Middletown, Connecticut, US, shortly after the explosion.

US explosion under investigation

The US Chemical Safety Board is investigating the explosion at the Kleen Energy Systems powerplant under construction in Middletown, Connecticut which resulted in several deaths.

"The CSB's investigative team will examine the activities that were ongoing at the time of this accident," the lead investigator Don Holmstrom said.

Three days before the explosion, the board recommended that the US fuel gas codes be amended to improve safety when gas pipes are being purged of air during installation or maintenance.

The Connecticut government has announced its own investigation of the explosion. The $1.4 billion combined-cycle natural gas powerplant, which was not yet completed, was designed to provide 620MW to Connecticut Light and Power.

WorleyParsons was the design engineer for the project being delivered by engineering, procurement and construction contractor O&G Industries.

PB Power, the electricity arm of Parsons Brinckerhoff, was the permitting engineer. North American Energy Services was to have been the plant's operator. The plant would have used Siemens gas and steam turbines to generate power.

Private equity fund Energy Investors Funds owns the majority of Kleen Energy Systems, with the balance held by private investment company White Rock Holdings Associates.

CONTENTS

News 1
Chemeca 2010 5
Call for nominations 6
Notices 7
New products 9

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEWS

Gold mine to be restarted in Victoria

Ballarat minerals processing equipment manufacturer Gekko Systems has received a contract from mining company Morning Star Gold to supply and install a gravity processing plant at the Morning Star gold mine.

Morning Star Gold is planning to restart operations at the mine northeast of Melbourne.

The mine, which had been worked since the Victorian gold rush in the 19th century, was shut down in 1963. The company estimates the mine still holds some 900,000 ounces of gold.

At present, the company is only considering a gravity circuit for the Morning Star mine and will sell a concentrated product on for cyanide leaching. The $2.5 million plant is scheduled to become operational in June.

A gravity processing plant is to be installed at the Morning Star gold mine, which is to be restarted after being shut down for nearly 50 years.

Reagent system upgrade to reduce flammability

An innovative technology will be used to decrease flammability risk from the flotation reagent system at the Riverside coal mine in Moranbah near Mackay in Queensland.

The technology will dilute methyl isobutyl carbinol frother thus reducing its flammability.

Aurecon Hatch will provide engineering services for the upgrade through its offices in Mackay and Gladstone. The client is BHPB Mitsubishi Alliance.

Engineering is scheduled for completion by next month, and the project is to be implemented by the end of this year.

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEWS

Search for less expensive nanotube production

An Indian oil company has signed a provisional deal with Perth based Eden Energy to test, in association with researchers from the University of Queensland, the commercial potential of a new manufacturing process for carbon nanotubes.

Under a non-binding terms sheet signed in India this month, the Delhi-based Indian Oil Corporation Limited (IOCL), subject to certain conditions, will participate in the development of a new pyrolysis technology jointly conceived by Eden and the University of Queensland.

The process separates methane gas (the major component of natural gas) into its hydrogen and carbon constituents to manufacture the nanotubes.

These nanostructures have extremely high tensile strength, strong electrical conductivity, high elasticity and special medical properties.

Composite materials containing nanotubes are already used in the construction of spacecraft, the latest commercial aircraft, Formula One racing cars, and a number of specialised lightweight products such as tennis racquets.

However, the production cost has thus far prevented wide-spread use. Eden hopes the pyrolysis process will allow large scale commercial production of nanotubes.

Under the terms of the arrangement with IOCL, Eden will purchase the University of Queensland's 50% interest in the patents and intellectual property of the pyrolysis process for shares in Eden, and will then transfer this interest to IOCL after the latter has upscaled the technology to a pilot plant stage.

Upon completion, Eden and IOCL will jointly own the intellectual property rights to the pyrolysis technology, together with the rights to its eventual commercialisation.

Copper project to be completed

Consulting engineer Ausenco has been awarded a $150 million engineering, procurement and construction contract to complete the Kinsevere Stage II copper project in Africa for Australian company Anvil Mining.

This contract award follows the recommencement last July of the provision of engineering and design services at Kinsevere, as well as the successful debt and equity refinancing of Anvil, completed last December.

Ausenco CEO Zimi Meka said: "Ausenco has been working collaboratively with Anvil to finalise the well advanced engineering and procurement activities on the project and define a mutually agreeable scope and terms of the EPC contract."

The project was suspended in late 2008 when engineering was substantially complete and the majority of major procurement contracts had been let.

The project, which will have a capacity of 60,000t/a of copper, is located 30km north of Lubumbashi, the provincial capital city of the southern Katanga province in the Democratic Republic of Congo. Kinsevere is majority owned and operated by Anvil Mining.

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEWS

Concept proof for new aluminium smelting technology

Melbourne-based company Calsmelt has completed a "concept proof" stage of technology development for its Thermical process. Calsmelt holds an exclusive world-wide license to the novel carbothermic smelting technology for aluminium production developed by Australian company Thermical IP.

Calsmelt cofounder and interim CEO Dr Greg Smith described the Thermical technology as a significant breakthrough for the production of aluminium at a significantly lower cost, and in a much more environmentally friendly manner.

He said the technology has now been proven to the point that "within a couple of years we will be ready to build a first small, but commercially viable plant".

Calsmelt's chief scientist, cofounder and technology inventor Dr Yaghoub Sayad-Yaghoubi said: "For around 70 years the aluminium industry has been searching for a suitable carbothermic technology to smelt aluminium in a similar manner to the way steel is produced. Such a technology would help it overcome the limitations of the industry's current, pervasive electrochemical approach. Our technology creates the potential for the industry to move to carbothermic smelting for aluminium."

Dr Mark Toner is the company's new chairman

The company also announced the appointment of Dr Mark Toner as its new chair. A chemical engineer, Toner is a former managing director of Kvaerner E&C Australia, a subsidiary of the international engineering and construction group Aker Solutions. He is a member of Monash University's IP and Commercialisation Committee and an adjunct professor at the university's Faculty of Engineering. He also chairs the board of Australian Science Innovations.

Construction on ammonium nitrate plant resumes

Construction of the ammonium nitrate plant at Moranbah, southwest of Mackay, has recommenced and is scheduled for completion in August 2011. The project is being carried out by UGL Resources, Bilfinger Berger Services and BGC Contracting.

The $935 million facility is designed to produce 330,000t/a of ammonium nitrate, and includes ammonia, nitric acid and ammonium nitrate plants, as well as associated infrastructure. The chemical will be used to make explosives for open-cut mining in Queensland.

The facility will process coal seam methane gas into ammonia, which will be used to produce nitric acid. The acid will be converted into ammonium nitrate solution and ammonium nitrate prill. The former will then be processed into an ammonium nitrate emulsion.

In February 2009, Incitec Pivot halted construction of the facility, citing shrinking demand for ammonium nitrate as a result of the global economic downturn.

The project was started by explosives manufacturer Dyno Nobel, which was acquired by Incitec Pivot in June 2008.

Engineering at the Edge

2010 chemeca

26 - 29 September 2010 | Hilton Adelaide | www.chemeca2010.com

We are delighted to invite you to Chemeca 2010, the annual Conference hosted by the Institution of Chemical Engineers in Australia (IChemE), Engineers Australia (EA), the Royal Australian Chemical Institute (RACI) and the Society of Chemical Engineers New Zealand (SCENZ). These bodies represent over 100,000 engineers and chemists working across the world.

Chemeca 2010 will interest all those who contribute to the advancement of technology and the process industries, including scientists, engineers, manufacturers, suppliers and service professionals.

Chemeca 2010 will not only be a showcase for new knowledge but also a forum to discuss current issues. It is an excellent opportunity to listen to and share our vision with leaders of the profession from industry and academia. Chemeca 2010 also provides the opportunity for the technology and service providers to promote their products and services to the sector.

Sub-themes:

- Engineering Sciences & Fundamentals
- Process Design, Control and Safety
- Particle and Minerals Technology
- Material & Mineral Sciences
- Energy & Fuels
- Food, Pharmaceutical & Bioengineering
- Industrial Best Practice & Innovation
- Environment, Water and Sustainability
- Micro and Nanotechnology
- Education

Key Submission Dates:

Abstracts
1 March 2010

Peer-reviewed papers
31 May 2010

Final papers
16 August 2010

Plenary Speakers:

- John England - BHP-Billiton
- Andrew Hopkins - Australian National University
- Hans Müller-Steinhagen - University of Stuttgart & German Aerospace Center
- Ziggy Switkowski - Australian Nuclear Science and Technology Organisation

Keynote Speakers:

- Rose Amal - University of New South Wales
- Dr Tom Beer - CSIRO Marine & Atmospheric Research
- Professor Suresh Bhargava - RMIT University
- Xiao Dong Chen - Monash University
- Paul Cleary - CSIRO Mathematical & Information Sciences
- Dr Geoff Dumsday - CSIRO Molecular and Health Technologies
- Barry Goldstein - Department of Primary Industries and Resources South Australia
- Professor Jinghai Li - Institute of Process Engineering, Chinese Academy of Sciences
- Mehmet Sarikaya - University of Washington
- Jerome Werkmeister - CSIRO Molecular & Health Technologies
- A/Professor Brent Young - The University of Auckland

Host Organisations

IChemE

SCENZ Society of Chemical Engineers New Zealand Inc.

The Royal Australian Chemical Institute Inc. Industrial Chemistry Division

ENGINEERS AUSTRALIA

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Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

Nominations invited for excellence awards

by Gordon Weiss

The Australia and New Zealand Federation of Chemical Engineering is now seeking nominations for the 2010 Chemical Engineering Awards of Excellence. The awards for 2010 are:

The Chemeca Medal

This is the most prestigious award in the chemical engineering profession in Australia and New Zealand. It is awarded to a prominent Australian or New Zealand chemical engineer who has made an outstanding contribution, through achievement or service, to the practice of chemical engineering in its widest sense and who continues to serve the profession. The recipient of the award is invited to present a plenary lecture at the annual Chemeca conference.

The Caltex Award ($5000 and certificate)

Recognises outstanding achievements in the teaching of chemical engineers.

The ExxonMobil Award ($5000 and certificate)

Recognises significant ongoing contributions to chemical engineering through innovations or a series of related publications over a number of years.

The Fluor Award ($5000 and certificate)

Recognises exceptional management and leadership talent that has directly resulted in a sustained corporate success over a significant period. It can include both line management and project management and can apply to either private or public sectors.

The Freehills Award ($5000 and certificate)

Recognises innovation in product design or development, or service delivery by a chemical engineer from Australia or New Zealand.

The Rio Tinto Award ($5000 and certificate)

Recognises outstanding applied chemical engineering.

The Uhde Shedden Medal and Prize ($4000)

Recognises practical services to the profession and to the practice of chemical engineering in Australia or New Zealand. Achievements may be in technical, marketing or management fields. Nominations can be made either by individuals themselves or by others. A candidate must be a member of Engineers Australia, IChemE, SCENZ or RACI and must be under 40 years of age.

The WorleyParsons Award ($5000 and certificate)

Recognises personal commitment and leadership by a chemical engineer in the area of safety and/or the environment. Applicants will have demonstrated outstanding leadership and/or commitment to safety or the environment during design, construction or operation of process plant.

Information on the awards and details on the nomination process can be found on the Australia and New Zealand Federation of Chemical Engineering website at www.anzfche.org. Nominations close on 28 May. Please contact Bill Chaffey (bchaffey@engineersaustralia.org.au) for more information.

The Australia and New Zealand Federation of Chemical Engineering acknowledges the generous support of the sponsors of the awards.

Dr Gordon Weiss is the chair of the Awards of Excellence Selection Committee.

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEWS

Early work on coal seam gas project

A joint venture of Baulderstone and Bilfinger Berger Services has been awarded a contract to supply engineering, procurement and construction services for the upstream segment of Australia Pacific LNG's coal seam gas to liquefied natural gas project.

The joint venture will undertake early works for the gas field facility in Queensland, prior to a final investment decision at the end of this year.

Around 100 design engineers will work on the project and will be based in Brisbane.

Australia Pacific LNG is a 50:50 joint venture between Origin Energy and ConocoPhillips. Baulderstone and Bilfinger Berger Services are members of the Bilfinger Berger Australia group.

Extracting nickel more sustainably

Perth engineering company Simulus has received a $275,000 grant to develop an alternative way of extracting nickel.

The 18-month project, funded by the federal government's Climate Ready Scheme, aims to develop a "low carbon emissions" flowsheet to replace the limestone neutralisation stage of nickel laterite processing.

Other objectives are to reduce the amount of sulfur needed for the process and the quantity of solid wastes produced.

"Approximately 70% of the world's nickel resources are laterite ores, and a more sustainable means of nickel processing is required if we are going to reduce carbon emissions globally while continuing with nickel production," Simulus managing director Brett Muller said.

NOTICES

New chair for fuels and energy

Dr Mike Sargent

Electrical engineer Dr Mike Sargent is the new chair of the Chemical College's National Committee on Fuels and Energy.

Sargent had a career in the power industry and is currently a non-executive director on the board of the National Electricity Market Management Company. He is a former national president of Engineers Australia.

Expo in China

The 8th AchemAsia expo and conference will take place in Beijing on 1-4 June 2010. It is an offshoot of Achema, the biggest chemical process engineering expo in the world, staged in Frankfurt, Germany, every three years.

The latest one was held in 2009. For more information on AchemAsia go to www.achemasia.com.

Australian chemical engineers win IChemE medals

Two Australian chemical engineers were recognised by IChemE in its 2009 medal program.

Guan Heng Yeoh from the Australian Nuclear Science and Technology Organisation and Jiyuan Tu from RMIT University were awarded the Brennan Medal for their publication, *Computational techniques for multiphase flow, 1st edition*.

The Brennan Medal is awarded to the author(s) of the best book published by IChemE.

The IChemE medals are presented every year to recognise important contributions in key aspects of the profession.

The medal recipients are determined by representatives of IChemE's awards committee and subject groups.

For a full list of medal winners, visit www.icheme.org.

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NOTICES

Promoting careers in oil and gas

A new initiative to encourage secondary and tertiary students to pursue a career in the oil and gas industry will be launched during the careers day at the 2010 Australasian Oil and Gas Exhibition, to be held in Perth next month.

The careers day, on 26 March, will communicate the career opportunities available in the industry through a combination of seminar presentations and face-to-face interaction between students and industry leaders.

It will be supported by Engineers Australia, Curtin University, the University of Western Australia, JP Kenny, the Society for Underwater Technology and Woodside.

The careers day will feature two streams of seminars targeting secondary students in years 10-12 and tertiary engineering and science students.

Participating students will also be invited to tour the expo in small groups and visit supporter stands to meet representatives from each company.

Woodside will showcase the $1.6 billion Angel project – the Northwest Shelf Venture's newest offshore gas production facility – as part of the exhibition's new Innovation Zone.

Eminent speaker tour on chemical safety

Bill Hoyle, retired investigations manager of the US Chemical Safety Board (CSB), is giving talks in Australia as part of Engineers Australia's Eminent Speaker Tour.

His tour is hosted by the Risk Engineering Society and the College of Chemical Engineering, and supported by the IChemE in Australia. His presentation will be on "Lessons for Australia from US Chemical Safety Board Investigations".

According to Hoyle, the CSB investigations reveal important lessons for a wide variety of workplaces. He will explore the successes and challenges faced by the CSB during 12 years of operation. He will present case studies that focus on combustible explosions including a sugar refinery incident that caused 14 fatalities.

In addition there will be a discussion of emerging safety issues including management of organisational change, employee fatigue prevention and new ways to measure safety performance.

Hoyle directed the investigations of more than 30 major incidents including the probe of the 2005 disaster at the BP Texas City Oil Refinery.

The dates and locations of his talks so are Perth 15 March (for RSVP online click here, Brisbane 17 March (for RSVP online click here, and Sydney 18 March (for RSVP online click here. For more information, visit www.engineersaustralia.org.au/eminentspeaker or email Nina Lenz nlenz@engineersaustralia.org.au.

Bill Hoyle will present case studies that focus on combustible explosions including a sugar refinery incident.

IChemE appoints international vice-president from Australia

Russell Scott, managing director of consulting engineer Uhde Shedden, has been appointed the first vice-president of IChemE for international affairs.

Russell Scott

A past chair of IChemE in Australia, Scott will be leading the IChemE's internationalisation strategy, with support from other members of Council and senior staff.

The appointment follows the signing of two working agreements this year with both the South African Institution for Chemical Engineers and the Canadian Society for Chemical Engineering, as well as the announcement that the Society of Chemical Engineers New Zealand is becoming a branch of IChemE in New Zealand.

NZ society joins IChemE

The members of the Society of Chemical Engineers in New Zealand (SCENZ) have voted to become a branch of IChemE in New Zealand.

The decision was made at a SCENZ special general meeting last November and the chair of the Board of SCENZ-IChemE in New Zealand, Dr Max Kennedy said the move will benefit chemical engineers in New Zealand.

IChemE chief executive Dr David Brown said: "IChemE is 100% committed both to the support of the New Zealand chemical and process engineering community and to contribute to the general promotion of the engineering profession in conjunction with the leading national bodies such as IPENZ (Institution of Professional Engineers New Zealand). This new branch is very important for IChemE to be able to effectively promote chemical and process engineering careers and the profession in New Zealand and to connect New Zealand chemical engineers with their global colleagues."

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEW PRODUCTS

Plastic double-diaphragm pumps

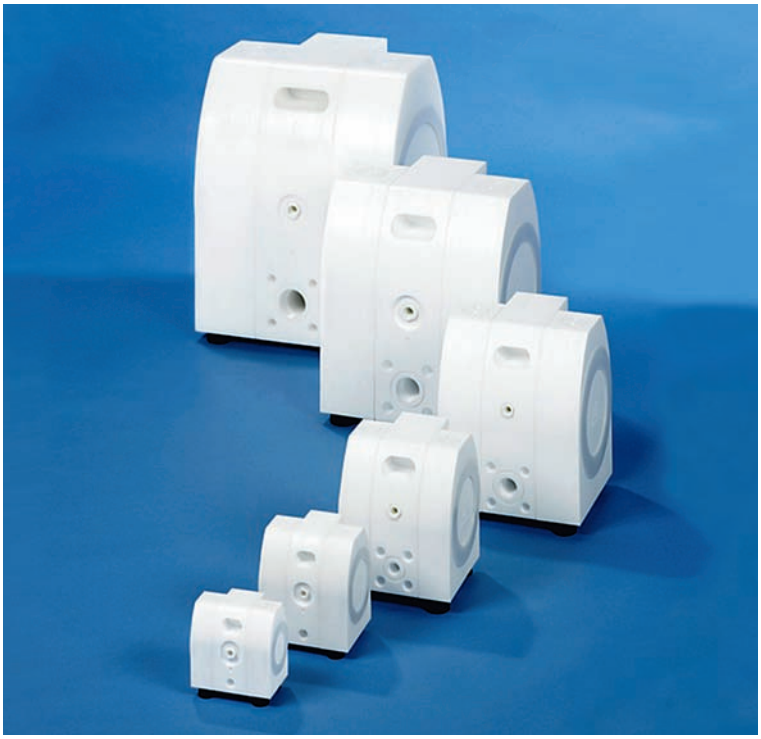
Almatec has created the E-Series range of air-operated double-diaphragm plastic pumps.

According to the company, the pumps are capable of producing a flow rate up to 28% higher when compared to legacy models, and consuming up to 15% less air.

The improved performance of the E-Series pumps make them suitable for chemicals, pharmaceuticals, cosmetics, ceramics, power plants, refineries, water processing, paper processing, electronics and solar cell manufacturing industries. Their housing is available in PE, conductive PE, PTFE and conductive PTFE, while the diaphragms are available in EPDM or PTFE. The ball valves are available in EPDM, PTFE or stainless steel, whereas the cylinder valves are made of PTFE. The E-Series pumps are self-priming and provide gentle displacement of fluids. The pumps are available in seven sizes, from the 15L/min E08 model to the 800L/min E80.

The E-Series pumps include an integrated muffler. Available options include a screw-on pulsation damper, draining system, barrier-chamber system, diaphragm monitor, stroke counting and flange connection.

www.almatec.de



The Almatec E-Series range of plastic pumps.

Heat exchanger processes low flow batches

Teralba Industries has released a new miniature heat exchanger for heating, sterilising or cooling fluid streams, liquid samples and pumpable products.

The Coilflo is suitable for food, dairy, beverage, chemical, pharmaceutical, HVAC and brewing industries. Capable of processing low flows and sample batches, the heat exchangers are compact and sanitary for laboratory use.

Their cylindrical profile facilitates a highly turbulent flow and thus maximises heat transfer coefficients.

The exchangers are available in duplex stainless steel, titanium and internally mirror-finished tube.

www.teralba.com

The Coilflo heat exchanger.

Volume ChE 35 No 1 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

FEBRUARY 2010

NEW PRODUCTS

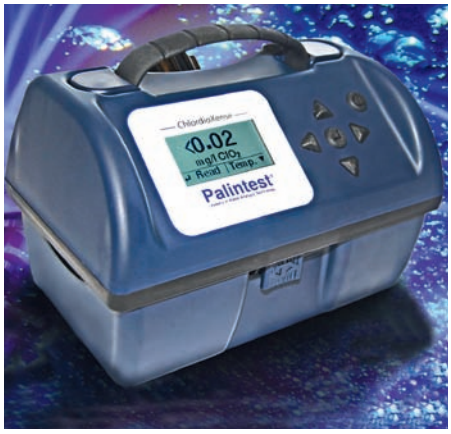
Measuring chlorine dioxide

Palintest has developed a new method for measuring chlorine dioxide levels in water.

Based on the electrochemical sensing technology in the company's ChloroSense digital chlorine sensor, the ChlordioXense is designed to be easy to operate. The user inserts a disposable electrode along with the water sample and closes the lid to start a test. The instrument works for concentrations in the 0.02mg/L - 50 mg/L range, with sample temperatures up to 40°C.

The results appear on the device's LCD screen in less than a minute.

The unit stores up to 500 results in its on-board memory, and can be connected by USB to a PC. It is powered by AA batteries and weighs less than 1kg.



The ChlordioXense device for measuring chlorine dioxide in water.

Applications include food processing, paper mills and building services.

www.palintest.com

Quantifying extensional properties of liquids

The Thermo Scientific HAAKE CaBER extensional rheometer makes it possible to quantify the extensional properties of fluids using normal force measurement. This option was developed by Prof Manfred Wilhelm from Karlsruhe Institute of Technology and Rüdiger Brummer of Beiersdorf in Hamburg.

The method involves placing a sample between two plates and raising the upper plate at very high speed in order to produce a fluid filament. A laser micrometer is used to determine the decrease in filament diameter as a function of time. Physical effects such as surface tension, elasticity, viscosity and mass transfer determine the extensional flow and can be quantified using model-fitting analysis. In this way, insights can be gained for such processes as fluid filling behaviour, the hardening of adhesives or the spray behaviour and misting of printing inks and wall paints. The measuring principle is ideally suited for viscoelastic samples which form cylindrical filaments on extension, such as cosmetic emulsions, hair colours, printer inks, food products, or certain adhesives.

The expanded measuring concept also permits the measurement of samples with non-cylindrical filament formation and is based on a highly sensitive, fast, normal force measurement in the sub-milli-Nnewton range, which is integrated in the lower measuring geometry of the instrument. The normal force which acts on the lower plate is determined while the upper plate is already moving upwards.

www.rheologysolutions.com

Labelling microplates

Agilent Technologies has introduced a microplate labelling system.

The new Agilent Microplate Labeler is equipped with a thermal label printer that provides 600dpi resolution and an expansive array of 1D and 2D coding symbols.

It is capable of printing and applying a label every four seconds.

The device can be operated as a standalone instrument using the included PlateTag software or integrated into third-party systems via the included ActiveX control and RS-232 serial or RJ45 Ethernet ports.

When integrated into automated systems, the Agilent Microplate Labeler is powered by VWorks software, which enables the user to apply unique sets of data to labels on all four sides of a microplate.

www.agilent.com

Valve for abrasive slurry

Larox Flowsys has introduced a new valve to supplement its pinch valve and knife gate valve lines. The Larox Rotary Disc Valve's rotating disc is designed specifically for heavy scaling, abrasive and corrosive slurries.

The valve is designed for shutting off the flow of slurries and liquids in a pipeline. The patented design allows the valve to cycle in heavy scaling slurries without sticking or leaking and with minimum wear. The valve available with pressure ratings up to 10,000kPa.

The valve is designed to be operated only in the fully open or fully closed positions. As the actuator is opened or closed, the disc is allowed to rotate due to the pressure pushing against the disc. As the valve is cycled, the disc rotates a few degrees, seating in a different position each time. The bonnet houses the rotating disc when open and seals around the spindle.

Larox rotary disc valves are available with manual, manual gear, pneumatic, hydraulic and electromechanical actuators.

www.larox.fi/flowsys

The rotary disc valve is designed for abrasive or corrosive slurries.