Volume ChE 35 No 2 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

APRIL 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

Federal minister to open Chemeca

Federal minister for climate change, energy efficiency and water Penny Wong will open Australasia's annual chemical engineering conference Chemeca 2010.

Titled "Engineering at the edge", the conference will be held on 26-29 September in Adelaide. It is organised by Engineers Australia's College of Chemical Engineers, the Institution of Chemical Engineers in Australia, the Royal Australian Chemical Institute and the Society of Chemical Engineers New Zealand which is now a branch of IChemE.

Plenary speakers will include Chinese Academy of Sciences vice-president Jinghai Li, professor of sociology at the Australian National University, Andrew Hopkins and Hans Muller-Steinhagen from the Institute of Technical Thermodynamics at Germany's Aerospace Centre in Stuttgart.

Penny Wong

Noel Williams, chair of IChemE in Australia, expressed his delight in Senator Wong's attendance. "As minister for climate change, energy efficiency and water, she'll be well aware of how important the science and engineering communities are to Australia.

"Possible answers to many of the environmental challenges we face will be discussed at the conference and it promises to be a learning experience for all of us."

For more information on the conference visit www.chemeca2010.com.

New process for biodegradable plastic

Melbourne-based Cardia Bioplastics has entered into a non-binding agreement with CNOOC Green Materials Co Ltd (a company controlled by major Chinese oil company China National Offshore Oil Corporation) to develop and manufacture a new polypropylene carbonate (PPC) resin tailored to be used by Cardia in its innovative starch blending technology.

The technology allows the blending of PPC with starch to produce a biodegradable plastic film. In the past PPC was not suitable for intimate blending with starch, Cardia said. The company has lodged provisional patents for the process.

The company develops, manufactures and markets sustainable resins and finished products derived from renewable resources for the global packaging and plastic products industries. Established in Australia in 2002, its headquarters and global applications development centre is in Melbourne. The manufacturing plant is in Nanjing, China.

Pipeline contract for LNG project

QGC, a BG Group business, has awarded a contract for the manufacture of 550km of pipe for its Queensland Curtis LNG Project.

The order has been placed with Howa Trading, a wholly-owned subsidiary of Baoshan Iron & Steel, known as Baosteel, in China. The coated steel pipe will be manufactured in Shanghai, with deliveries starting in October. The pipe will be used for a collection header pipeline and 340km main export line that will transport gas to Gladstone from QGC's coal seam gas fields in the Surat Basin in southern Queensland.

Construction will begin after BG Group has made a final investment decision on the Curtis LNG Project later this year and after Queensland and federal government environmental and regulatory approvals.

The contract follows BG Group's announcement on 5 February 2010 that Bechtel Oil, Gas & Chemicals was awarded the engineering, procurement and construction contract for the LNG plant on Curtis Island at Gladstone.

For further information visit: www.qgc.com.au or www.qclng.com.au

Engineering an answer to poverty

Chemical engineers are being asked to support some of the world's poorest communities.

IChemE has called on its 30,000 international members to demonstrate chemical engineering technology that can support people living on less than $2 per day. The individual or team that best displays such technology will receive a $10,000 donation from award sponsor Reliance Industries to extend the successful project. Reliance Industries is one of India's largest private sector enterprises.

"Chemical engineers are innovators so it makes sense for them to use their abilities to help some of the communities that are

CONTENTS

Volume ChE 35 No 2 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

APRIL 2010

most in need of support," said IChemE CEO Dr David Brown. "We're calling on chemical engineers everywhere to make the most of this fantastic opportunity."

The award is named after the founder of Reliance Industries, Dhirubhai Ambani, and will be presented at the IChemE 2010 innovation and excellence awards dinner on 4 November in Manchester, UK.

The deadline for entries is Friday 16 July and application forms can be downloaded at www.icheme.org/awards.

Workshop on research skills

The IChemE's Education Subject Group is running a workshop on "Teaching research skills". The ability to collect, assess and present information as well as design experiments that yield valid insights into engineering phenomena is key to the success of chemical engineers whether working in design, operations or traditional research. However, developing these skills takes considerable time and resources and it is increasingly difficult to develop research skills throughout the whole curriculum.

This workshop is an opportunity to share best practice with colleagues from other universities and develop new ways of getting better results from students' research projects. The workshop is suitable for junior and senior academics. Topics to be covered include industry involvement in projects, project planning and experimental design, safety and risk, maximising quality of projects, supervising supervisors and communication of results.

The workshop will be held 8-9 July. For more details contact the chair of the Education Subject Group, Matt Hardin (math@mech.uwa.edu.au).

Engineers Australia events

- The Chemical Engineering Branch of Sydney Division is holding a presentation on "Fluid transient analysis – Are you at risk of surging in your piping systems?" in the Division's auditorium at 18:00 for 18:30 on Tuesday 11 May. Contact Jeffrey Shi (xshi@gmail.com).

- The Western Australian Oil and Gas Facilities Group is organising two events.

An "Update on IBM's Integrated Operations Program with Statoil" will be held at 18:30 on Tuesday 4 May. The speaker will be David Haake, oil industry solutions executive with IBM Australia. A talk on "Just when you thought it was safe to go back into the water" will be held at 18:00 on Tuesday 6 July. The speaker will be Ivan Skibinski, general manager of the Australian Marine Oil Spill Centre.

Both events will be held at the Division's auditorium. More information can be obtained at www.engineersaustralia.org.au/wa.

Joint Committee

The Joint Chemical Engineering Committee of South Australia Division is holding a technical presentation at 17:30 on Wednesday 5 May. Contact Paul Godden at pgodden@engineersaustralia.org.au.

Volunteers wanted

Chemical engineers are wanted by Newcastle Division for its Chemical Engineering Committee. Interested members should contact the Newcastle Division office (02 4926 4440).

Volume ChE 35 No 2 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

APRIL 2010

NEWS

New course catalogue

Details of more than 50 courses including IChemE approved ones, in-company training and e-learning options are featured in the new IChemE courses catalogue.

Training specifically run in Australia includes Fundamentals of process safety, HAZOP study for team leaders and team members, Chemical engineering for non-chemical engineers and IChemE international forms of contract, a one-off in 2010 due to take place in April.

"Our training courses remain popular throughout the process industries with good employers recognising that even in challenging times, retraining and up-skilling key staff mustn't be neglected," said IChemE CEO David Brown.

The catalogue can be downloaded at www.icheme.org/CoursesCatalogue2010. Hard copies can be requested by contacting austcourses@icheme.org.

IChemE events

Join the board of IChemE in Australia for a member dinner on Thursday 10 June in Perth.

The annual member forum will be held prior to the Chemeca conference welcome function in Adelaide on Sunday 26 September at 14:00.

More details for both events will be available shortly on our website at www.icheme.org/australia.

Engineering at the Edge

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

Host Organisations
These bodies represent over 100,000 engineers and chemists working across the world.

IChemE
SCENZ – IChemE in NZ

SCENZ
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Senator The Honourable Penny Wong, Australian Federal Minister for Climate Change, Energy Efficiency and Water will open Chemeca 2010 at 8:30am on Monday 27th September 2010.

Key facts:

- Six plenary and over twenty keynotes from around the world, across industry, government and academia will present their facts on the 'energy jigsaw', biotechnology and nanotechnology as well as the more traditional aspects of industrial chemistry and chemical and process engineering.
- Six top-rated journals will publish special issues special issues of top-rated journals associated with Chemeca 2010 that span the conference topics.
- **Chemical Engineering Research and Design** (IChemE)
- **Biochemical Engineering Journal** (Elsevier)
- **Experimental Thermal and Fluid Sciences** (Elsevier)
- **Energy & Fuels** (American Chemical Society)
- **Biomicrofluidics** (American Institute of Physics)
- **Powder Technology** (Elsevier)
- **Advanced Powder Technology** (The Society of Powder Technology Japan; Elsevier)
- **Safety Science** (Elsevier)

Prizes will be awarded for the best paper, poster and presentation.

2010 chemeca

Early Bird Registration Fees

[before 31 July 2010]

Member	AUD895.00
Non Member	AUD1,030.00
Student* with Social Program	AUD650.00
Student* without Social Program	AUD500.00
Organisation	AUD1,250.00
Day Registration	AUD500.00

Register Now

www.chemeca2010.com

Conference Office: ICMS Pty Ltd
84 Queensbridge Street, Southbank
Victoria 3006, Australia
Email: chemeca2010@icms.com.au
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Volume ChE 35 No 2 – ISSN 1446-0831

NEWSLETTER

CHEMICAL ENGINEERING IN AUSTRALIA

APRIL 2010

The Institution of Chemical Engineers (IChemE) and the Australian Academy of Technological Sciences and Engineering (ATSE) hosted an "energy briefing" dinner on Wednesday 17 February at the Docklands, Melbourne, with guest speakers Andrew Liveris, John White and Drew Clarke. Liveris spoke on the global chemical industry and energy challenges. Following is a report on his address.

A different take on the energy issue

If individual countries want to expand their economies and provide a sustainable business environment that attracts investments, they must embrace "new ways of doing business". That was the message from Andrew N Liveris, chairman and CEO of The Dow Chemical Company, who said the days of believing that growing the economy and environmental protection were two separate ideas was outdated.

"The economy and the environment are part of the same big picture," he said. "If our cities are under water in 50 years, the global economy will be too. Since there isn't an option, we need to get positive and find ways to achieve win-win solutions."

At the function were (l-r) Noel Williams (chair of IChemE in Australia), Dr David Brown (CEO of IChemE), Dr Margaret Hartley (CEO of ATSE), Andrew Liveris (chair and CEO of the Dow Chemical Company).

Liveris acknowledged that all countries, including Australia, must make tough decisions and equally tough tradeoffs. He used Dow as an example of one company that has transformed the way it approaches growth by incorporating environmental and other issues into its strategy.

"We've transformed our company around the idea that some of the world's biggest challenges – megatrends like the need for cleaner, more abundant, more affordable energy – can be major business opportunities," he said, encouraging the audience to use the same drivers Dow is using – conservation and innovation – as a launching pad to transform government policies that will accelerate growth while also protecting the environment.

Conservation

Liveris said that conservation is the "quickest, cheapest and easiest" answer to the world's growing energy crisis. He pointed out that Dow has invested approximately US$1 billion in energy conservation over the past several years, making major changes in chemical processes, large scale investments in cogeneration facilities, and also fundamentals such as ensuring that steam traps do not leak.

Since 1990, that investment has allowed the company to reduce its energy intensity by 38%, saving 1600 trillion BTU of energy.

During the same period, the company also prevented 86Mt of CO_2 from being released into the atmosphere – a 20% reduction in absolute greenhouse gas emissions, well beyond the voluntary targets set at Kyoto.

The best bonus, Liveris said, was that the US$1 billion investment converted into a savings of US$8.6 billion.

"I'll be honest, if that $1 billion investment was a $1 billion loss, we wouldn't have done it. Dow is a business, not a philanthropy. We made these changes not just because they're good for the environment, but because they're good for our bottom line," he said.

Convinced that environmental consciousness is good business, the company has set higher sustainability goals and climate change targets for the future. By 2015, the company aims to reduce energy intensity by another 25% and cut greenhouse gas intensity by 2.5% a year.

"I am confident that what Australia is doing – pledging to reduce emissions by 25% below 2000 levels by 2020 and its *Water for the Future* framework – will also yield future bonuses that justify the tough decisions that you are making today," Liveris said. "Doubling efficiency improvements would hold CO_2 con-

Volume ChE 35 No 2 – ISSN 1446-0831
NEWSLETTER
CHEMICAL ENGINEERING IN AUSTRALIA
APRIL 2010

centrations below 550ppm (the apparent threshold for dangerous climate change), save $3 trillion in electricity generation costs; and reduce demand by the output of 2000 coal-fired power plants."

Innovation

Liveris said that conservation by itself, however, won't be enough to solve the world's problems. The other necessary initiative must be innovation, both within industry laboratories and within the halls of government.

Over the past century, groundbreaking ideas and technologies have made the impossible possible time and again. Airplanes cut distances between countries, and antibiotics and vaccines have eliminated some of the planet's most deadly diseases. New crop strains ended hunger for millions of people in developing countries while the microprocessor ushered in an age of instant communication.

The need to balance development and environmental protection is driving innovation at Dow, Liveris said. But it's also driving new developments throughout Australia and the rest of the world that "are nothing short of breathtaking," he said. For instance:

- *Carbon capture and storage*. Only a few years ago, the idea that carbon dioxide would be harvested from a smokestack was unthinkable but it is already happening today although not scalable as yet. If carbon capture and storage becomes feasible, it would mean that coal could continue to be a big part of the energy mix and would remove the single biggest hurdle to Australia's transition to clean energy. "That's why it was encouraging to see Australia start the Global Carbon Capture and Storage Institute and take real international leadership on this issue. Dow is proud to be one of the Institute's founding members."
- *Biofuel.* Algae eat through carbon emissions with machine-like efficiency and their waste product is ethanol, a fuel.
- *Next Generation Nuclear Plants.* Small nuclear power sources that are so safe, they can be used at an industrial site not just for electricity, but also for heat energy.

"None of these technologies is a sure thing but innovation never is," Liveris said. "If any one of them works, it would be a game-changer for Australia and the world."

Innovation in public policy

Liveris thinks innovation should not just happen in science laboratories – it should also happen in legislatures.

"We need creativity and entrepreneurship in public policy just as much as in the private sector," he said. "We need governments and multilateral organisations to bring business leaders, NGOs, academics, and other stakeholders to the table and craft balanced, comprehensive energy policies. We need innovative public-private partnerships now more than ever."

Liveris outlined four broad policy innovations that could help bridge the gap between economic development and environmental protection. "If we don't meet these challenges, we could be facing the worst catastrophe human beings have ever faced," he said.

1. *Policies that encourage efficiency*

Paralleling Dow's own experience, energy efficiency is also the low-hanging fruit for public policy makers.

Public and private sectors should work together on meaningful efficiency standards for things like buildings, automobiles and appliances, standards that would be implemented by business.

2. *Policies that speed the development of alternative and renewable energy supplies*

"There's a saying in our business: 'It's easy to find the first investor for my *second* plant.'"

Government needs to seed the ground for alternative energy and pioneers of innovation must be supported.

3. *Policies that address climate change*

Carbon pricing, for example, is a way to reduce carbon footprint and at the same time introduce some degree of predictability for businesses to make investment decisions. The other half of the equation is that money generated must be channeled towards developing new technologies.

Volume ChE 35 No 2 – ISSN 1446-0831
NEWSLETTER
CHEMICAL ENGINEERING IN AUSTRALIA
APRIL 2010

4. Appropriate energy policy

While viable alternatives are being invented and scaled up, current resources need to be embraced and used efficiently to ensure that economies continue to grow. This is best helped by a comprehensive, balanced energy policy that encourages the availability, sustainability, and stable supply of traditional energy.

"What baffles me is that every year, three million tonnes of liquefied natural gas come on shore to Darwin but not a single drop is available domestically to Australians," said Liveris, who is originally from Darwin. "Because prices are high right now for oil and gas, the market dictates that all this LNG should be sold and shipped to other countries."

Liveris said that market forces are not the solution and called for positive government action as a remedy.

Balancing gas available for domestic consumption versus LNG export would not just meet local energy needs but also open opportunities for the development of advanced downstream manufacturing industries that takes commodities and turns them into high value, high margin products, he said. There should be an incentive to use gas, rather than coal, for local consumption that recognises the preferred environmental impact. Australia is in a unique position to capitalise on the gas resource position to stimulate downstream value adding.

Such value-adding manufacturing will stimulate local investment, create high-paying jobs, attract top scientists and engineers, put money back into the system, and strengthen the industrial and economic base of nations like Australia.

"The US chemical industry used US$85 billion worth of energy/feedstocks last year," Liveris said. "However, we had a direct output equal to US$689 billion, an eight-fold value-add. For every job created in the chemical industry, more than five additional jobs were generated elsewhere in the economy."

Every day, Dow uses the energy equivalent of 850,000 barrels of oil – this is nearly equal to the daily oil consumption of Australia. But the company isn't simply burning fossil fuels – it is breaking hydrocarbon molecules down and using the pieces as building blocks for its manufacturing process. About 85% of Dow's energy demand is used on feedstocks, raw materials to make its products, Liveris said.

"Without energy, chemistry doesn't work. That means we at Dow have a real interest in being at the forefront of this fight."

IChemE signs up 30,000th member

Tadafumi Adschiri, a professor at the Advanced Institute for Materials Research at Tohuku University in Japan has become the 30,000th member of IChemE. He has joined IChemE as a Fellow.

"It is wonderful news and I'm happy to be the 30,000th member. I published my first research more than 20 years ago with IChemE so I've been familiar with the Institution for a long time. I was shortlisted in the IChemE awards last year and that was a good chance for me to get involved again and apply to become a member."

He said he has joined IChemE at a time when the function of chemical engineers is changing. "Part of my role is to explore the fusion of chemical engineering research with other disciplines including chemistry, biology, medical research, material science and maths.

"The role of chemical engineers will become more important in the coming years, especially in relation to the fusion of these different disciplines. Chemical engineers can act as a conductor to make a beautiful symphony in the interdisciplinary R&D."

A graduate from the University of Tokyo, Adschiri specialises in supercritical fluids.

IChemE members are spread across more than 120 countries and Neil Atkinson, director of qualifications and international development, said the global interest in IChemE is driven by changes in the process industries: "Our continued growth reflects strong interest in professional qualification and this is a trend we're seeing all over the world. As the process industries globalise and economies develop, the need for ever-stronger chemical engineering talent pipelines emerges."

Professor Tadafumi Adschiri... "Part of my role is to explore the fusion of chemical engineering research with other disciplines including chemistry, biology, medical research, material science and maths.

IChemE CEO, David Brown added: "I joined IChemE during the presidential term of Greg Lewin and it was Greg who described chemical engineering as a 'boundaryless profession'. He recognised that chemical engineers are working across an increasingly diverse range of sectors and most effectively alongside other engineers, scientists and specialists.

"That makes our job as the professional organisation that represents chemical engineers even more of a challenge. The boundaryless profession must be supported by a boundaryless institution," he said.

NEWSLETTER
Volume ChE 35 No 2 – ISSN 1446-0831
CHEMICAL ENGINEERING IN AUSTRALIA
APRIL 2010

CHEMECA

Nominations invited for excellence awards

by Gordon Weiss

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

NEWSLETTER
Volume ChE 35 No 2 – ISSN 1446-0831
CHEMICAL ENGINEERING IN AUSTRALIA
APRIL 2010

NEW PRODUCTS

Software calculates material needed for sealed pipes or cables

Beele Engineering's calculation software, designed to help determine materials requirements for sealed cable or pipe penetrations, is now compatible with more sealing options.

The current version calculates Rise or Riswat insert sleeves; Rise, Riswat or Nofirno filler sleeves; Actifoam spare filling sheets; Rise or Rise/Ultra crushers; and Drifil, Ftwa or Nofirno sealant.

After entering the dimensions of the conduit opening, and the amount and outer diameters of the ducted cables or pipes, the software calculates the amount of material needed.

Users can switch between the systems and A-class, H-class, EMC and watertight penetrations.

Based on the entered data, the program also displays the remaining free space in the conduit opening.

In addition, the filling rate of the cable penetrations is shown. Warnings appear for deviations of the certified configurations, and for overfilling the transits or exceeding filling rates.

All calculated transits for a created project can be stored in a database. Order and calculation forms can be shown on screen for project totals and single transits.

The material lists can be printed and/or exported to Microsoft Word.

All transits in a project can be selected to create a similar list for all materials for the whole project.

The program runs in Windows and automatically checks for updates at regular intervals.

www.beele.com

Dryer removes water vapour from analysers

Perma Pure's MD series dryers remove excess water vapour to keep analysers in environmental, laboratory, food, beverage, pharmaceutical, water, and industrial applications free from damage and inaccurate results.

The device incorporates two swivel head connectors for easier installation.

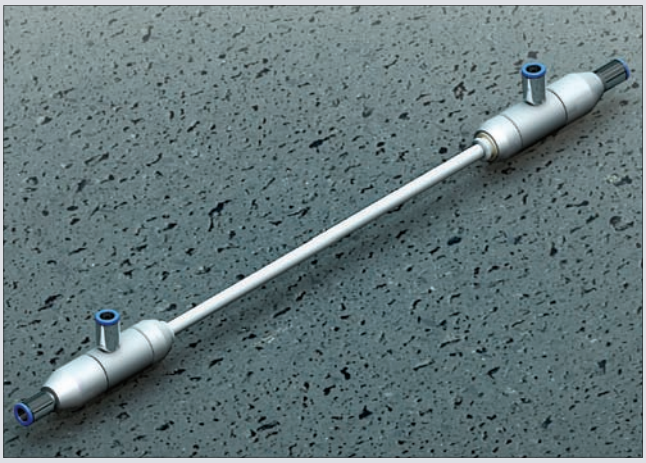
Using Nafion membrane technology, the dryers only remove water vapour from gas samples, leaving the concentration of other gas stream constituents intact for measurement.

The dryers provide an alternative to drip legs, peltier coolers, or desiccant canisters.

Without moving parts, the dryers require no routine maintenance.

The two swivel head connector polypropylene and fluorocarbon MD series dryers are available in a range of sizes to accommodate a variety of applications with flow rates of up to 4L/min.

www.permapure.com



The MD series of dryers is available with dual swivel head connectors.

Volume ChE 35 No 2 – ISSN 1446-0831
NEWSLETTER
CHEMICAL ENGINEERING IN AUSTRALIA
APRIL 2010

NEW PRODUCTS

Receptacle can be used as a secondary conduit seal

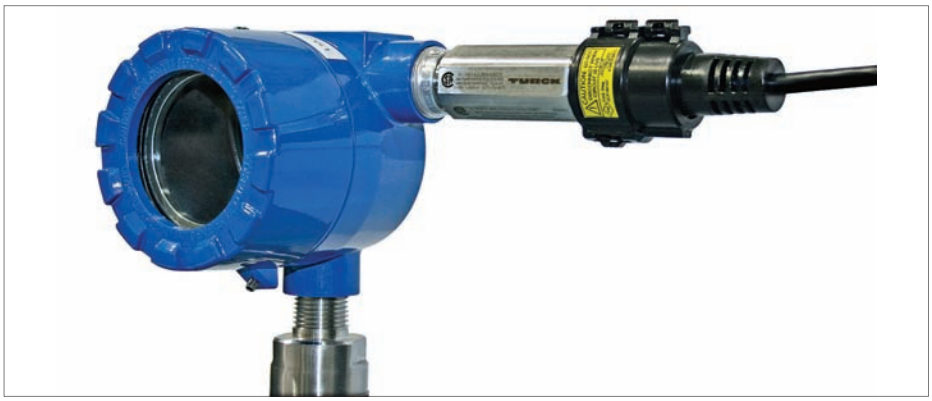
Turck has released the new 7/8-16UN minifast explosion-proof feed-through receptacle, which is CSA-certified as a secondary conduit seal.

This product can serve as a secondary conduit seal to prevent gas migration or as a boundary seal, when used with a certified cordset. The receptacle may be applied in Class I, Division 2 locations without the use of intrinsically safe circuits or in Class I, Division 1 locations with intrinsically safe circuits.

Fully potted in a durable 316 stainless steel housing, the explosion-proof feed-through receptacle is designed to withstand 13,790kPa. It also provides IP67 protection when a mating connector is attached.

The receptacle can be installed directly into 1/2-14NPT threaded conduit entries and is rated for 600V and 9A. When used as a secondary conduit seal, the receptacle is limited to 30V and 600mA.

www.turck.com.au



The feed-through receptacle can be used as a secondary conduit seal.

Pump designed for industrial applications

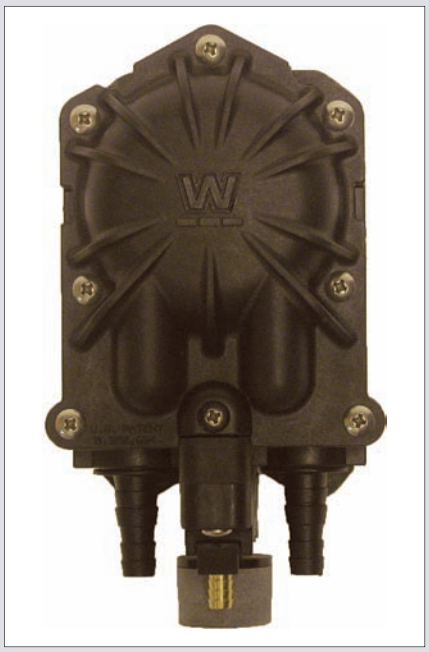
Wilden has announced the release of 10mm and 13mm Hornet pumps. The Hornet series of pumps is engineered for industrial applications including chemical dispensing, car wash, and OEM systems.

The pumps feature the Almatec air distribution system and Wil-Flex integral piston diaphragms. Spring-loaded check valves provide multi-directional mounting.

The Hornet pump is available with multiple fitting options: 10mm barbed hose, 10mm male national pipe thread and 13mm barbed hose. These fittings are easily removed or changed to provide compatibility with application requirements.

Made of glass-filled polypropylene, the pumps deliver flow rates of up to 20.8L/min.

wildenpump.com



The Wilden Hornet pump is available with several fitting options.

Portable filter

Donaldson Australasia has released Filter Buddy, a heavy duty hand-held portable filtration system.

Working at a rate of up to 7.6L/min, the device suits many applications, including fluid transfer, offline filtration of hydraulic oils and lubricants, water removal, transmission fluids, and checking the purity of new fluids.

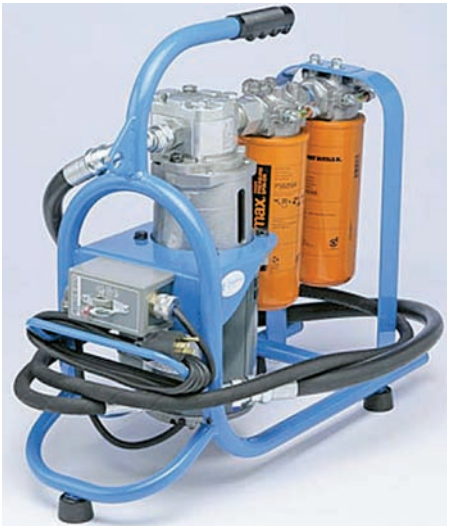
Filter Buddy has been designed to be easy to carry on stairs and fit into confined spaces.

The device features dual HMK04 filtration utilising Donaldson's Synteq media. The filters are plumbed in series, giving uses the option of coarse/fine particle removal or the ability to install a water absorbing element for water/particle removal.

There are two models available: a low viscosity version for fluids up to 194cSt and a high viscosity one for fluids up to 1725cSt.

Features include a durable frame with high-efficiency media grades, dual stage filtration, overload protection switch and sample port.

www.donaldson.com



The Filter Buddy portable filtration system.