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JUNE / JULY 2007 • VOLUME 8 ISSUE 3




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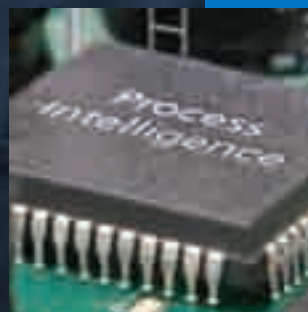
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Instrumentation Manufacturer Move to State-of-the-Art Offices



Michell Instruments (UK) are delighted to announce that they have moved into brand new, custom-built offices in north Cambridgeshire. Based just outside the cathedral city of Ely, the new offices have been developed to house Michell Instruments expanding team.

The new custom-built factory boasts a completely new service laboratory designed to provide the customer with the best possible service. There is also a new production line that will in turn offer reduced delivery times and added value for the customer. The new factory not only improves the working environment and development of Michell Instruments, but also reflects the direction of the company as it expands as a global force and brand.

Michell Instruments CEO, Mike Bannister added these comments about Michell's move:

"I am extremely proud of our new Head Office in Ely. The custom-designed R&D, manufacturing and office facilities provide our staff with almost twice the space we previously had in Cambridge. Our continued rapid growth as a world-wide force in industrial instrumentation is helped tremendously by the availability of first class facilities. The 3.7 acre site provides us with ample opportunity to further expand here in Ely to meet future demand for Michell's products and services".

Reply Card no 4

Flowmeter Contract Signed at Interkama



Krohne Messtechnik (Germany) has concluded a framework contract at this year's Hannover trade fair/Interkama with Uhde regarding the supply of

flowmeters. The agreement encompasses electro-magnetic, Coriolis and variable area flowmeters. In addition, Uhde can also obtain ultrasonic and vortex flowmeters from KROHNE with very favorable terms.

Krohne views the conclusion of this framework contract as confirmation of its competence in the ultrasonic field and as a mark of success of its latest Vortex flowmeter. For Uhde, the contract enables them to handle projects with greater efficiency, which will benefit the end customer.

Reply Card no 5

Distributed Control Systems for Two New Husky Energy Grassroots Ethanol Refineries in Western Canada

Invensys Process Systems is providing Foxboro I/A Series distributed control systems (DCS) for two new Husky Energy grassroots ethanol refineries in western Canada. The Invensys implementations include the latest mesh control network-based I/A Series system technology, intelligent measurement and instrumentation equipment, and a range of professional services. Husky Energy's ethanol plant at Lloydminster, Saskatchewan commenced operations in September 2006. The company's second ethanol plant at Minnedosa, Manitoba is scheduled to start up in late 2007. The plants are the largest of their kind in western Canada.

Each of the two new plants will produce

130 million litres (34.3 million gallons) of ethanol annually, to be blended up to 10 percent into gasoline products to help motorists reduce greenhouse gas emissions. The grain-based processes will use high-starch feed-quality wheat as feedstock, consuming approximately 350,000 tonnes annually for each plant.

The Foxboro DCS implementations each communicate with approximately 1,800 direct I/O points and 2000 I/O points through multiple PLCs. The plants' networked control systems each include three pairs of Foxboro ZCP 270 control processors in fault-tolerant configurations connected with distributed I/O cabinets at nine process units throughout each

plant. The systems perform a wide variety of control functions, including batch processing applications. At the Lloydminster site, the ethanol plant controls are integrated with existing I/A Series control consoles at the adjacent existing Husky Lloydminster heavy oil upgrader facility, which has been under I/A Series control since 1992.

Invensys Canada is also providing various professional services for each DCS implementation, including database engineering, graphics development, configuration services, start-up assistance and training for engineers and operators.

Reply Card no 6

IECEX - A Global Solution for the Ex Industry

Advances in technology along with globalisation have produced many changes in our industries and the field of Ex-equipment is no exception. Modern day automation of processes mean more and more specialised equipment are being exposed to harsh environments, especially those where the presence of flammable gas/vapours either exist or may exist. The international Ex community (Ex equipment manufacturers, end users and regulators) have worked long and hard at providing standardisation of technical requirements for Ex-equipment and systems now reflected in the set of standards like the

60079 series. The benefit of publishing international equipment standards can be overshadowed by the application of different testing and certification practices and systems, like the differences between ATEX, FM and CSA, around the world, resulting in costly re-testing/certification and lost time-to market for manufacturers and down time for plant operators.

While for the EU, the ATEX Directive has been seen as a solution towards a common approach, the question now is "What about companies and organisations that operate globally?"

Today the answer is use the IECEx scheme. The objective of the IECEx Scheme is to facilitate international trade in electrical equipment intended for use in explosive atmospheres (Ex-equipment) by reducing testing and certification costs to the manufacturer, reducing time to market, building international confidence in the product assessment process and providing "one" international database listing

The final objective of the IECEx Scheme is worldwide acceptance of one standard, one certificate and one mark for hazardous area equipment.

Reply Card no 7

Oil and Gas Customer Centre Opened in Houston

3M Energy and Advanced Materials Division (USA) recently announced that it will open a Customer Centre for the company's Oil and Gas business in Houston, Texas. The Centre is scheduled to open in spring 2007.

The Customer Centre, a first of its kind, will be dedicated to accelerating application development, and will spotlight 3M's proven applications and innovative technologies in the oil and gas industry. The facility includes laboratory, meeting and demonstration space to showcase, demonstrate and develop viable solutions for the industry. Many proven applications will be highlighted at the Customer Centre, with specific focus on four

application development areas within exploration and production: drilling fluids, low density cement, liquid filtration and pipe insulation. Technical experts will team up with customers and collaborate on their specific needs. The Centre will serve as a pipeline for 3M's proven applications that utilise 3M's 45 core technology platforms. This facility allows for synergy and interaction between customers and technical experts in a laboratory setting to delve into the challenges companies face that match 3M's offerings.

"3M has had a commitment to the oil and gas industry for more than 30 years, with solutions ranging from corrosion protection used in large-diameter pipes, to

downhole solutions to environmental safety sorbents," said Doug Rowen, global oil and gas business director with 3M. "Our global oil and gas team continues to find new ways to apply 3M's technology portfolio to solve key problems for our oil and gas customers."

"Houston was a natural location to open the first Centre of this kind," said Scott Hanson, who will lead business development at the Centre. "Houston is the global hub of the oil and gas industry, and our proximity will allow us to bring our technical resources and expertise where our customers are."

Reply Card no 8

Global Market Leaders Welcome New Timing and Location

The 4th Analytica Anacon India invites decision-makers and users from Indian laboratories in science and industry to its new location in Hyderabad. The change in the fair's venue is being accompanied by a new cycle - as of 2007, analytica Anacon India will be held every other year during uneven years. Both changes have been very well received among

international market leaders in the analysis, laboratory technology and life science industry. So far, Agilent, Millipore, Perkin Elmer, Shimadzu, Thermo and Waters have confirmed that they will be participating in analytica Anacon India at the new Hitex Exhibition Centre in Hyderabad.

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ALTAIR PRO Single-Gas Detector [Big on features, small in size]



The new MSA ALTAIR PRO is a reliable and compact high-performance single-gas detector with field-proven, fast-responding 20 series sensors. Three sensor options are available to suit various applications and needs: Carbon Monoxide, Hydrogen Sulphide and Oxygen.

ALTAIR PROs true single-button operation offers a quick and easy access to all functions of the instrument. If a simple calibration check or "bump test" is carried out the instrument will display a checkmark that lasts for 24 hours, increasing user confidence. The ALTAIR PRO display is extremely easy to read allowing users to view gas concentration, alarm conditions, alarm set points, battery status and peak reading. In addition to the displayed alarm super-bright LEDs, a distinctive audible and a strong vibration alarm ensure complete protection.

The replacement of both the sensors and batteries is incredibly simple, minimising any maintenance downtime. The highly efficient, commercially available battery ensures the ALTAIR PRO will run for over a year when used over a standard working week.

ALTAIR PRO features an extra thick rubberised housing which provides resistance to water and dust ingress. With the rugged suspension clip fitted as standard the ALTAIR PRO can be securely attached to clothing.

A highly comprehensive datalogging facility is standard on ALTAIR PRO. Via the built-in Infra-Red link data is transferred to a PC where information can be assessed quickly and easily.

The ALTAIR PRO is big on features but small in size.



circle pin. 11



NEW: ALTAIR QuickCheck [Simple testing in less than 30 seconds]

The new ALTAIR QuickCheck is designed to test ALTAIR and ALTAIR PRO Single-Gas Detectors. This economical test station checks the detector's visual, audible and vibrating alarms along with response to a known gas concentration.

ALTAIR QuickCheck is maintenance-free and provides a quick and easy bump test – in less than 30 seconds! Simply press the button and place the detector into the test station. A 24 hour check-mark is displayed on the detector once it passes the bump test. The date, time and result of a test are recorded in the detector.

Three super bright LEDs point at the test results: alarm test, gas test and final indication of pass or fail. Green LED signifies a passed test, red a failed test and flashing amber a test in progress.

There is both an automatic and a manual version of ALTAIR QuickCheck are available to suit your needs.

The ALTAIR QuickCheck enables quick and easy testing in less than 30 seconds.



circle pin. 10



ULTIMA X³ Gas Monitor

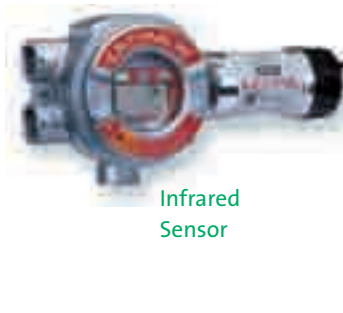
[ULTIMATE Flexibility – One for All]

MSA's modular ULTIMA X series now features all new X³ technology which allows up to three sensors to be connected to one monitor. A single electronics module design is used for all sensor types, catalytic, electrochemical and infrared. With the ULTIMA X³ up to 31 monitors, 93 gas sensors, can share one signal line and communicate via ModBUS to a PLC, DCS or other control system.

The modular design allows the use of remote sensors up to 15 metres from the monitor. ULTIMA X³ Gas Monitors feature interchangeable smart sensors that can be changed under power even in a hazardous area, assignable alarm relays, large highly visible status LED's and scrolling text diagnostic messages.



Catalytic Sensor



Infrared Sensor



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The new standards in gas detection are anything but standard.

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shown actual size



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New GPC for Polyolefin Resin Characterisation

Polymer ChAR (Spain) has developed a new high sensitivity infrared detector for composition characterization of polyolefin resins by GPC, the IR5-MCT. It is capable of measuring low methyl content with high accuracy and resolution due to the use of MCT detectors with five different wavelength filters. All components of the detector are devoted to become a very robust and simple equipment, not requiring the use of N₂ liquid and having the possibility to connect it to whatever GPC instrument in the market. The equipment includes internal temperature controllers for a high temperature cell and heated transfer line.

The continuous signals at different bands from the multiple filter system included in the detector are provided in real time allowing very simple processing. IR5-MCT is thought to be the most demanding applications in concentration and composition detection in polyolefin analysis, like GPC-IR analysis to obtain composition-molar mass dependence in pipe resins or in Ethylene-Propylene copolymers, as well as low number of short chain branching (SCB) in polyethylene.

circle pin. 19

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Low-Cost, Compact Polarised XRF Benchtop Analyser

Spectro Analytical Instruments (Germany), a unit of Ametek, Inc. has announced the launch of the Phoenix II benchtop Polarised XRF analyser. The instrument is ideal for elemental analysis of liquids, solids and powders for measuring Mg through U.

The Phoenix II is a low-cost, benchtop XRF spectrometer with a compact footprint designed for use in the rugged environment of production process and quality control as well as in the laboratory. Its on-board PC makes use of Windows operating system along with a simple, intuitive touch-screen display, making analysis easy for non-technical operators but advanced enough for the more-experienced user as well.

The Phoenix II combines a 48kV tube and Polarised source x-rays with a rugged gas-filled proportional counter detection system, giving the PHOENIX II improved performance for the measurement of low atomic number elements such as Mg, Al and Si as well as S and Cl. The prop counter detector design yields a high x-ray count rate throughput and makes use of x-ray filters to separate the spectral peaks of elements with adjacent atomic numbers.

With its onboard computer, no external computer is needed. The Phoenix II does not require an external mouse or keyboard, yet offers USB, VGA and Ethernet connections for networking and connecting to external devices. This compact, simple to operate XRF system offers a unique combination of high powered Polarised x-rays and a high sample throughput with rugged detector at a very affordable price.

circle pin. 20



Innovative Automation is the Key to Growth

TTP LabTech (UK) have announced further expansion of its Custom Automation business. This follows six years of continuous growth (annual turnover has grown over 24% a year compound) and a doubling of staff numbers to enable faster delivery of innovative engineering to a broad spectrum of high profile clients. With unrivalled expertise covering engineering, software, physical and organic chemistry, and materials science, TTP LabTech boasts a team of exceptional calibre and is set to significantly broaden its global customer base.

With 20 years' experience developing novel technologies, TTP LabTech's custom automation business provides practical and innovative integrated automation across a number of industry sectors. Core skills of process automation, liquid and solid handling, and manufacturing scale-up have made TTP LabTech a particularly successful technology provider for the research and development section of the petrochemical market. Recent projects

undertaken have involved automating the movement of volatile and viscous liquids, designing novel reaction vessels, and developing automated synthetic formulations and analytical platforms.

Matthew Cook was recently appointed Commercial Development Manager, to further develop the custom automation business and address the increasing need for automation and development projects across numerous industry sectors, "We have always worked very closely with scientists and engineers to bring new and innovative technology to the market place, as evidenced by our strong product portfolio. We also manufacture our own products, so understand the need to develop systems that are simple to produce but robust in the field. Our multidisciplinary and highly skilled development team, have provided our partners with exceptional solutions to complex automation-based problems" He continued, "This experience and expertise has allowed us to apply our innovations across many new industry sectors such as the petrochemical market, in order to discover new and exciting challenges."

circle pin. 21



Some Points of Interest in the Early Russian Oil Industry

At the beginning of the 20th Century the three major oil-producing countries were the US, Russia and Mexico. In 1900 the US and Russia were about neck-and-neck in oil production. Baku, close to the Caspian Sea, is currently an important scene of oil production and has been so since the 1860s. A pipeline for conveying crude oil from Baku entered service in 1878, the pipes themselves having been imported from the US. At the present time Baku is the scene of a newly commissioned pipeline - the Baku-Tbilisi-Ceyhan Pipeline - which is 1600 km in length and will hold 10 million barrels of oil.

In the early 20th Century the motor car proliferated in the US, but not in Russia. By the late 1920s the entire Russian car industry produced fewer than a thousand units per year. Low internal demand for oil left large quantities for export, to countries including Turkey. Another reason for the surplus was that Russia was significantly behind the US in entering petrochemical manufacture. Whereas in the US the first patent relating to cracking was filed in 1915, the first cracking plant in Russia did not enter service until 1927*. It was at Baku, at one of the refineries there, and there were setbacks in its commissioning which caused it not to be fully operational until 1929.

Grozny, in the Caucasus region, has a place comparable to that of Baku in the development of the Russian oil industry. Oil had been discovered there in 1833 and by the early 1930s it was accounting for almost a third of the country's oil production. Hitler's failure to gain control of the oil reserves at Grozny was a factor in his eventual defeat. Both Baku and Grozny, though continually producing oil, diminished dismally in productivity between WW2 and Perestroika. Russian oil production did however undergo a renaissance in the late 1990s, and by the time of writing Russian oil production exceeds that even of Saudi Arabia: in June 2006 Russia extracted 9.236 million barrels of oil which by a small margin exceeded that of Saudi Arabia for the same month. Though undoubtedly reflecting a thoroughly revived Russian industry, the excess over Saudi Arabia for that one month is not necessarily straightforward to interpret. One factor which has to be considered is that Saudi Arabia unlike Russia has an OPEC quota. Another is the death of the King of Saudi Arabia a few months earlier.

* Over the period referred to - 1915 to 1927 - Russia had gone from being under an Imperial regime to being part of the USSR.

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Professional Ion Chromatography



Metrohm IC is ion chromatography from the technology leader. The 850 Professional IC is the first professional ion chromatography system with intelligent system components:

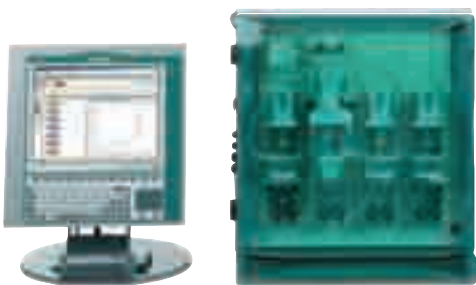
- Intelligence in the newly developed hardware of the 850 Professional IC,
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- Intelligence in the Metrosep iColumns.

Professional IC guarantees excellent results, gapless system monitoring, guaranteed traceability of all actions and the simple operation of even complex procedures.

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circle pin. 24

At-line Analysis in the Plating Industry



The ProcessLab is a new at line analyser to follow on in the success of the titrando range of laboratory titrators from Metrohm

The system uses well-established hardware and software, including the Titrando titrator and tiamo™ software. The advantages to the process industry are the industrial PC and I/O controller, for sending of information to process control systems. The system will automatically analyse plating baths, e.g. copper, nickel and zinc for content and associated other baths used for cleaning and degreasing.

Typical analysis for these are Cu, Ni, Zn, Cr and Pb. As well as total acidity and alkalinity.

All of this analysis is carried out in the ProcessLab without operator intervention and results are relayed to the process controller so remedial action for bath quality is regulated automatically.

With values for bath top up being sent to the operator or fully automatically via a computerised dosing system.

circle pin. 25

Oxidation Stability of Biodiesel and Biodiesel Blends with Metrohm Rancimat According to EN 14 112

A standardised quality parameter to avoid motor damage can be easily determined with the highly reliable Biodiesel Rancimat from Metrohm

In addition to other alternative fuels such as ethanol, methanol or biogas (methane), fatty acid methyl esters are increasingly found on the market; these are then known as biodiesel, RME (rapeseed oil methyl esters) or FAME (fatty acid methyl esters). Fatty acid methyl esters are usually obtained from oil seeds and are mainly used in their pure form or mixed with conventional diesel fuel in the transport sector.

Fatty acid methyl esters are relatively unstable on storage, they are slowly oxidised by atmospheric oxygen. The substances produced in this way could cause motor damage. This is why the oxidation stability is an important quality criterion for biodiesel; it is regularly determined during the production process.

With the 873 Biodiesel Rancimat from Metrohm this determination can be carried out quickly and simply. The oxidation process can be delayed by the addition of antioxidants. The 873 Biodiesel Rancimat can also be used to determine the effectiveness of antioxidants.


The 873 Biodiesel Rancimat is a compact instrument and has two heating blocks with eight measuring positions. Each channel can be started independently. Up to four instruments can be connected to one PC. All instrument functions are easily controlled from the PC.



circle pin. 26

Intelligent Chromatography

IC for Professionals



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ion analysis

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circle pin. 27

ATEX Compliant Noise Monitor



Casella CEL (UK) has released an ATEX compliant noise monitor to coincide with the New Noise at Work Regulations, enforced in all EU member states.

The new Intrinsically Safe (I.S) version of Casella's market leading CEL-320 and CEL-360 series noise dosimeters, allows individuals to carry out personal noise dosimetry in potentially explosive atmospheres. Rugged and simple to use, this instrument is compliant with ATEX standards, making it the first UK manufactured noise dosimeter to be granted this approval.

Tim Turney, Product Manager for Noise Instrumentation says: "We now have an IS noise monitor for employees who are highly mobile or work in dangerous environments. This ATEX approved I.S. version of the popular CEL - 300 series dosimeter ensures noise dose measurements can be performed in these flammable atmospheres."

circle pin. 28



HART Communication Now Available For Multi-Spectral Infrared (MSIR) Flame Detector Offering Superior False Alarm Immunity

The innovative Multi-Spectral Infrared (MSIR) FL4000 Flame Detector from **General Monitors** (USA) is now available with HART® communications. The FL4000, with its next-generation MSIR sensor that incorporates neural network technology (NNT), provides highly reliable flame monitoring with superior false alarm immunity, an exceptionally wide field of view (FOV) and the industry's longest extended range.

HART is a field-proven instrumentation communications protocol that is easy-to-use and provides reliable two-way digital communication without disturbing the integrity of the 4-20mA analog signal. HART communications permit remote process variable interrogation, cyclical access to process data, parameter setting and diagnostics. Unlike other technologies, HART provides a unique communication solution that is backward compatible with the installed base of instrumentation in use today.

Setting a new industry standard for performance, reliability and value, the FL4000 Flame Detector gives process and plant engineers a powerful new tool in protecting people, equipment and facilities from dangerous hydrocarbon flame sources. It provides exceptional performance and reliability while minimizing operational costs associated with false alarms.

Designed with an exceptionally reliable NNT flame discrimination algorithm, the FL4000 detector is highly immune to false alarms while at the same time offering extended range (up to 230 feet) and wide field-of-view (FOV) characteristics (100° at 50 feet). For example, the FL4000 MSIR flame detector provides false alarm immunity to arc welding as close as 5-15 feet. Other features include built-in COPM (Continuous Optical Path Monitoring), a self-testing feature designed to check the optical path integrity of the detector elements and the related electronic circuitry once every two minutes. Serial ports allow up to 128 units (247 using repeaters) to be linked up to a host computer using either HART or MODBUS® communications.

The advanced FL4000 combines an optical MSIR sensor array with NNT processing. NNT is based on artificial neural networks (ANN), which are mathematical models of neurons in the human brain that correlate given signal patterns with target flame conditions. The optical IR sensor array and the neural network function together as an adaptive and intuitive decision-making mechanism. The resulting flame detector provides the industry's most reliable discrimination between actual flames and costly false alarm sources.

The MSIR sensor array in the FL4000 allows the detector to sample different IR spectral areas to detect a flame. Each sensor's analog signal is sampled and then converted into digital format for initial signal pre-processing to extract time and frequency information. The time and frequency information are used by the FL4000's proprietary neural network classification algorithm to identify if input IR signals are emitted from a flame or non-flame source. The flame or non-flame decision is then reported as an output via LEDs, relays and MODBUS.

Because of its accurate and reliable flame detection scheme, the FL4000 sets a new standard for performance, reliability, safety and value. Furthermore, the FL4000's ability to differentiate spectral radiation emitted by actual flames from that emitted by background ambient radiation is exceptional. This differentiation is extremely crucial, as failure to do so results in either undetected fires, or more commonly, nuisance false alarms.

circle pin. 30

Accuracy + Portability = Practicality



Accurate gas mixtures blended gravimetrically according to international standards

- ▶ Portable range of lightweight reliable cylinders and associated accessories
- ▶ Practical easy to use calibration gas standards

Putting Safety First – the only way to ensure correct and accurate functioning of gas detection equipment is to bump test and calibrate it using a suitable gas mixture.

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and ask to speak to our Special Gases Division.



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circle pin. 29

New Extreme Environment Harnesses



Miller®, the fall protection specialists and part of world leading PPE manufacturer, **Bacou-Dalloz** (UK) has literally taken safety levels to new heights with two new "Extreme Environment" harnesses.

The Miller Atex harness and the Miller Kevlar® harness both address critical safety issues for those working at height in high-risk environments such as the petro-chemical industries; mining; fire-fighting and offshore. Both the Atex and the Kevlar harness have been designed with the safety, comfort and work demands of the wearer as priorities in already difficult environments.

The Atex Anti-Static harness is ideal for those working at height in a potentially explosive atmosphere, such as petrochemical sites or the mining industry. It is made from a special anti-static material which eliminates the risk of an electrostatic discharge (which can be created as the worker moves around) igniting the explosive atmosphere.

With two anchorage points (front and rear), the Atex harness can be worn for a range of working at height tasks. Once fitted, the dorsal extension strap on the harness can be connected to an intermediate attachment such as a lanyard or fall arrest block. This gives the wearer free movement around the work area, while still safe from a potential fall (or while still protecting the worker in the event of a fall).

For complete safety, the Atex should be worn with an

anti-static self-retracting lifeline, such as the Miller® Falcon™ SRL, and a grounded anchorage point.

A detachable dorsal pad makes the Atex harness easy to put on and prevents the straps from becoming entangled. Other key features designed for maximum wearer comfort include a sub pelvic strap, a protective back pad, adjustable shoulder straps and adjustable leg straps with automatic buckles.

The Miller Kevlar harness provides exceptional heat and fire resistance for anyone working at height in a high-risk environment such as fire-fighting, welding, defence and offshore applications.

Special flame retardant Nomex® webbing protects against weld splatter and sparks while a tough yellow Kevlar inner core adds strength and is high temperature resistant (or high temperature resistance. If we want to qualify it we can say that it withstands working temperatures of up to 177°C and will start decomposing at 482°C).

The bright contrasting colours of the blue Nomex and yellow Kevlar also make it easy to check for potentially dangerous wear and tear on the harness during inspections.

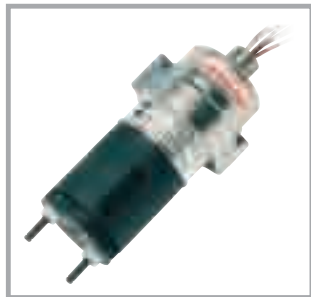
The Miller Kevlar harness comes in two different models, which can be used for a wide range of applications. The Kevlar harness, model 751K is a one-point harness with rear anchorage point, while the 650K model comes with adjustable shoulder straps as well.

Both Kevlar harnesses include a sub pelvic strap, adjustable leg straps and clips on shoulder straps for lanyard when not in use

All the Miller extreme environment harnesses come in small, medium and large sizes and are compliant with EN 361 (2002). The ATEX harness is also compliant with the European Directive ATEX/94/9/CE in accordance with EN 13464-1 and EN 13463-1 (2003).

circle pin. 31

gas detection



'True pioneers and innovators come but once in a lifetime'

From the development of the first catalytic bead during the last century, through to production of today's market leading detection solutions, Honeywell Analytics has always delivered expertise in gas detection. Since Joshua Sieger's ground breaking concepts in the 1960's, we have been at the forefront of detection innovation - from drawing board to life saving product.

Honeywell Analytics is not only the market leading supplier of gas detection equipment and accessories, but a pioneering force behind the industry with an unrivalled offering of technical services - you could say we are the true Experts in Gas Detection. The simple brilliance of our product range speaks for itself, as does the unrivalled quality of service and support we offer our customers.

The Optima Plus is an advanced flammable point infrared detector, certified for use in potentially explosive atmospheres. With a fast speed of response and a dual channel, fully compensated infrared optical configuration, Optima Plus is suited to a wide range of applications from oil platforms to distilleries. The device is fail to safe and features advanced internal fault diagnostics, meaning that routine maintenance is also reduced.

Honeywell



ATEX – Keeping on the Ball

Ron Sinclair, Managing Director Baseefa, Rockhead Business Park, Staden Lane, Buxton SK17 9RZ, UK

It is now almost a year since the compulsory full application of the ATEX “User” Directive (199/92/EC) throughout the European Economic Area and it is worth reviewing how things are progressing and looking at developments in the international field.

Ron Sinclair has been active in the certification of equipment for use in explosive atmospheres for over 30 years. Previously a designer of large electrical machines, he has developed expertise in all types of Ex protection while working for the UK Health and Safety Executive’s Baseefa and EECS. When HSE decided to terminate the certification activity in 2001, Ron led the staff into the creation of a re-formed Baseefa as a private company. Baseefa boasts over 300 years collective experience of hazardous area equipment certification, and is now working increasingly to support the users of such equipment.

Ron is active in standards development for hazardous area equipment: he is Chairman of BSI Committee GEL/31; Chairman of Cenelec Committee TC31; and a major contributor to the development of IEC standards as well as the CEN standards for non-electrical equipment. He attends the European Commission’s ATEX Standing Committee, and is well placed to interpret the latest thinking from the legislators. Last year, he was presented with the prestigious IEC 1906 Award, for his contributions to many of the working groups and maintenance teams of IEC Committee TC31.

Are we making progress?

When the full provisions of ATEX Directive 199/92/EC came into force in July last year, it was obvious that, although most of the multi-nationals had made good progress, many other plant owners had not prepared themselves for the new legislation. Unlike the ATEX product directive 94/9/EC, the

user directive did not apply directly to the offshore installations, but it has certainly been taken to represent good practice by most of the enforcing authorities. The two directives are interlinked in such a way that it would not make sense to ignore one while applying the other.

There is one other major difference between the directives: 94/9/EC is a trading directive, whose sole purpose is to prevent concerns on safety prejudicing trade within the European Economic Area; 1999/92/EC is a safety directive, concerned with securing improvement in the safety of workers exposed to the potential for explosions in hazardous atmospheres. The second directive ensures that the products traded under the first directive are correctly selected, installed and maintained.

Because 1999/92/EC sets minimum requirements, it is up to the individual national authorities within Europe to prepare their own national legislation which may be more restrictive than the directive. In the UK, the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) has not significantly increased the requirements, but it has brought the relevant parts of the Dangerous Substances Directive into the same bit of legislation. (The remainder of the Dangerous Substances Directive are to be found in the CoSHH Regulations.)

At Baseefa, we are finding increasing interest in our training courses that prepare people for taking on various roles outlined in 1999/92/EC and conclude that there are many companies who have not yet begun to prepare the mandatory Explosion Protection Document. The guidelines to

the directive specifically encourage the incorporation of existing risk assessment documentation, rather than starting afresh, and the HSE in the UK have certainly advocated that the Explosion Protection Document should not stand alone from other assessments required, for example by the Provision and use of Work Equipment Regulations (PUWER) and the Management of Health and Safety at Work Regulations (MHSWR). The HSE policy is to place minimum additional documentation requirements on the management of the workplace, while still ensuring that the intent of the regulations is satisfied.

Why the delay?

For many companies, creating the Explosion Protection Document is not an arduous task, but it does rely on having a team of people with the necessary background experience to be able to draft the Zoning Diagram and complete the ignition risk assessment on legacy plant. If that expertise is missing, the task can seem enormous and is likely to keep appearing on tomorrow’s “to do” list, rather than being tackled today. In addition to ATEX Notified Bodies such as Baseefa, there are many independent consultants who will be pleased to provide the necessary expertise and although the legal responsibility for the documentation cannot be subcontracted, it will often make sense for the actual document creation activity to be done with the help of external experts.

What’s new?

The international area classification standard (IEC 60079-10) is currently being revised and the new edition should be published later this year as IEC 60079-10-1. Of particular interest is the inclusion of specific information on flammable mists for the first time. Although this will be a welcome addition, no one should delay a zoning exercise, awaiting publication, since the fundamental presentation of the basic information has not changed. Of equal importance for the future will be the new IEC 60079-10-2 which constitutes a revision of IEC 61241-10, the equivalent area classification code for hazardous dust atmospheres. Here we expect to see some technical changes, affecting the extent of zones, but we must wait for the draft to receive its first formal vote before considering that the new text is generally agreed.

The new numbering system affecting the area classification standards is part of the move to cover both gas and dust in the IEC 60079 series. The next edition of the general requirements document IEC 60079-0 (due for publication later this year) will include both dust and gas/vapour requirements and will also introduce Equipment Protection Levels (EPLs). The EPL is defined in almost the same way as the related ATEX Category, but will use the lower case letters “a”, “b” and “c” rather than Category 1, 2 and 3. This should be no surprise to users of intrinsic safety equipment who have been familiar with levels of protection “ia” and “ib” over many years and are just now starting to get to grips with level “ic” which is replacing the “energy limited” requirements for Ex n equipment in IEC 60079-15. Encapsulation with



Large motor repair workshop (courtesy Cegelec)



Examining a flameproof motor (courtesy AEMT)

levels "ma" and "mb", although not so common, has also been with us for a few years and will soon be joined by "mc" in the next edition of IEC 60079-18.

Another recently published standard of direct interest to owners of hazardous area plant is the new edition of IEC 60079-19 relating to the repair and overhaul of Ex Equipment. A revision was well overdue as the original version of 1993 was based directly on the Beama/AEMT Guide of 1984. There have been considerable advances in repair techniques over those years, as well as new problems associated with changes in the construction standards. In addition to the traditional "gas" protection concepts, the new edition also deals with repair of dust protected equipment.

There are significant changes in the way the new standard addresses the repair of flameproof (Ex d) equipment and a major new section on "competency" rather than "training". Some types of repair permitted by the previous edition are no longer acceptable, but additional advice is given to assist other types of repairs.

Confidence in the competency of repair companies is a concern of many users of Ex equipment. With coincidental timing, the IECEx Scheme has launched its "Service Facility Certification Scheme", to enable repairers to prove their capabilities to the worldwide Ex community.

Altogether, this is a time where users of equipment, as well as manufacturers, need to keep abreast of the new standards as they are issued and check how they directly affect their own plant and processes.

Baseefa has become the first certification body in the world to have its IECEx scope extended to include electrical Service Facility Certification.

The move confirms Baseefa's place as world leaders in the Ex certification field, and follows on from the leading role that the Buxton company has taken in the issue of IECEx Product Certificates of Conformity throughout the world.

Managing director Ron Sinclair commented: "We see this as further evidence of our faith in an international system of conformity in hazardous area product certification. In an increasingly-international market, it has been a continual source of frustration that differing technical and conformity assessment criteria – such as the European ATEX directive – has often led manufacturers into having to make distinct products for different parts of the world.

"The intent of the IECEx Scheme is to cut out this waste and achieve a single certificate for a single product or service which is acceptable anywhere in the world. Our acceptance as the first certification body to have its remit extended into the Service Facility field is a major step forward, and we believe points the way to the future."

The IECEx Certificate of Conformity for Service Facilities covers the repair and overhaul of electrical equipment for use in hazardous or explosive atmospheres. Information and documentation is available on-line by contacting www.iecex.com/service_facilities

The on-line viewable certificates can only be issued by approved IECEx Certification Bodies (initially only Baseefa), and they attest that a service facility as described on the certificate has been independently assessed and found to have the appropriate equipment, competent staff and operating procedures which will provide confidence that the repair, overhaul or modification work complies with IECEx requirements, including IEC 60079-19. It also attests that the service facility site has been audited to verify that its quality system meets IECEx requirements, as specified in the IECEx Operational Document OD 014.

Allan Ogden, the internationally respected certification engineer and active member of a range of international standards committees, having recently joined Baseefa from Hawke International, is heading up this Service Facility programme.

The IECEx Operational Manuals obtainable on the website given above include IECEx 03, which aims to ensure that each certification body, accepted by ExMC for the purposes of issuing IECEx Certified Service Facility Certificates, processes applications from Ex repair facilities with the same approach and technical rigour – known as "certifying the IECEx way". It outlines procedures for both the issuing and the maintenance of the validity of the certificates, including a description of each step showing the link between flowcharts and table; a description of the activity; related documents; the responsible person or party, and additional comments and remarks where appropriate.

Under the procedures for the maintenance of an IECEx Service Facility Certificate, guidance is provided for the certification body when conducting surveillance audits of the facility. It points out that to ensure the on-going credibility of the scheme, in addition to the scheduled audits, it may be necessary for the certification body to conduct unscheduled visits, to "check test" company activities where serious non-compliances have been identified, or to note such instances on the file for raising at the next surveillance audit.

The on-line documents also outline the procedures for the issuing of certification changes, including the extension of the scope of the certificate; the assessment procedures; technical requirements and quality management system requirements involved in the repair, overhaul and modification of Ex electrical equipment.



Allan Ogden at the IECEx Conference in Buxton 2005



Intelligent Rate of Rise Heat Detector TMP2

The TMP2 series of fire and overheat detectors from **Oggioni** (Italy) includes an electronic circuit for signal conditioning generated by the transducer.

The electrical signal of transducer, is transformed into an engineered output with different interface solutions, current absorption, Proportional 4-20mA output or Relay contact.

The electronic card, reduced to the minimum size is made using SMT technology and placed directly into the unit probe.

TMP2 detectors are sturdy, shock and vibration resistant, the detectors are capable of sustaining impacts of up to 4g-force of 100 ms and vibration from 0.5 to 200 Hz with acceleration of 4 g.

TMP2 are compatible with any standard fire alarm control panel on the market, and particularly suitable in dangerous environmental conditions such as in the presence of corrosive elements or condensing steams.

Available also in the ATEX version for use in explosive atmospheres.

circle pin. 37

Intrinsically Safe Giant LED Clusters



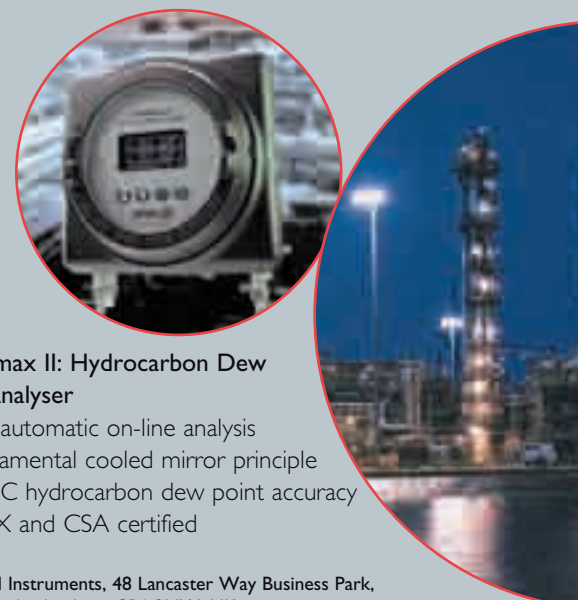
The DA180 range of Giant LED Clusters, from **RTK Instruments Ltd** (UK), having a 66mm diameter lens, not only provides clear indication from a distance but is also visible from the side. Lenses are available in six super-bright colours and feature an integral current regulator to limit the current to 20mA. This ensures that all colours are matched to obtain consistent brightness across the range including white and blue. Up to two LED Clusters can be driven from a single IIC power source. The lamps are designed to provide a minimum of 100,000 hours of service life.

The DA180 Giant LED Clusters are ATEX Certified to Ex II 2G, EEx ia IIC T4 and are suitable for zones 1 and 2. The LED Clusters can be supplied as loose parts or pre-mounted in a stainless steel or polycarbonate IP65 box ready for immediate installation on site. The

DA180 range of Giant LED Clusters can be linked into either the LN1000 Intrinsically Safe Alarm Annunciator or one of a number of safe area annunciators. With the LED's lower power consumption, low heat dissipation and long life expectancy, the DA180 is an ideal indicator for safe and hazardous areas alike.

circle pin. 38

On-line measurement of water and hydrocarbon dew point in natural gas



Condumax II: Hydrocarbon Dew Point Analyser

- Fully automatic on-line analysis
- Fundamental cooled mirror principle
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circle pin. 39

New Intrinsically Safe CEL-350 dBadge Noise Dosimeter for Flammable Atmospheres



Casella CEL Ltd (UK) a leading manufacturer of occupational health, safety and environmental monitoring equipment, launches the new ATEX approved, Intrinsically Safe (I.S.) CEL-350 dBadge personal noise dosimeter for use in flammable atmospheres. This follows on from the successful launch of the original CEL-350 dBadge, famous for its cable free versatility, reliable digital technology and robust, small and lightweight (68g) ergonomic design.

The I.S. CEL-350 dBadge can measure all occupational noise parameters in potentially explosive atmospheres, it can record the time history of an individual's noise exposure throughout the day and features a unique noise exposure alarm. It also hosts a built in graphic display which is used to show status information and completed noise exposure results.

The I.S. CEL-350 dBadge includes an extensive software package, with database and reporting features, as well as graphical analysis of an individual's daily noise exposure. The dBadge is downloaded to a PC by an infra-red link, a communication technology chosen because of proven wireless reliability.

The I.S. dBadge is supplied as a kit, in a rugged briefcase that also includes an acoustic calibrator, intelligent charging system, mounting kit, windshields, software and infra-red download cable. Kits are supplied with quantities ranging from 1 to 10 dBadges. The I.S. dBadge has integral NiMH batteries that give an unprecedented 32 hours of operation, and can be recharged in under 90 minutes using the intelligent charging system.

The I.S. CEL-350 dBadge system exceeds International Standards for acoustic and electro-acoustic test methods and performance requirements. The ATEX Directive embodies the European requirements for equipment used in potentially explosive atmospheres.

circle pin. 40

ATEX Moisture Meters Head East



MCM (UK) shipped the first 10 of 100 eagerly awaited portable moisture analysers rated Ex ia IIC T4 to various petrochemical plants in the Far East.

The ATEX Microview range of ultra fast, temperature controlled moisture measuring instruments with its unique sensor drying feature has been eagerly awaited by customers requiring quick and precise data at low moisture concentrations.

The ability to validate moisture data quickly and reliably has been a 'golden chalice quest' within the petrochemical industry, with few manufacturers being able to deliver fast or reliable results.

MCM's technology approaches moisture measurement from a known dry condition before each test. This gives laboratories and process people a common point of reference

during validation, significantly reducing uncertainty.

MCM develop instrumentation to the higher T4 temperature rating because it offers greater flexibility and convenience in operation which users welcome over the explosion proof route.

circle pin. 41

Alarm Annunciators & Event Recorders

RTK
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Products ideal for all process and alarm applications

High Integrity Design (high availability)

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Please call +44 (0) 1423 580500 for full details or visit us at www.rtkinstruments.com



circle pin. 42

UL and CSA Approved Portable Gas Detector Range Extended



UL and CSA approvals have been granted to a number of **Crowcon's** (UK) rugged, portable, single and multiple gas detectors. This means they can be used throughout the US and Canada for hazardous area applications.

The UL and CSA approved range now includes the new Tetra:3 for monitoring oxygen, toxic and flammable gases. The unit, which has a top-mounted display, is water and dust resistant to IP65 and submersible to IP67.

Other approved models include the Gasman range of single gas detectors and the Tetra multiple gas detector, all of which share common features with Tetra:3, such as instant and effective warning when a gas hazard is detected with a powerful audible alarm (up to 95 dBA depending on the model), an extremely bright unique flashing red/blue LED light, and a vibrating alarm.

Designed for use in the most demanding conditions, all Crowcon's detectors are simple to operate. Also, because each model shares many common features, such as single button operation, user training is incredibly simple across the entire product range.

circle pin. 43

A New Generation of Mobile Computers for the Ex Area



Bartec's (Germany) powerful hand-held MC9090ex Mobile Computer is based on the success of the MC9060ex series and provides mobile employees all over the supply chain of chemistry and chemical engineering with a flexible and uninterrupted data connection.

The MC9090ex series is equipped with the new Intel® XScale™ PXA270 processor with 624 MHz as well as with a robust and persistent memory and several advanced

data acquisition options. The version with integrated WLAN allows for a real-time data exchange with the host system. Windows Mobile 2005 is one of the most stable Microsoft operating systems. Due to its numerous functions and the familiar environment of Windows Mobile 2005, the MC9090ex is really user-friendly.

Picture acquisition and barcode scanning can be done in different business divisions with only one device, from distances ranging from 10 cm to 12 m. Because of the optimised energy management, the battery working life is sufficient for a complete working shift. The modular key panels and the 1/4 VGA colour display with an aesthetic touch-screen technology which can easily be read indoors and outdoors, guarantee an easy and comfortable application.

The MC9090ex enables mobile employees to record and access important company data in real time. The robust design is even suitable for rough applications under extreme and various ambient and working conditions. As it is equipped with the ignition protection type "sand filling" and "intrinsic safety", it can be directly applied in the Ex area of zone 1. The seamless integration into wireless LAN networks all over the world serves as a consistent global platform for applications in the supply chain. The MC9090ex series supports the radio standard IEEE 802.11a/b/g.

Like its predecessor, the MC 9090ex is available in two different approval versions for the explosion-hazard area. For ATEX zone 1 there are the MC 9090ex - G's with pistol grip and 1D Long Range Scan Engine as well as the MC 9090ex - K without pistol grip and with 1D Standard Range Scan Engine or 2D Imager. For UL Class I Div 1 Bartec offer the MC 9090ex - G with pistol grip and 1D Long Range Scan Engine or 2D Imager and the MC 9090ex - K without pistol grip and with 1D Standard Range Scan Engine or 2D Imager.

The user has the option of wireless printing and synchronising via Bluetooth. The conveniently placed scan trigger allows for an operation with one hand. The ergonomic scan pistol grip of the gun device allows for a comfortable operation even for longer periods of application, e.g. for inventory management.

Due to its properties, the MC9090ex allows for optimised business courses, a lower error rate as well as an improved productivity and profitability.

circle pin. 44

Free Poster for Ex tool Applications



Fluke (The Netherlands) is offering a free 'Intrinsically Safe Test Tool' poster and product guide. Available via the Fluke web site the poster clearly shows where Fluke's Ex test tools can be used in hazardous environments.

User safety is one of the primary drivers for the development of all Fluke test tools. Fluke was one of the first manufacturers of ATEX-compliant hand-held tools, and now offers a broad range of intrinsically safe process calibrators and a version of the world's most popular industrial multimeter. They can be used to install, maintain and troubleshoot equipment, as well as maintain and calibrate sensors, transmitters and control loops. These products meet the needs of technicians in petro-chemical plants, oil platforms, refineries, governmental bodies, commercial organisations and any location subject to the risk of explosion.

circle pin. 45

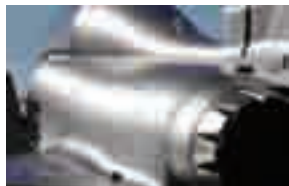
GasCheck Gets its Flying Stripes

Recently BAE Systems purchased Ion Science's GasCheck 3000is instrument for detecting leaks. This was used alongside the CalCheck equipment. The big advantage of the GasCheck 3000is was the ATEX approval, which met BAE Systems' requirements together with the direct ml/sec readout and the ability to calibrate the unit with the CalCheck for traceability.

Mark Rhodes of BAE Systems stated that "the way we use the GasCheck 3000is, is as a leak detector for the refrigeration units located in the aircraft wing tips for simple detection of refrigerant R245fa gas, this allows us to quickly check integrity of the system and ensures that required standards are met. BAE Systems, as a partner in the Eurofighter consortium, has customers that include the air forces of Germany, Italy, Spain and the UK as well as Austria. In the future GasCheck may become a recommended service tool to use for Typhoon's.

Key features of the GasCheck 3000is include:

- Micro thermal conductivity sensor
- Rapid response times
- Easily operation/ detection of small leaks
- Conveniently calibrated against helium
- Intrinsically safe
- Advanced software features



For more information please contact us at info@ionscience.com or visit our website www.ionscience.com.

circle pin. 46

PhoCheck+ - The Most Versatile PID on the Market

Ion Science's PhoCheck+5000Ex, is the only instrument in the industry with a distinctive detection range of 1 ppb to 10,000 ppm; making PhoCheck+ the most advanced PID on the market. The instrument's versatility allows for greater detection of a wide range of dangerous toxic gases, Volatile Organic Compounds (VOC's) (hazardous to health) and flammable gases at lower explosive level thresholds.

The PhoCheck+ instrument can be applied to a diversity of applications including: STEL and TWA monitoring, atmosphere monitoring, environmental clean-up, petrochemicals, confined space entry, first response HazMat/WMD, arson investigation, leak detection, indoor air quality and soil contamination. This shows that PhoCheck+ provides a diversity of uses.

Advanced features include high sensitivity, humidity resistant photoionization detection (PID) with patented Fence Electrode Technology, fully upgradeable instruments from PhoCheck+ 1000Ex all the way up to the revolutionary FirstCheck 6000Ex multi gas instrument (with additional sensors).

PhoCheck+ is the ideal PID for providing truly traceable results; this offers increased memory capacity for data logging, improved PC communication via IRDA technology and rapid response/recovery for faster detection.

For more information on products and applications please visit www.ionscience.com/applications.php



circle pin. 47

TVOC – The World's First Intrinsically Safe Fixed PID Gas Detector



Ion Science's TVOC is a intrinsically safe fixed PID Gas Detector providing effective continuous monitoring for the detection and measurement of total volatile organic compounds (TVOCs); ideally used in manufacturing and process industries where VOCs are typically present.

Features include: humidity resistance, a selectable detection range of 0 – 100 ppm, with simple installation, service and calibration. Using a 4-20 mA analogue output TVOC can be simply integrated into a data control system to provide warning or control of high VOC levels in the working environment. In addition a diffusive sample technique is used resulting in less contamination issues, compared to pumped systems, reducing lamp cleaning and servicing requirements.

TVOC can be used through a diversity of applications including: pharmaceutical industry, chemical industry, indoor air quality, refineries, petrochemical plants, solvent recovery systems, waste water treatment plants, offshore, pulp and paper industry, industrial painting/ coating.

Intrinsically safe PID's are advantageous because there is no need for an expensive explosion proof enclosure; allowing simple servicing with no hot work permit and an easily accessible/ changeable PID sensor (taking only seconds).

For information on products and applications visit www.ionscience.com/applications.php

circle pin. 48

The world's most advanced PID detectors ...just got better!

PhoCheck+

The advanced range of photoionization detectors (PID) for the ultimate in VOC detection

- Simple to use PID's from £995
- Choice of detection range 0.1 – 4,000 ppm up to 1 ppb – 10,000 ppm
- Fully upgradeable in the range
- ATEX approved
- Rapid response and recovery
- Humidity compensation
- Data logging
- Health and Safety monitoring

TVOC

For fixed continuous total volatile organic compound monitoring

- Detection range 0 – 100 ppm or 0 – 1,000 ppm
- Scaled 4 – 20 mA output
- ATEX approved
- Includes 10.6 eV lamp
- Easy access PID
- Simple calibration

Ion Science Ltd
The Way, Fowlmere, Cambridge. SG8 7UJ. UK "Whatever your application ...Ion Science has the gas detector for you"

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circle pin. 49



Highly Intelligent Toxic Gas Detector Receives ATEX Approval For European Use

Offering protection against a wide range of hazardous industrial gases, as well as oxygen deficiency, the TS4000 Intelligent Toxic Gas Detector from **General Monitors** (USA) has received ATEX Approval for use in potentially explosive environments classified as EEx d mb IIC (-40°C < Ta < +75°C).

The TS4000 Toxic Gas Detector's sophisticated design offers many advanced features, including long distance remote mounting up to 2,000 feet, dual redundant MODBUS communications, 8 amp relays, three-digit display, 4-20mA output, and indication of remaining sensor life. All of the electronics are contained within an explosion-proof housing so that sensor information can be processed at the sensor site. Additionally, the interface module's galvanically-isolated, intrinsically-safe design supports sensor field replacement without special tools or hot work permits.

Easy to install--the TS4000 features one-person calibration and can virtually self-calibrate by activating a magnetic switch and applying gas. Process engineers who need to protect people and equipment will find that the TS4000 Intelligent Gas Detector is ideal for chemical, oil/gas, wastewater and other hazardous environments. Additional applications include

public utilities, refineries, pharmaceuticals and food and beverage.

The TS4000 monitors a variety of toxic gases in the parts per million (ppm) range, including: ammonia, carbon monoxide, chlorine, chlorine dioxide, hydrogen chloride, hydrogen sulfide, nitric oxide, nitrogen dioxide, oxygen deficiency, ozone, and sulphur dioxide. The system displays gas concentrations up to 500 ppm, fault codes for troubleshooting, prompts when calibration is needed, and provides complete status to the Control Room. Additionally, the TS4000 simplifies operation and maintenance and reduces downtime by providing remaining sensor life indication.

The TS4000 utilizes an intelligent microprocessor-based design in an explosion-proof housing. This 24 VDC-powered toxic gas detector is comprised of a base unit, sensor housing with interface module and electrochemical sensor. The interface module processes information at the sensor site and communicates detected gas values to the base unit for data control and display. By combining explosion-proof certification with intrinsically safe inputs, the TS4000 provides high performance in hazardous locations. It can also be used for general-purpose, non-hazardous applications.

circle pin. 50

Enhanced Loop Powered Transmitter Now Intrinsically Safe



Michell Instruments (UK) are delighted to announce they have developed a certified intrinsically safe version of their Easidew Transmitter. The Easidew TX I.S. increases the already highly successful range of Easidew dew point instruments, which includes portable and on-line hygrometers, as well as dew point transmitters. The Easidew TX I.S. is a low cost, rugged impedance dew-point transmitter for continuous measurement in industrial gas applications.

The Easidew TX I.S. is ATEX certified by BASEEFA for use in hazardous areas to Ex II 1G ia IIC T4 when used with a galvanic isolator for signal power supply connections. Easidew TX I.S. can therefore be safely used in virtually all industrial gas

measurement applications. The certification lists five different galvanic isolators from two different manufacturers. This allows the customer to choose the most suitable isolator to the correct hazardous / safe area interconnection.

The new transmitter offers the customer many more new and improved features. The modified transmitter can now be connected in a 2-Wire loop powered or 3-Wire configuration. The Easidew TX I.S. also features HDPE filter, designed to show contamination for service ease which is <10um porosity and impermeable to liquids

The intrinsically safe transmitter has powerful processing capability allowing for the first time the on-board calculation of ppm(v) moisture content (ranges 0-100, 0-1000ppm and 0-3000ppm). Application software also allows the user to configure output parameters, ranges and scaling.

The Easidew TX I.S. is designed for ease of use, incorporating all the features the user could want to make installation and operation as simple as possible. For the first time, dew point measurement is made as accessible as temperature and pressure with this fully configured, calibrated transmitter that can be instantly incorporated into your air or gas management and control system.

The key to the Easidew TX I.S. Transmitter's performance is its sensor technology. Michell Instruments' Advanced Ceramic Moisture Sensor is coupled with advanced microprocessor based measurement circuitry to produce a fully calibrated and interchangeable sensor transmitter. All calibration data is stored within the transmitter's flash memory and so calibration exchange, or service, can be affected in seconds, even by untrained personnel. The Easidew TX I.S. is simply disconnected, removed from its sampling block and replaced by a new fully calibrated unit.

circle pin. 51

BARTEC

The New Star in Moisture Measurement in Natural Gas

BARTEC Safe.t® Technology

The HYGROPHIL F 5673 multi-channel trace moisture measurement device marks a new milestone in natural gas measurement. The device operates in accordance with the proven drift-free fibre optic measurement principle and offers many advantages.

- NEW up to three sensors can be connected
- NEW Ethernet
- NEW graphic-capable display

Make your decision for a strong partner. Choose BARTEC, the No. 1 in Safety Technology in Europe.

BARTEC GmbH Germany 94239 Gotteszell Phone: +49 9929 301-0 info@go.bartec.de www.bartec-group.com

circle pin. 52

Tunable Diode Laser Analyser for Gas Measurement in Harsh Environments

The new **Yokogawa** (Europe) TruePeak tunable diode laser (TDL) analyser is designed to make fast, accurate measurements on near-infrared absorbing gases in harsh process environments. It is ideally suited to in situ analysis, particularly for measurements in environments involving changing pressure or temperature.

It can operate with process pressures up to 20 bar absolute and process temperature up to 1500°C, has a fast response (from 1 to 20 seconds), and is interference-free for most applications.

The TruePeak analyser operates by measuring the amount of a laser light that is absorbed as it travels through the gas being measured. Involving no sensor contact with the process and no moving parts, it leads to a high MTBF and hence a low cost of ownership. It offers a range of flexible installation options, and features on-board diagnostics. Using a tunable diode laser as a monochromatic light source offers the benefits of sensitivity, selectivity to resolve single absorption lines, and power - to overcome the effects of optically thick environments with high particulate loading.

The new instrument is one of the most robust process analysers available. In addition to operating in conditions of high temperature or pressure, it can be used under difficult conditions including environments involving corrosive, aggressive and high particulate content materials.

The TruePeak TDL analyser forms a complementary solution to Yokogawa's ZR Zirconia oxygen analyser, and measures oxygen (O₂) with process temperatures as high as 1500°C and pressures as high as 20 bar absolute. Measurement span is typically between 1% and 100% oxygen.

Carbon monoxide (CO), from low ppm detection limits to percentage levels, and carbon dioxide (CO₂) can also be measured at process temperatures of up to 1500°C.

The analyser can also be used for measuring parts per million moisture content in corrosive and aggressive process streams including chlorine and hydrocarbons.

The ability of the new instrument to carry out accurate online process measurements makes it ideally suited to applications such as combustion control, where it can be used to optimise the combustion process by measuring excess oxygen and carbon monoxide on a precise and continuous basis. It also allows carbon monoxide to be accurately measured on a continuous basis at low ppm levels so that air fuel ratios can be precisely and continually optimised.

Other potential applications include the monitoring of carbon monoxide, methane and moisture to enable burner flame-out and process tube leaks to be identified; the measurement of oxygen on flare lines, alkylation units and

gas plants; the monitoring of carbon monoxide and oxygen on fluid catalytic cracking units for safety and catalyst regeneration; or the detection of low ppm concentrations of water in hydrocarbons in catalytic reforming processes.

The TruePeak analyser is a compact stand-alone unit with a built-in 4 x 20 vacuum fluorescent display for scrolling information and a 7-inch colour screen with keypad. The instrument offers a range of interfaces including Ethernet, USB and wired or wireless PDA communication for safe or hazardous areas. The instrument includes three configurable 4-20 mA outputs, two 4-20 mA in case of temperature and pressure compensation, and relay outputs including warning/fault relays and valve control.

The analyser is CE marked and ATEX approved for Zone 1 or 2 installations with purge system.

The new TruePeak tunable diode laser (TDL) analyser is manufactured by Analytical Specialties Inc, and has been tested in harsh conditions by Dow Chemicals.

circle pin. 53

NEW

GASSONIC SURVEYOR



WHY ULTRASONIC GAS LEAK DETECTION?

In oil/gas installations, one of the key focus areas of the F&G safety system is response time. Fast response means that action can be taken to prevent catastrophic situations from escalating. Fast response may thus improve the overall hazard management and it may prevent material damages, loss of production, damage to the environment and the loss of human life.

Gassonic's ultrasonic gas leak detection technology detects gas leaks instantly without having to wait for an explosive gas cloud to build up and physically come into contact with the sensor.

The robust microphone technology ensures minimal maintenance and continuous operation even in harsh environmental conditions. Gassonic worldwide installations include remote and extreme locations such as Middle Eastern deserts and arctic conditions in Russia and Kazakhstan.

The development of the Gassonic Surveyor is based on Gassonic's more than 10 years of experience in manufacturing and marketing fixed ultrasonic gas leak detectors.

Gassonic A/S has trained and experienced engineers that may assist customers during pre-engineering and commissioning to optimize the performance of the ultrasonic gas leak detection system.

THE GASSONIC SURVEYOR

Robust and proven stainless steel microphone to ensure instant gas leak detection

Wide detection coverage up to 20 metres in radius

Visual LED indication of detector status

Wide dynamic range (44-104 dB)

Standard 4-20 mA analogue output

EExi, intrinsically safe

Can be tested and calibrated with the Gassonic 1701 Portable Test Unit

Retrofittable with Gassonic MM0100 installations

● ● circle pin. 54



GASSONIC

Tel. +45 44 700 910 · www.gassonic.com

New Kinematic Viscosity 12 litres bath (TV12)



Tamson Instruments (The Netherlands) will launch a new kinematic viscosity bath. The bath cover has 4 holes with a diameter of 51mm to accommodate glass capillaries in their supports.

The Tamson baths are specially designed for tests that require ultra precise temperature control, or processes that need to be followed visually.

Examples are viscosity, thermometer calibration, crystal growing, density and reaction rate measurement.

The TV12 is based on Tamson's latest technology. The fully ASTM D445 bath offers unique figures for temperature stability and overall dimensions.

Tamson has put a lot of effort in even improving the bath stability of their well-known quality baths. Stability of less than ± 0.005 K can be achieved while using only 12 litres of bath content. This not only saves energy, also will help the environment due to the reduced amount of wasted bath fluid.

Another advantage is the reduced size of the bath. In practice Tamson have found that customers use several thermostatic baths running at different temperatures. Most common working temperatures are 40°C and 100°C. When placed next to each other, two TV12's only take 70 cm of your work bench.

circle pin. 55



New Bomb Calorimeter Offers High Accuracy at a Low Budget

Digital Data Systems (South Africa) introduces the new e2K Combustion (Bomb) Calorimeter to the CAL2k system range. The e2K is inexpensive, language compatible and suited to both the high and mid to low end markets. The e2K has an isothermal ("dry" static jacket) design using a waterless patented bomb vessel. The e2K is available in a variety of system options to suit different customer budgets and complies to all international standards.

The low maintenance e2K offers rapid and accurate determinations in only 3 to 5 minutes on an easy to read LCD display in English and one alternative language (for example; Chinese). The e2K has an isothermal ("dry" static jacket) design using a waterless patented bomb vessel. The unit's fast operation is due to improved software, e2K users also enjoy 0.1% RSD (Repeatability), Isothermal ("dry" static jacket) design using a waterless patented bomb vessel, intelligent operation support, ability to print results directly without using a PC, large memory for storing +1000 determinations, manual or automatic mass entry through keyboard or balance interface, full automatic calibration in BTU, CAL and MJ/Kg, high speed communication for fast data retrieval and a real-time clock with one week back up.

circle pin. 56

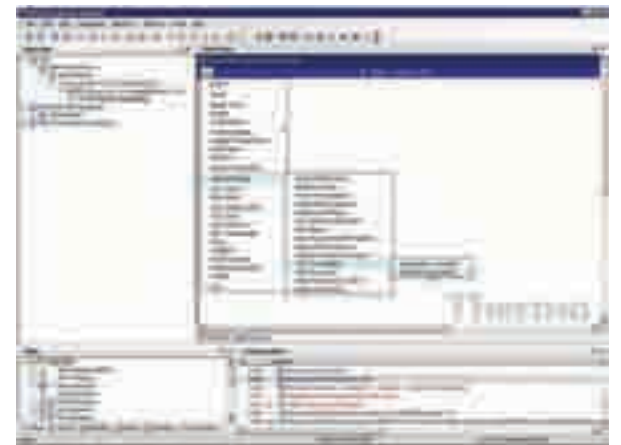
Ultra Low Sulphur in Diesel Fuel Calibration Standards

Beginning on June 1, 2006 any refiner desiring to sell diesel fuel to the United States must meet the new ultra low sulphur requirements outlined by the United States Environmental Protection Agency of 15 ppm sulphur in diesel fuel. In order to comply with the precision and accuracy criteria for approval of test methods for determining the sulphur content of motor vehicles and NRLM diesel fuel (under EPA Motor Vehicle Diesel Fuel Sec. 80.580 to Sec. 80.585 of TITLE 40 - Protection of Environment Chapter 1 - Environmental Protection Agency Part 80 - Regulation of Fuels and Fuel Additives), **DCG** (USA), a calibration standard manufacturer, has available N.I.S.T. standards to comply with the legislation.

Traceable by weight gravimetric standard kits and reference diesel sample kits. These kits are available in concentration ranges as described in EPA Sec. 80.854 and for the method approval according to EPA Sec. 80.585. In addition, DCG also has available calibration kits ranging from 1 - 20 ppm by weight sulphur in diesel fuel. Higher range calibration kits are also available. All standards in addition to being gravimetrically prepared and N.I.S.T. Traceable by weight have also been verified by one or more analytical methods.

circle pin. 57

Problem Resolution System to Optimize Software Development and Enhance Customer Support



Thermo Fisher Scientific Inc., (USA) has announced it has chosen the BMC AppSight Application Problem Resolution System to provide the highest level of support for customers using its Thermo Scientific LIMS and CDS, as well as to optimize the development of those laboratory software solutions.

With thousands of Thermo Scientific laboratory information management systems (LIMS) and chromatography data systems (CDS) licenses sold to date, Thermo Fisher is committed to delivering outstanding service to its worldwide customer base. BMC AppSight leverages patented technology that will be used to record LIMS and CDS activity in the customer environment and capture a log of user actions, systems events and more to determine - quickly - the root cause of any unexpected application behavior. This speeds triage for customer support personnel and enables timely resolution for the customer.

BMC AppSight also enables Thermo Fisher developers to optimize their work by automating the iterative, manual process of root-cause analysis that occurs throughout the software lifecycle. By reducing the time developers spend attempting to find and fix software issues - oftentimes those caused by changes in the customers' enterprise, BMC AppSight yields productivity gains of 30 percent or more for development organizations. The Thermo Fisher development team will re-invest these gains to achieve faster product release cycles, increase testing for improved quality, and to develop additional product features.

"The use of BMC AppSight technology is a win/win for us and for our customers," said Dave Champagne, vice president and general manager of informatics for Thermo Fisher. "It gives our development staff a competitive advantage as they work on next-generation solutions and it enables us to offer the best possible products and support for our customers. With BMC AppSight in place, our development staff can focus even more on product innovation to significantly speed our release schedule and improve the overall quality of each product. For our support staff and customers, BMC AppSight speeds the resolution of customer issues, particularly those that can't be recreated in our development environment, by immediately zeroing in on the root cause."

BMC AppSight, the industry-leading application problem resolution system, is helping nearly 1000 enterprises and software vendors accelerate software application delivery, increase application quality, performance and availability, and reduce application support cycles.

circle pin. 59

Select Applikon Analytical for Robust and Accurate On-Line Analysis in Petro- and Chemical Industries

Petro Industry:

- TAN/TBN
- Water Content
- Bromine Number/Index

Chemical Industry:

- Acidity/Alkalinity
- Water Content
- Molar Ratio
- Peroxide
- Calcium & Magnesium in Brine
- TBC in Styrene

Waste / Recycle Streams:

- P & M number
- Ammonia
- Sulfides
- Fluoride
- COD
- (Total) Nitrogen
- (Total) Cyanide, Phenol
- (Heavy) metals



Applikon Analytical On-Line Analyzers

Analytical methods are conducted according to official standards (**DIN, ISO, ASTM**). Applikon's diverse sensing techniques (titration, colorimetry, ionchromatography and voltammetry) accomplish a wide measuring range spanning from micrograms per liter to percent levels.

For more information and many more applications:



Applikon Analytical BV

On-Line Analyzer Division • Phone: +31-10- 298 35 55

www.applikon-analyzers.com

circle pin. 58

Petrochemicals Volatile Samples Toxic Substances

Fast and automated 4-decimal place density measurement

DMA 4500 is the most advanced density meter for quality control applications. Combined with a sample changer, it provides fully automatic filling, cleaning and drying routines even for highly viscous petrochemicals.

circle pin. 60

Fuels | Engine Oils Lubricants

The new standard for viscometry: ASTM D7042

SVM 3000 is designed to measure the viscosity and density of petroleum products in the viscosity range from less than 1 to 20 000 mm²/s.

circle pin. 61

Bitumen and Asphalt AASHTO/SHRP Specifications TP5

The leading instrument for asphalt testing

SmartPave is a Dynamic Shear Rheometer (DSR) combined with a completely new and unique Peltier heating system. SmartPave incorporates new and innovative features that take asphalt testing to previously unattained levels of accuracy, comfort, and ease of use.

circle pin. 62

Lubrication Oil | Fuels

Modular platform system for microwave sample preparation

Multiwave 3000 is designed for maximum productivity and highest decomposition quality for a wide selection of samples which decompose under pressures up to 80 bar and temperatures up to 300 °C simultaneously.

Ingenious sensor and safety technologies and a unique cooling system guarantee safe and complete digestion of even difficult samples in a fraction of the time required by conventional techniques.

circle pin. 63

Trace Elements in Oil

The ultimate wet digestion system

The High Pressure Asher HPA-S is the reference instrument for wet-chemical pressure decomposition. It enables safe and accurate decomposition in hermetically sealed reaction vessels made of quartz or glassy carbon. Uniform heating and exact temperature control up to 320 °C at a pressure of 130 bar guarantee total mineralization of organic samples at the highest level of reproducibility.

circle pin. 64

Mineral Oils | Diesel Oil | Petrol

Intrinsically safe and portable density meter ideally suited for QC work in the field

DMA 35N Ex Petrol is ideal for QC checks in filling and loading stations, tankers, refineries and storage sites. It is protected by a special housing which is resistant to petrol and organic solvents.

circle pin. 65

Petrochemical Distillation Residues Crude Oil | Bitumen | LPG

Density measurement at sample pressures up to 1400 bar (20,300 psi) and temperatures up to 200 °C (392 °F)

The high pressure cells DMA HP and DMA HPM handle both gaseous and highly viscous samples. The extremely accurate nature of the oscillating U-tube principle, developed by Anton Paar, provides reliable, correct and repeatable measuring results under extreme conditions.

circle pin. 66

Blending Applications Fiscal Metering

Process density meters are ideal for highly accurate online metering of petroleum products

Evaluation units calculate the true density, temperature and all API values according to ASTM D1250. Anton Paar process density meters are used in the following applications:

- Storage facilities
- Refineries: crude oil, intermediate and end products,
- Concentration of chemicals: HCl, H₂SO₄, NaOH, etc.
- Blending applications
- Fiscal metering / custody transfer
- Interface recognition, product identification
- Allocation metering

Norm: ASTM D1250, CE, ATEX, PTB and BEV accreditation for fiscal measurement in Germany and Austria.

circle pin. 67



Curiosity builds
on responsibility



Instruments for:

Density and concentration
measurement Rheometry and
Viscometry Sample preparation
Microwave synthesis Colloid
science X-ray structure analysis

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info@anton-paar.com
www.anton-paar.com

circle pin. 68

New Benchmark in Distillation Testing



PAC (USA) just introduced its new distillation analyser. Eighty years combined experience of the companies Walter Herzog and ISL in designing and manufacturing automatic distillation equipment, directed PAC to the development of the most revolutionary automated distillation analyser ever built.

OptiDist™ is the State-of-the-Art Optimal Solution for performing atmospheric distillation offering highest precision and ease of use.

Only the OptiDist™ enables truly "one button" straightforward operation. The easy to use distillation analyser with advanced MMI features contributes to a trouble-free operation requiring less operator expertise.

Without preliminary trials and manual adjustment the operator selects the test method and starts the distillation by just pressing the Start button.

The OptiDist™ automatically sets the optimal distillation conditions for any sample through the unique heating optimizer technology. It delivers up to 2 times better precision for all common distillation samples. No more precious time loss for repeating tests, you get perfect results from the first run even for "unknown" samples!

The optimizer technology assures perfect repeatability of distillation conditions without a compromise on safety. The optimized heating protects flask material from critical overheating, improves flask life-time and prevents from potential fire. The operator also benefits from the environmental-friendly design by the drastically reduced VOC emission.

The versatile design enables multi-methods and non-standard capability and can easily be adapted for different applications. The testing and results are in full compliance with all distillation methods. Either standalone or networked, you can start any product group without unit reconditioning and have a flexible and customized test report with enhanced communication features to LIMS, any printer or a centralized database on a PC with HLIS or ALAN software.

Using the small OptiDist™ foot print allows you to save expensive laboratory space and reduce installation, operational and maintenance costs.

More Features are: Maximized throughput by minimizing test turnaround time and having no downtime between consecutive tests, Optimal reliability through merging over 80 years of experience of the companies ISL & Walter Herzog and LIMS Communication available.

circle pin. 69

Your instruments are only as good as the standards you use to calibrate.

DCG is a leader in calibration standards for consistency, precision and reliability. Our standards are verified by at minimum one analytical method and are NIST traceable.

- Ultra-low Sulfur in Diesel fuel calibration standards
- Sulfur in Gasoline, Isooctane & Mineral Oil calibration kits
- Sulfur EPA qualification kits
- Sulfur in LPG & Gases
- Biodiesel Sulfur standards
- Custom Standards upon request

281.648.1894
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www.dcgpartnership.com



circle pin. 70

Intertek Commercial Laboratory Standardises on LIMS Solutions

Thermo Fisher Scientific Inc., (UK) announced that Intertek, a leading global provider of quality and safety services, has selected SampleManager LIMS™ as its corporate standard to manage laboratory data in the laboratories of the Intertek Oil Chemical and Agri Division (Caleb Brett).

With its global headquarters in Houston, Intertek Oil Chemical and Agri division provides contract testing services to a range of industries from its analytical testing laboratories worldwide. SampleManager LIMS™, a Thermo Scientific laboratory information management system (LIMS), was selected to replace an existing commercial system, as well as a home-grown LIMS and manual processes.

"Intertek selected SampleManager ultimately because it will benefit our own internal data-sharing and enhance our end-service to our customers. The system offers a majority of the functionality that Intertek requires, with the least amount of customization compared to other solutions we evaluated,"

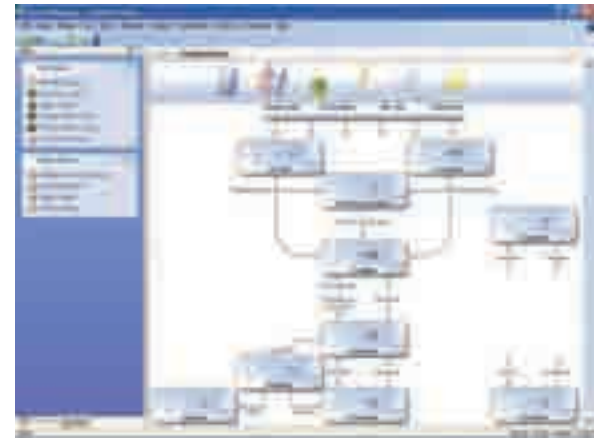
said Darryl Jesionowski, Intertek Oil Chemical and Agri General Manager of Laboratories, Americas, and LIMS project manager. "We look forward to creating one virtual lab with this implementation, using a central server to connect all our Americas laboratories in real-time for access to data, no matter where it is entered."

As the leading provider of commercial laboratory services globally, Intertek handles high volumes of samples requiring rapid turnaround and accurate results for its customers, who range from world's largest oil companies to local service companies and operate across the commodities sector. A standardized SampleManager deployment integrates the many Intertek Oil Chemical and Agri laboratories in real-time for Intertek users and customers alike to access data.

Jesionowski explained that, previously, time and human resources were required to transfer data back and forth between laboratories and customers. "With SampleManager, data will automatically be available," he said. Additionally, Intertek benefits from SampleManager's thin-client Web interface, which enables remote users and customers to easily access data.

Intertek Oil Chemical and Agri, which piloted SampleManager in one of its larger laboratories, plans to deploy the LIMS across more than 90 percent of its Americas-based laboratories by 2008, and transition out the commercial LIMS now used independently in six laboratories by the end of 2007. Intertek's long-term strategy is to deploy SampleManager and other Thermo Scientific LIMS and chromatography data and spectroscopy software across Intertek Oil Chemical & Agri locations internationally, according to Jesionowski.

"SampleManager is an ideal solution for Intertek," said Dave Champagne, vice president and general manager of informatics at Thermo Fisher. "Our six-month pilot demonstrated that we not only had the technology, but also the domain expertise and services, to meet their needs now and as they evolve."



circle pin. 71

Easy, On-Site Measurement of Hydrocarbon (Oil/Grease) Concentration in Water in less than 15 Minutes



Determining the total hydrocarbon level is a problem that faces numerous industries today to ensure compliance with governmental permit requirements for discharge of wastewater. In order to ensure compliance with these regulations and avoid fines for exceeding permit discharge levels, more frequent wastewater measurements are necessary to determine the total hydrocarbon concentration level. **Wilks Enterprise, Inc.** (USA) manufactures portable infrared analysers that have been specifically designed for easy, on-site measurement of the hydrocarbon (oil/grease) concentration level in water.

Using either the Infracal™ TOG/TPH Analyser, Model HATR-T2, or the Model CVH – depending on the solvent selected for the extraction process – on-site determinations of the total hydrocarbon (oil/grease) concentration level in the wastewater can be easily and accurately determined in 10-15 minutes – including extraction process. Measurement data obtained with the Model HATR-T2 will correlate to EPA Method 1664 and with the Model CVH to the new ASTM Method D 7066-04. Currently, there are upwards of 1,400 of these analysers in worldwide operation – many on offshore oil platforms. They Infracal TOG/TPH Analysers have become the industry standard for determining hydrocarbon (oil/grease) concentration levels in water.

circle pin. 72

A Viscometer/Rheometer-on-a-Chip

RheoSense (USA) is now introducing the VROC™; a highly accurate flow through viscometer and rheometer. This MEMS manufactured device characterises complex liquids from miniscule 50 micro litre samples in a closed system design that eliminates contamination and solvent evaporation, measures faster and more accurately, greatly facilitates online high throughput processing and production, integrates easily into larger systems.



The VROC™ is an enhanced rheology device with more capabilities than conventional instruments. The functional differences are produced by hybrid micro-fluidic and electronic interfaces that in combination with the small form factor make the VROC less vulnerable error inducing variables.

This enhanced accuracy is validated by the fact that the VROC™ easily characterises complex liquids even during high shear measurement (one of the most challenging measurements for viscometers and not possible with rheometers). If you have used conventional capillary and rotational instruments for this measurement you know the problem.

VROC™ provides the extra information because much easier to complex liquids like inks, API's, Oligomers and other which benefit from accurate characterization. With the VROC you can accurately measure 'true' viscosity, temperature and pressure with one instrument.

In summary, the VROC™ is a robust, flexible and adaptable rheology device which is perfectly designed for challenging and high throughput manufacturing applications. The accuracy and speed of the VROC technology could revolutionise high throughput manufacturing in the petroleum, biopharmaceutical and chemical industries.

circle pin. 73

Automation, Diversity and Flexibility – Attaining New Dimensions

The multi EA 3100 represents a new generation of elemental analysis systems for determining carbon, sulfur, nitrogen and chlorine content. It is outstandingly well suited for the analysis of element contents from the ultra-trace through to the mass percent range. The hitherto unattained diversity of modules for sampling and detection, which offers optimal adaption to every analytic task arising, opens up new horizons in elemental analytics. This multi-matrix capable analysis system allows solids, liquids, gases and LPGs to be investigated without time-consuming hardware reconfigurations or recalibration of the measurement system. Even the most difficult matrices, such as oils, fuels, solvents, polymers, coal, liquid gases, EOX, AOX etc., can be investigated quickly and reliably.

The multi EA 3100 also excels through its simple operation, minimal maintenance requirement and premium measurement result precision.

This is ensured with the automatic monitoring of all relevant system parameters through the integrated self-check system and flame sensor technology. Thanks to its unique double furnace technology, vertical or horizontal sample insertion modes are combined in a single instrument thus saving space. This allows the user optimal adaption of the analysis system to the respective sample matrix.

Ease of operation is further enhanced through the use of the APG 3100 automatic sampler system. This autosampler is suitable for use both in vertical and horizontal modes and may be converted from a solid to a liquid sampler with a minimum of effort. The autosampler can also be fitted with a tray sensor for maximum dependability in solid mode, especially for AOX analytics.

Advantages at a glance

- "Multi Matrix" – solid, liquid and gaseous samples
- "Multi Element" – C, Cl, N, S determination
- "Multi Application" – TC, TN, TS, TX, AOX shaking and column method, EOX etc.
- "Double Furnace Technology" – vertical and horizontal modes in a single instrument
- Unrivalled measurement range – ultra-trace to mass percent
- Modular construction – also allows subsequent expansion of the analysis system to include detection and sampling systems
- Use-friendly plug-&-start connection technology for add-on modules

circle pin. 74

Unique Digestion Properties Thanks to High Radiation Density - multi N/C UV HS



High performance and low maintenance are properties which set apart the new generation of TOC instruments working on the UV-supported wet chemical digestion principle from Analytik Jena. The multi N/C UV HS – an ideal TOC instrument for ultra-pure water, drinking water, groundwater and low-particle wastewater. The extreme performance of the technique is achieved through the use of two different wavelengths. In addition to conventional UV radiation at 254 nm, a highly efficient wavelength of 185 nm is used for sample digestion.

The sample to be analysed is located in a special reactor from Analytik Jena, which is directly surrounded by the relevant radiation source. This achieves a very high radiation density and therefore very high digestion of the contents of relevance to TOC. The optional addition of an oxidation agent alongside the "normal" UV radiation serves to further optimise digestion, especially of highly-polluted samples.

The user is guaranteed a high level of cost-effectiveness thanks to the low maintenance requirement and long service life of the UV lamp is achieved with special reaction engineering. The troublesome formation of ozone is safely avoided through the use of nitrogen as the carrier gas.

Analytik Jena's multi N/C UV HS can be used for the most varied applications as a result of its flexibly variable sample volumes (0.5 ml – 20 ml) and its special multi-channel NDIR detector. The system can also be equipped with the appropriate sampler and a high temperature module depending on the type of application.

circle pin. 75

analytikjena

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- Innovative technology
- Durability

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- Molecular Spectroscopy: **UV VIS, NIR**
- Elemental Analysis: **C, N, S, Cl**
- Sum Parameters: **TOX, TOC, TN**

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circle pin. 76

A New Fast, More Accurate On-line Physical Distillation Technique

Since **PAC** (USA) introduced the Micro Distillation PMD 110 instrument in the lab, the PMD 110 has been successful. Based on the similar technology, PAC / PSPI now introduces the MicroDist™ analyser which provides a complete distillation run and test report within 10 minutes using only 10 ml of sample. It employs leading research, the most advanced technology and highest quality design, enabling quick, reliable distillation characteristics under atmospheric pressure comparable to ASTM D86. The MicroDist™ on-line analyser is now performing at a European refinery.



An ASTM inter-laboratory study included the laboratory Micro Distillation Method and ASTM Test Method D 86. The summary of the research report presented at the June 2006 ASTM meeting, indicated that the Micro Method appears to exhibit better or have comparable precision to D86 and would be a suitable alternative for use in distillation at atmospheric pressure. The apparent advantages of this method are the short time required for the test and small sample volume, as well as the much smaller overall size of the apparatus. The on-line PAC / PSPI MicroDist™ analyser should exhibit comparable repeatability and reproducibility since its design is based on a similar concept.

The analyser has preventative maintenance features built in that insure a consistent sample supply and volume. It can automatically control the level of the coking in the distillation flask and determine the necessary periodicity of the regeneration cycle.

The analyser will perform a preventive regeneration cycle if coking occurs. The duration of the regeneration procedure is less than 10 minutes and it does not require the intervention of the maintenance staff. Currently, more than 1500 sampling tests have been run without any need of regeneration of the cell on the product.

The new PAC online MicroDist™ analyser can achieve the result quicker than traditional methods and correlates directly to D86, using a smaller sample amount, providing better accuracy, and changes in blends do not affect the accuracy. When compared to the other technique, the MicroDist™ analyser is more cost effective for a single point analysis.

circle pin. 77

Viscosity Sensor

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- Know the condition of your oil real time!
- Reduce and minimize waste for better monitoring
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circle pin. 78



GC/MS Range Expanded to Meet Customer Needs

PerkinElmer, Inc. (USA) have announced the introduction of the Clarus® 560 D Gas Chromatograph/Mass Spectrometer (GC/MS) to offer another option for lower-volume laboratories' routine application needs. The Clarus 560 D GC/MS combines the diffusion-pump capabilities currently on the high-end Clarus 600 D MS with the robust Clarus 500 GC enabling low-throughput laboratories to conduct reliable, cost-effective analyses.

"The Clarus 560 D GC/MS combines two highly effective analytical tools to help our customers with standard applications while being sensitive to customers' budget requirements," said Eric Ziegler, chromatography business unit manager for PerkinElmer Life and Analytical Sciences.

"It offers increased productivity through state-of-the-art electronics, the fastest scanning rates to yield the most accurate data, the widest mass range and the latest in reporting capabilities for easy environmental compliance." Ziegler added that the instrument also includes the most robust, flexible GC autosampler, an intuitive touch-screen interface and dual channels for additional application work, while maintaining a compact footprint for minimal bench space.

circle pin. 79

Nano-Torque & Nano-Strain Boosts Rheological Measurement Control and Analysis

The new Nova Rheometer from **ATS RheoSystems** (USA) features a unique "Net-Zero" bias bearing system. This null balance system allows for Nano-Torque and Nano-Strain measurement control and analysis.

Also featured is an innovative, low inertia drag cup motor utilizing novel "Feed Forward" strain and speed control. The torque range is from 3 nNm to 200 mNm. It is possible to extend this to 1 nNm on the low end and 230 mNm at the high end for certain test parameters. The Nova's strain resolution is 0.01 μ rad.

Additional standard features include "Auto-Detect" measuring systems, video & image software, and high performance open-source instrument control software.

Also featured are patented differential pressure normal force sensor, a camera viewer, ethernet communications, high-speed USB port and RheoExplorer V6 Software.

circle pin. 80



New EZ-Lock Spindle Coupling System Improves Viscosity Testing Speed and Efficiency

Brookfield Engineering (USA) introduces the new EZ-Lock Spindle Coupling System for retrofit to standard digital Viscometers and Rheometers. The new EZ-Lock System was designed to improve both speed and convenience when testing viscosity.

The first step is to attach the EZ-Lock Spindle Coupling to a spindle (see inset on right). Then slide the spring-loaded knurled sleeve up, insert the spindle and slide the sleeve back down.

With the new EZ-Lock Spindle Coupling System, technicians can quickly and easily attach spindles in busy laboratory environments, improving productivity. The EZ-Lock System also helps protect the pivot point and jewel and eliminates the chance of cross threading.

The EZ-Lock System can be retrofitted to many existing Brookfield Viscometers and Rheometers, including the following models: DV-I+, DV-I Prime, DV-II+, DV-II+ Pro, DV-II+ Programmable, DV-III+ and DV-III Ultra. Additional EZ-Lock Spindle Couplings are also available from Brookfield.

circle pin. 81

Informatics Offering Extend into Colombia



Thermo Fisher Scientific Inc., (USA) has established a new partnership with Bogota-based Integrador de Soluciones Technologicas Ltda. (IST Internacional) to open a new sales centre for Thermo Scientific informatics solutions in Colombia and Central America. IST Internacional aims to provide local customers with reliable and professional sales services based on a thorough knowledge of their business requirements acquired through timely and frequent communication in the local language.

The new partnership will support sales activities in Colombia for the complete Thermo Scientific informatics product range, placing a special focus on Laboratory Information Management Systems (LIMS) and Chromatography Data Systems (CDS). Dedicated sales experts will

target a number of industries which are strong in Colombia, and which Thermo Fisher has long served, including petrochemical, chemical, mining, cement, mineral, metal, environmental, water treatment and pulp and paper.

Oliver Faidi Cortés, Director of Latin America and Caribbean sales for informatics at Thermo Fisher Scientific, explains: "We have served this region for more than 20 years, helping customers in the process industries to improve production performance and quality while reducing operational costs. Working with IST on a local level, we are well-positioned to help Colombian customers reduce risk and total cost of ownership as they deploy informatics solutions to improve their operations."

"IST Internacional has also been serving the Colombian process industry for more than 20 years," Faidi Cortés continued. "As a result, the company has a deep and comprehensive knowledge of the industry and the operative challenges it faces, and they provide local knowledge of our software solutions. As our authorized partner in Colombia, IST Internacional is perfectly positioned to extend our sales activity in the country. The partnership demonstrates and further strengthens our dedicated commitment to our customers in Latin America and the Caribbean."

Fabian Nino, General Manager at IST Internacional, adds: "We entered this collaboration having realized that Thermo Fisher Scientific shares our vision for increased investment in Colombia in terms of sales, technical support services, and new product development to adapt to the local needs."

circle pin. 82



Bench-top WDXRF Sulphur Analyser for Ultra Low Sulphur Fuel

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 Tel: +81 72 693 7990 Fax: +81 72 693 6746 E-mail: rdkkikak@rigaku.co.jp Web: www.rigaku.com

Recent developments in ultra low sulphur diesel (ULSD) fuel has improved fuel efficiency and created cleaner exhaust gas. Refiners in USA are required to produce 80% of their annual output as ultra low sulphur diesel (ULSD) fuel oil, with a maximum of 15 ppm of sulphur from 2006. In addition, the regulations of ultra low sulphur fuel for the sulphur content are moving ahead in all other nations. The sulphur content in the regulations will be less than 10 ppm from 2007 in Japan and from 2009 in the EU, and so on.

Thus, there is a strong possibility that these regulations will become even more severe in the near future and it is forecasted that levels will be lowered to 5 ppm.

For compliance verification, X-ray fluorescence (XRF) spectrometry is the definitive analysis tool for use at distribution terminals, refineries, as well as mobile or stationary testing laboratories.

Introduction to the equipment



Fig1. Rigaku/Mini-Z Sulphur Analyser

The Mini-Z Sulphur Analyser is the bench-top type, wavelength dispersive X-ray fluorescence analyser dedicated to sulphur analysis. To make the equipment operational, a standard AC power electric outlet and a helium gas container are the only requirements.

It differs from both the combustion ultraviolet fluorescence method and the oxidative microcoulometry method. The analyser can analyze infinitesimal amounts of sulphur, and measurements are not just limited to either organic or inorganic sulphur compounds. The total sulphur content in all sulphur compounds are detected during analysis.

Obtaining measurements does not require any special sample preparation for analysis - the sample oil is poured into the container which is then placed onto the turntable. The user then simply pushes the 'start' button and the measurement begins automatically. Also, stable measurements of highly volatile oils, such as gasoline, can be achieved with low power X-ray irradiation of samples with Mini-Z Sulphur Analyser compared to general purpose large XRF instruments.



Fig. 2 Operation from the sample loading to starting measurement

Features

The Mini-Z Sulphur Analyser is a spectrometer especially sensitive to sulphur. Despite having a relatively low X-ray power of 40 W, analysis from infinitesimal to high concentration levels can be performed with high degree of sensitivity and repeatability. The quantitative range is from 1 ppm to 4 mass% and it is possible to measure a wide range of oil samples.

Also, the special sensitive spectrometer for sulphur has a mechanism for measuring both S-K α peak intensity and the background intensity which complies to ASTM-D2622, ISO

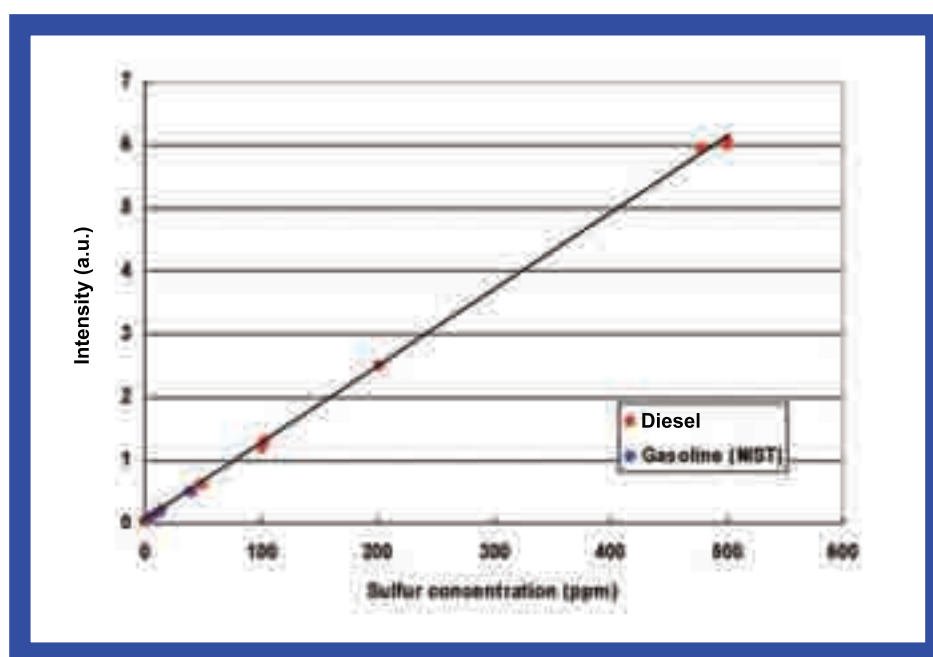


Fig 3. Calibration curve of gasoline and diesel

20884 and JIS K2541-7.

Since the background is low and the performance with signal to background ratio is excellent, a single calibration curve covers for the analysis of different kinds of oils.

Precision data

Stability tests of short-term repeatability and long-term reproducibility for 20 days were carried out according to the ISO 20884 testing method.

Repeatability, demonstrated by successive measurements (Table 1), was shown to be \leq 0.25 ppm irrespective of sampling technique. Illustrated in fig.4, results demonstrated better than 1 ppm precision for the 5 ppm standard at the 95 % confidence interval. Performance was shown to exceed ISO 20884 and ASTM D-2622 specifications and, thus, be ideal for ULSD validation measurements.

Table 1. Result of long-term reproducibility for ultra-low sulphur diesel standards

	Short-term Repeatability (1 σ ppm)	Short-term Repeatability (1 σ ppm)	Long-term Repeatability (1 σ ppm)
Sulphur (ppm)	10 successive measurements (back-to-back)	10 successive measurements (resampled)	10 successive measurements (back-to-back) per day for 20 days
1	0.12	0.15	0.24
5	0.18	0.19	0.23
10	0.24	0.25	0.25
15	0.26	0.36	0.3
50	0.38	0.5	0.56
100	0.85	0.56	0.77
500	1.88	2.64	1.25

Comparison with the related products

Rigaku spectrometer lineup has general purpose X-ray fluorescence spectrometers with the tube below optics which are suitable for oil analysis in addition to the Mini-Z Sulphur Analyser.

The typical spectrometers are the Primini, a bench-top system, and the large-sized, highly efficient general purpose machine ZSX Primus.

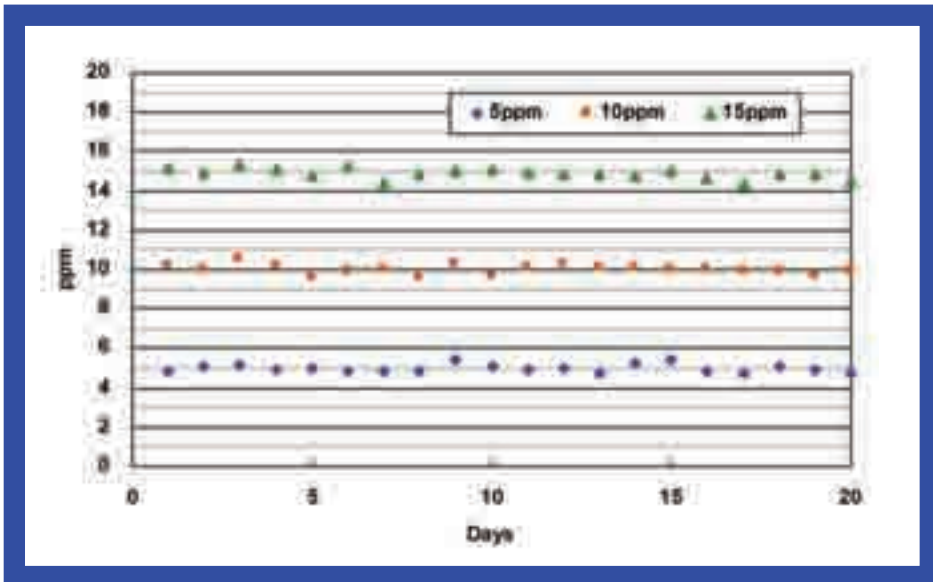


Fig.4. Plot of long-term reproducibility for 5 ppm, 10 ppm, and 15 ppm ultra-low sulphur diesel standards.

Table 2. Typical use and performance of X-ray analyser

	Mini-Z Sulphur Analyser	Primini (Sequential Type)	ZSX Primus (Sequential Type)
Analysis Element	^{16}S	^9F - ^{92}U	^4Be - ^{92}U
Sample	Fuel Oil	Fuel Oil, Catalyst	Fuel Oil, Catalyst
L.L.D.(Sulphur)	< 0.3 ppm	1.5 ppm	0.3 ppm
Power(X-Ray)	40 W	50 W	Max 4k W



Fig.5 Rigaku/Primini



Fig.6 Rigaku/ZSX Primus

Since the general purpose spectrometers can analyze elements other than sulphur, they can be applied to the analysis of impurity elements in oils and the analysis of catalyst.

Conclusion

Mini-Z Sulphur Analyser is a dedicated sulphur in oil analyser and is in compliance with ASTM-D2622, ISO 20884 and JIS K 2541-7. L.L.D. performance is less than 0.3 ppm and therefore the 5 ppm regulation level can be more than adequately measured. The day to day reliability of measurements is very high and sample preparation only involves pouring of the sample oil into the container. Measurements are obtained by placing the sample container on the turntable and simply pushing the start button, making this analytical tool ideally suited for routine-analysis.

XRF and XRD Spectrometers Address Environmental Applications Needs



Thermo Fisher Scientific (USA) announces that its innovative series of X-ray Fluorescence (XRF) and X-ray powder Diffraction (XRD) spectrometers is ideally suited for a diverse range of environmental applications.

Designed for accurate and reliable analysis of drinking water, waste water, soils, sludge, air monitoring and spent materials such as paints, plastics and tires, these novel spectrometers are designed for use in manufacturing plants and contract laboratories as well as in the water, energy, waste disposal and recycling industries. Thermo has published several application notes to demonstrate the unique analytical capabilities of its XRF and XRD spectrometers including Thermo's ARL QUANT'X, ARL X'TRA and ARL ADVANT'X which are all specifically suited to the environmental market. These application notes are available to download free-of-charge from the Thermo Fisher website.

Thermo's comprehensive suite of WDXRF (Wavelength Dispersive X-ray Fluorescence), EDXRF (Energy Dispersive X-ray Fluorescence) and XRD spectrometers employs fast multi-element techniques. Achieving precise and repeatable results covering all elements and respective ranges, they also provide detection limits in the ppm range.

Additionally, the instruments are particularly easy to install and use while requiring very little or no sample preparation and offer flexible sample handling. The WDXRF and the EDXRF techniques, designed for use with Thermo's ARL ADVANT'X and ARL QUANT'X, are ideally suited to the analysis of waste oils, plastics, paints and contaminated soils whereas the ARL X'TRA spectrometers used with XRD are mainly used for analyzing particulates in air such as asbestos and quartz. Both XRF and XRD techniques are capable of handling totally unknown samples thanks to the powerful "standard-less" analysis packages such as UniQuant® and SiroQuant®.

This series of spectrometers has also been designed to help scientists comply with strict European and US regulations, including the RoHS/WEEE directives. These RoHS/WEEE regulations have been introduced to reduce the damage to both the environment in terms of pollution as well as to human health from occupational exposure and exposure following disposal.

circle pin. 83



New Low-Cost Benchtop Analyser Offers Improved Resolution and Detection Limits

Jordan Valley's (USA) new low-cost EX-Cite will replace the EX-310, the previous base model energy dispersive x-ray fluorescence (EDXRF) benchtop analyser. The EX-Cite EDXRF benchtop spectrometer has many improved features over the EX-310, including an integrated computer system, a smaller footprint, vastly improved resolution and corresponding improved detection limits.

With newly developed improvements to proven PIN diode technology, the 35kV, 9 watt EX-Cite produces superior sensitivity with improved peak-to-background ratios, high count throughputs and superior resolution as compared to earlier PIN diode instruments. At the same time, the high-voltage, high-powered x-ray source delivers traditional laboratory instrument performance in a compact, self-contained package that fits conveniently on a traditional laboratory bench. The side window x-ray tube and advanced optical design permit extremely close

coupling to the sample. The EX-Cite provides non-destructive qualitative and quantitative determination of Sodium through Uranium. It can be easily customized for several different industries and applications.

Laura Oelofse, Vice President of Sales and Marketing at Jordan Valley said, "The EX-Cite is a natural evolution in Jordan Valley's quest to provide low-priced XRF analysis at the best possible price-performance ratio."

The integrated computer system combined with the robust design make the instrument ideal for a mobile laboratory. It meets MIL-810E specifications for shock testing.

For more powerful performance, Jordan Valley's new 50kV, 50 watt EX-Calibur includes a fully integrated computer system and provides full qualitative, semiquantitative and quantitative analytical capabilities. This liquid nitrogen free EDXRF spectrometer achieves similar resolution to a traditional LN2 cooled Si(Li) detector, while eliminating the cost and inconvenience associated with liquid nitrogen.

circle pin. 84

Screening of Ultra-low Sulphur Diesel



The determination of sulphur in fuels is one of the most important analytical applications in the petroleum oil industry. As one of the worldwide leading manufacturers of analytical instruments for energy dispersive X-ray

fluorescence analysis (EDXRF), **Spectro** (Germany) has prepared a new application for the SPECTRO PHOENIX II EDXRF analyser for this analytical task. This inexpensive compact instrument has been designed for utilisation in refineries, pipelines, terminals, tank farms and distribution centres and is especially easy to operate. In production control and sorting control of sulphur petroleum oils, the instrument enables sulphur determination in accordance with ASTM D4294, IP 336, IP 496, ISO 8754 and ISO 20847.

Spectro has prepared an application report about the new application with detailed information as to the analytical procedure and measurement results. The PHOENIX II design is ideal for the screening, identification and verification of ULSD (ultra-low sulphur diesel) at peripheral test points. The report can be requested at www.spectro.com.

As documented in the report, the new application is thoroughly tailored to simple use. This begins with the simple sample preparation. Due to its polarised excitation source and rugged proportional counter detector, the Spectro Phoenix II achieves a very low detection limit for sulphur while maintaining high precision for the measurement. In addition to ULSD the Phoenix II also measures sulphur at the higher levels in off-road diesel, aviation gasoline, kerosene, bunker fuel and crude oil, as well as the low sulphur in gasolines and road diesels. Several elements can be measured in residual oils, lube oils, waste oils and cutting fluids. This enables the application to deal with many analytical tasks in production control in the petrochemical industry.

The Phoenix II does not require an external mouse or keyboard and offers USB, VGA and Ethernet connections for networking and connecting to external devices. As a useful tool in the petroleum industry, the Phoenix II XRF system gives the operator a unique combination of simplicity, high powered X-rays, a rugged detector system and a high sample throughput, all at a very affordable price.

circle pin. 85



Beyond the Limits - Expanding the Analytical Performance of WDXRF with Novel Developments

Today's analytical scientists face more challenges in elemental analysis regarding analytical performance, ease of use and cost of ownership than ever before. Often a single instrument has to provide full analytical flexibility and performance for all applications in industry, research and development, fulfilling future demands for higher product quality and decreasing limit values for regulated elements. Bruker AXS offers the WDXRF spectrometer S8 TIGER, with its innovative, optimized X-ray optics and user interface matching these needs.

While the S8 TIGER's new high-intensity X-ray tube excites the sample even more efficiently, the combination of the tube with the shortest beam path leads to the highest possible element sensitivities. Novel analyser crystals of the "XS" series significantly improve detection limits, precision and resolution for a number of elements and specific applications. The versatile beam path and wide selection of different crystals and collimators provide advanced analytical flexibility even for the most demanding applications.

The high analytical performance of the S8 TIGER WDXRF system is made even more powerful with leading-edge analytical software and its integrated analytical intelligence. A uniquely designed XRF expert system, actively guiding users in creating methods, checking performance criteria and running evaluations, enables even inexperienced users to achieve accurate, reliable analytical results.

circle pin. 86

Total Hydrocarbon Analyzers Make Elemental Analysis of Petrochemicals as Easy as 1-2-3



At last, elemental analysis of fuels, oils, greases, lubricants, coal, coke, plastics, and oil-based combustibles is as easy as 1-2-3. Total Hydrocarbon Analyzers from Bruker AXS -- consisting of an optimized S4 EXPLORER or S4 PIONEER wavelength dispersive X-ray

fluorescence (WDXRF) spectrometer, safe liquid handling, and dedicated PETRO-QUANT solution - provide everything you need for fast, accurate, and efficient analysis of petrochemical samples.

The S4 EXPLORER and S4 PIONEER combine superior analytical performance with low cost of ownership. Able to measure sulfur of less than 300 ppb in oil, the S4 EXPLORER and S4 PIONEER can also quantify all elements from Na to U in concentrations from ppb to 100%. The S4 EXPLORER requires no compressed air, cooling water or detector gas, making its operation far less expensive than conventional ICP and AAS systems. The S4 PIONEER provides the ultimate in light element sensitivity and ultra-low measurement times for high sample throughput.

For petrochemical applications, both analyzers come with unique multilevel protection for safe liquid handling. The sample loader is equipped with color-coded cells specifically designed for liquid sample cups. Software detects the presence of a liquid, automatically selecting a helium atmosphere, loading the sample directly into the measurement position, and sealing the sample chamber to prevent spillage and contamination of spectrometer parts.

PETRO-QUANT on the S4 EXPLORER and S4 PIONEER allows you to obtain norms-compliant results with minimal training. With its universal pre-calibration, OIL-QUANT, you can run routine analyses of 26 elements with standard errors in the lowest ppm range. For analyses against international norms such as ASTM, DIN, or EN ISO, PETRO-QUANT supplies measurement methods and pre-calibrations to match your specific needs.

Save time, save money and boost your productivity with solutions uniquely tailored for your petrochemical applications. Bruker AXS' Total Hydrocarbon Analyzers produce fast, accurate, and dependable results right out of the box.

circle pin. 87

Bruker AXS

● S8 TIGER – Elemental analysis at the touch of your finger

TouchControl™

- Easy operation due to intuitive touch screen interface
- Ergonomic sample loading with trays

SampleCare™

- Fail-safe operation with automatic sample recognition
- Component protection with integrated contamination shields

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- High intensity X-ray tube
- Application optimised analyzer crystals

For more information visit www.bruker-axs.com

think forward

XRF

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5 Years of Revolutionary XRF Analysis



Innov-X Systems was founded in early 2001 to revitalise the XRF industry with a pioneering approach to portable analysers. When Innov-X delivered the world's first x-ray tube-based portable XRF, a new era in portable XRF began. We set XRF technology free to live outside the box!

We leveraged our experience and knowledge in portable application requirements; high-performance, rugged miniaturised technology; PDA/Pocket PC utilisation; and XRF methodology to engineer our high-performing portable elemental analyser from the ground up. Our universal hardware platform can be configured for hand-held, mobile, benchtop, on-line and OEM applications.

Core to the Innov-X business philosophy is our rapid response to custom application requirements. We are committed to delivering cost effective, advanced portable technology solutions to our customers - integral drivers of Innov-X product development efforts and the source of our on-going success. With thousands of our systems already being used worldwide, we are poised to meet the Portable Analytical Application Challenges of the 21st Century.

Innov-X Analysers cut across geographical boundaries for true worldwide use. Our analysers are based on a universal hardware platform for ease of configuration and installation. The PC technologies we use offer flexible software, exceptional graphical user interface (GUI), multiple languages, wireless communication, global positioning software and conventional MS Windows architecture for rapid and seamless customisation.

Our headquarters occupies 22,000ft² of space in Woburn, MA, just north of Boston. Innov-X Systems has full service offices in Europe (Netherlands) and Asia (Hong Kong). We maintain sales management, marketing and service alliances in the Middle East (Saudi Arabia) and South America (Sao Paulo). Innov-X is a privately held, profitable and growing firm with exceptional worldwide customer support.

Innov-X Systems combines Point-and-Shoot Simplicity with Pocket PC Power and Advanced Analytical Capabilities for the broad analytical range of P to U. Confirm the absence or presence of a metal. Identify elements and measure concentrations. The



Innov-X Handheld XRF performs without transporting, altering, or damaging your samples. You can even take it into the lab if you want to - dock it into a hands-free testing station for AC power and Desktop PC control.

There are few samples that haven't been analysed with an Innov-X Portable XRF!

Use it for alloys, environmental, security & law enforcement applications! Use it for specialty applications: artistic & historic works, biomedical & pharmaceuticals, bromine, catalysts, coatings & thickness, food, industrial hygiene, mining, paints, petrochemicals, polymers, process chemistry, semiconductors, wear metals, X-ray diffraction screening, and customised applications.

Join in with the thousands of Innov-X customers already solving problems and addressing issues in academia, private industry, institutions and governments. Use the Innov-X Advantage for versatile, affordable, high performance, non-destructive XRF analysis. No other portable XRF is as reliable, flexible and adaptable to so many different applications.

circle pin. 89

Innov-X Systems Environmental



Analysers for Multi-elemental Analysis of Metals in Soil, Filter Media, Dust Wipes, Thin Films, Paints & Coatings, Oils & Liquids, and Hazardous Waste Classification!

- A Field-Proven, X-ray Tube-Based System: No Radioactive Isotopes!
- Accurate Analysis of RCRA Metals & Priority Pollutant Metals in Seconds!
- Best performance on Cr of any Existing Portable XRF: LOD's of 25-45 ppm Cr in Soil Achievable!
- Provides industry-leading performance on Cr, Ti, & Ba
- Meets OSHA Methods OSA1 & OSS1 and EPA Method 6200 and NIOSH Method 7702!

In-situ Tests:

- Rapid, thorough site investigations, delineation and contamination patterns
- Confirm minimally required samples to drive investigation
- Avoid confirmatory lab testing of high-concentration samples
- Establish area contamination boundaries and depth profiles
- Test directly thorough corings for depth profiles
- Dock into convenient testing stand for bagged or liquid samples

CCA - Identify Toxin-Treated Wood Products :

- Screen recycled wood mulch, pellets & other by-products for toxic metals
- EPA compliance & label confirmation at wood treaters, lumberyards, retail centres
- Screen in-coming wood at municipal incinerators, landfills & recycling facilities
- Determine effectiveness of protective coatings & sealants from CCA & other toxins
- Test for arsenic leaching out of unlined landfills & around residential wood structures

Industrial Hygiene :

- Comply with NIOSH Method 7702 - Pb in Air Filters, OSHA Methods OSA1 & OSS1 for Pb
- Non-destructive, on-the-spot analysis of airborne metal filter media or dust wipes
- Protect workers in mining, welding, construction, fabrication, maintenance & repair, paint removal & rehabilitation
- Determine process adjustments by monitoring levels in real-time

Lead Inspection :

- Classify definitive positive/negative results for Pb in seconds
- Comply with restrictions on lead exposure during building demolition & construction
- Use in manufacturing, homes or commercial buildings

circle pin. 90

Visit us at www.innov-xsys.com

Innov-X Rhino

This brand new Alpha based ULTRA RUGGED AND WEATHERPROOF XRF handheld is equipped with a fully integrated, sealed electronics is resistant to water and dust - perfect for analyzing in the harshest environments. The Rhino has a bright color display easy to read in any light, even in direct sunlight.



circle pin. 91

Innov-X QXR High Volume Material Sorting Systems

For high-throughput, automated sorting Innov-X offers the conveyer-based QXR sorting systems. These systems operate at 20 – 100 tons/hour depending upon the material, and are designed for continuous, high feed rate material identification and sorting. Applications include:

- Alloys – upgrading stainless, zorra, copper and other heavies. Also high Cu or Zn aluminum.
- Glass.
- PVC, BFR in polymer streams.
- "Meatball" extraction (diverting copper-bearing material from ferrous streams).



circle pin. 94

Innov-X Vacuum Analyzer



Now measure Mg, Al, Si, P and 20+ other elements simultaneously in alloys, powders, ores, liquids and more

No Helium gas or compressed tanks to carry with you! No vacuum pumps to wear or attach! Just connect the miniature, battery-operated pump for 20 seconds and the internal vacuum is maintained for up to 6 hours. This vacuum option is available with either the Alpha or the brand new Rhino model.

circle pin. 95

Innov-X Mobile XRF Analysis X-50



Our newest analyzer, the X-50 offers the performance of a benchtop XRF and true portability. Weighing in at about 9 kg. the system is readily portable. It provides superior performance for alloys, environmental and mining applications, oil and fluids analysis. It is also a closed-beam system.

circle pin. 92

Innov-X SEA-Mate Oil Analyzer



In partnership with the world's largest shipping company A. P. Moller-Maersk, Innov-X has designed and manufactured the SEA-Mate line of XRF analyzers for analysis of oils, fuels and lubricants. These analyzers are designed for the marine and other heavy transportation industries and have been rigorously tested on board numerous Maersk vessels.

circle pin. 93

Analyze priority pollutant metals in soil.

Use the latest in XRF technology to test soils, alloys, filters, paints, liquids and other materials.

Benefits of the Alpha Series™ include:

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- Meets US EPA Method 6200.
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circle pin. 96

New Software to Aid RoHS Compliance

Innov-X Systems (USA) has released new software—RoHS-STAR(tm)[™]—to assist manufacturers in complying with the European Union's Restriction on Hazardous Substances (RoHS) directives*. The new RoHS-STAR(tm) software enables rapid screening of electronics systems, PC boards, plastic parts, and components for RoHS compliance.

The new software makes it possible to screen large quantities of electronics and components quickly without stopping to re-program the XRF system for each sample tested. It automatically senses and adjusts for the different types—alloy, plastic or mixed samples. Mixed samples, consisting of both plastic and alloy, can be wires and/or finished circuit boards. It uses settings, algorithms and calibrations which are best suited to the specific sample. This guarantees the best analytical results without changing analysis mode for each sample.

The "RoHS-STAR(tm)" software simplifies screening, as described by IEC protocol, with its PASS/FAIL guidelines. Alternatively, users may customise the analysis by entering their specific PASS/FAIL criteria. The screen clearly displays information for each sample, as well as indicating whether the overall sample is compliant or not.

Portable XRF is ideal as the non-destructive testing (NDT) method for RoHS screening. It is described in a Protocol published by the IEC—International Electrotechnical Commission – Advisory Committee on Environmental Aspects. Such screening allows manufacturers to segregate leaded and lead-free inventory, perform due diligence testing to verify supplier certifications, and integrate with process quality control for ISO 9000.

The simple point-and-shoot operation of Innov-X's analysers makes them ideal for on-the-spot or high-volume testing without the need for sample preparation. The ALPHA[™] Series are hand-held tube-based XRF analysers that provide fast and accurate results: Pass, Fail, Inconclusive, in addition these analysers can test a wide variety of samples such as PVC, PE, alloys, ceramics, and packaging materials. The ALPHA[™] Series can be used by non-technical operators to perform a wide set of previously difficult tasks such as detecting ppm levels of Pb, Hg, Cd, Cr, and Br in seconds and measuring odd shapes and sizes of components: wires, cables, etc

Alpha Series are capable of storing more than 20,000 legally-defensible measurements for later downloading. All source data are maintained in an onboard PDA to prevent tampering with the analytical results, and may be easily incorporated into users' PLM or quality control systems.

circle pin. 97

New Total Sulphur Analyser

Tanaka Scientific Limited (Japan) launches a new total sulphur analyser for ultra low sulphur(ULS) fuels. Model FX-700 conforms to ISO20884 and ASTM D2622 to cover 0-500mg/kg with the LOD of 1mg/kg and LOQ of 4mg/kg.

Ease of operation has been the main theme for developing this ULS fuel analyser. While the proven wavelength dispersive X-ray fluorescence(WDXRF) technology guaranteed a high level of precision, ease of operation has been sacrificed on predecessor WDXRF models available in the market, due to their multiple elemental analysis capabilities. FX-700 is dedicated to ULS fuels analysis, and thus much of the operations have been simplified. 10 membrane switches and an LCD screen provide all user interfaces with easy dialog-type operation, and results are preserved by a built-in printer.

The small footprint of merely 60cm(width) by 55cm(depth) allows for installation on a small laboratory bench. Since the X-ray source is a small air-cooled X-ray tube, the analyser is rated at only 0.5kW, and no major regulations for X-ray safety applies. (For regulations on X-ray, consult local safety authorities.) Also, the small X-ray tube is highly reliable and low cost.

circle pin. 98

Low-Cost, Compact Polarised XRF Benchtop Analyser

Spectro Analytical Instruments (Germany), a unit of Ametek, Inc. has announced the launch of the Phoenix II benchtop Polarised XRF analyser. The instrument is ideal for elemental analysis of liquids, solids and powders for measuring Mg through U.

The Phoenix II is a low-cost, benchtop XRF spectrometer with a compact footprint designed for use in the rugged environment of production process and quality control as well as in the laboratory. Its on-board PC makes use of Windows operating system along with a simple, intuitive touch-screen display, making analysis easy for non-technical operators but advanced enough for the more-experienced user as well.

The Phoenix II combines a 48kV tube and Polarised source x-rays with a rugged gas-filled proportional counter detection system, giving the PHOENIX II improved performance for the measurement of low atomic number elements such as Mg, Al and Si as well as S and Cl. The prop counter detector design yields a high x-ray count rate throughput and makes use of x-ray filters to separate the spectral peaks of elements with adjacent atomic numbers.

With its onboard computer, no external computer is needed. The Phoenix II does not require an external mouse or keyboard, yet offers USB, VGA and Ethernet connections for networking and connecting to external devices. This compact, simple to operate XRF system offers a unique combination of high powered Polarised x-rays and a high sample throughput with rugged detector at a very affordable price.

circle pin. 99

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Sindie 7039 XR
Sulfur Analyzer

The **Sindie 7039** sulfur analyzer is recognized as the most reliable bench-top analytical tool for measuring sulfur concentrations in such hydrocarbon samples as ULSD, bio-diesel, and additives.

XOS now introduces the **Sindie 7039 XR** software package, enabling users to determine sulfur concentration from 0.4 to 100,000 ppm. Just one intuitive and robust analyzer, with all the precision benefits of Monochromatic WD XRF, per ASTM D 7039.

The **XR** package is offered as either a retrofit upgrade enabling users to extend the range of their existing **Sindie 7039** bench-top analyzer, or the **XR** option can be incorporated into a new analyzer.

- One analyzer for all total sulfur analysis needs
- Dynamic range: 0.4 ppm -100,000 ppm (10 wt.%) with only two cal curves
- Test samples from ULSD, gasoline, bio-diesel and additives to fuel oil, marine fuels and crude
- Reduce maintenance cost, bench space and capital expense
- Available as software upgrade or specify as new analyzer option

Contact us to schedule a **Sindie 7039 XR** demo at your site, or for more detailed information visit us at www.xos.com.

better analysis counts

The Right Fuel Analysis



Thermo Fisher Scientific introduced recently an enhanced version of its latest wavelength dispersive XRF product, the compact ARL OPTIM'X. Its innovative goniometer - the SmartGonio™ - is now configured to cover all elements from F to U.

The ARL OPTIM'X is ideally suited for areas such as refineries or central labs in the petrochemical industries. It offers a cost effective analytical solution for dedicated applications, like:

- Sulphur analysis in petrochemical products (oils, gasoline, fuels, diesel, naphta,..) according to ISO or ASTM standard methods. The performance of the ARL OPTIM'X is such that it already complies with the most stringent regulations for S content (less than 10 ppm) that are effective since 2006!
- Pb content in gasoline according to ISO or ASTM standards
- Other traces and additives (Ca, Zn, Ba, Cl, P, etc.) in oil industry products.

circle pin. 101

Dramatically Different ICP



The recently introduced Thermo Scientific iCAP 6000 Series is the world's most compact inductively coupled plasma (ICP) spectrometer. The iCAP 6000 Series extends the company's long-standing leadership in ICP technology, offering reduced cost of ownership and unmatched performance in resolution, sensitivity and results accuracy. The iCAP 6300 and iCAP 6500 are the latest additions to the company's broad range of spectrometers designed to help laboratories carry out the most demanding analyses while maximizing productivity and profitability. Enhanced performance in quantifying trace elements in both solid and liquid samples means laboratories can achieve their analytical objectives even faster.

circle pin. 102

Total Sulfur Analysis for Biofuels



The recent ultra-low-sulfur diesel program will offer an opportunity for biodiesel as a lubricity additive and perhaps as a cetane booster as well. Thermo Fisher Scientific provides a robust, accurate and easy-to-use Total Sulfur Analyzer which gives real total sulfur content for a range of biofuels within 5 minutes. The analyzer does comply with ASTM D5453 methodology and features a long lifetime furnace and unique pulsed UV-Fluorescence detection technique which doesn't require frequent calibration.

circle pin. 103

PetroilQuant™, Ready To Run...

Petrochemical regulations are becoming stricter demanding lower levels of quantification for key elements such as sulfur (S), Pb etc.

Thermo Fisher Scientific has developed PetroilQuant™, a unique pre-calibration program to help analysts in the petrochemical and petroleum industries meet these requirements.

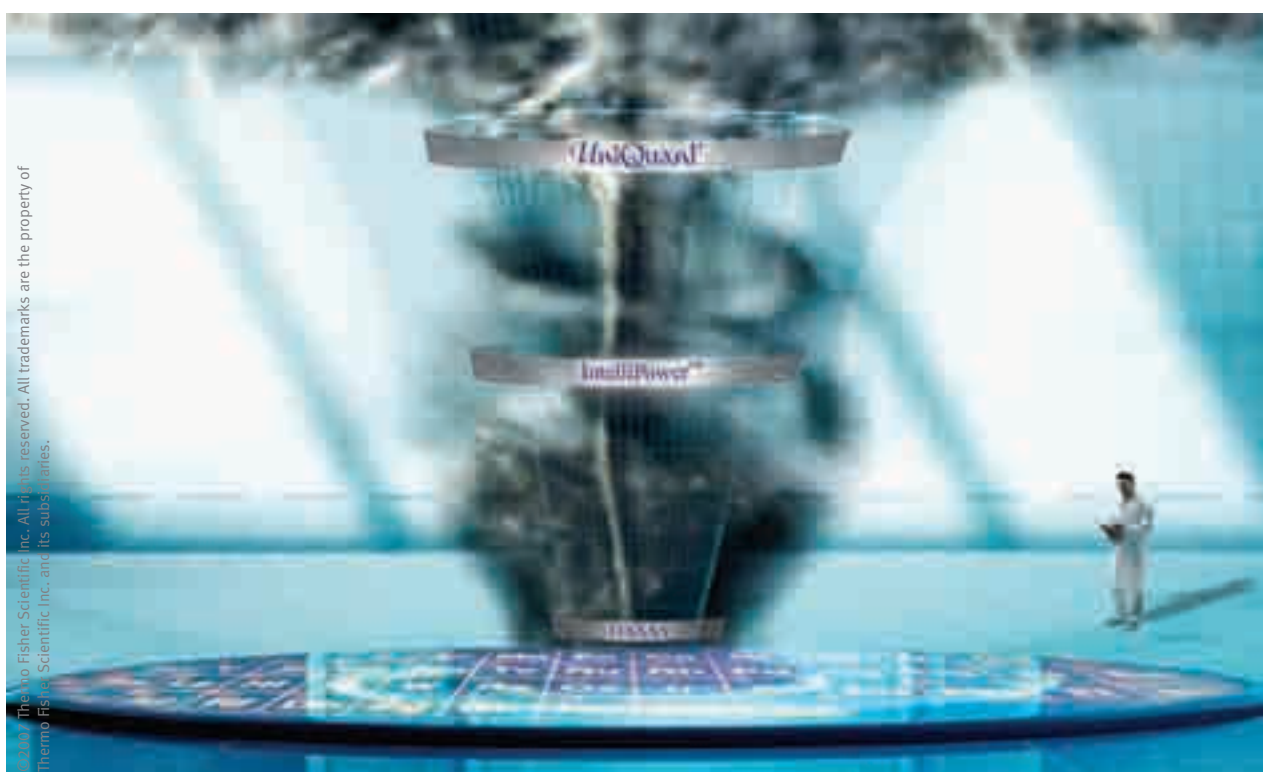
PetroilQuant is designed for use in conjunction with Thermo Scientific ARL ADVANT'X and ARL OPTIM'X X-ray spectrometers and is capable of quantifying up to 24 elements in a variety of automotive fuels, lubricants and heavy residual oils both quickly and cost-effectively.

In addition to sulfur in automotive fuels, PetroilQuant covers other elements generally needed for blending control of fresh lubricants such as Sodium (Na), Magnesium (Mg), Silicon (Si), Phosphorus (P), Chlorine (Cl), Potassium (K), Calcium (Ca), Zinc (Zn), Molybdenum (Mo), Bromine (Br) and Barium (Ba).

PetroilQuant requires no analytical expertise and provides a "ready to run" analytical package for beginners as well as advanced users of Thermo Scientific XRF instruments.



circle pin. 104



ARL ADVANT'X, IntelliPower™ and UniQuant® ...Harnessing the Power of X-ray Spectrometry

The Thermo Scientific ARL ADVANT'X Series of X-ray fluorescence spectrometers with IntelliPower can be preconfigured with the industry standard UniQuant® software module. Enabling today's demanding laboratories to harness the true power of X-ray spectrometry.

- Integrated **UniQuant®** module enables rapid, round the clock, quantitative analysis of any unknown sample type without the need for standards
- Innovative **IntelliPower** provides application focused performance, precision and sensitivity – when and where it's required and without any water cooling system
- Powerful **OXAS** software platform facilitates intuitive, automated control of every aspect of the ARL ADVANT'X Series

Harness the power of your X-ray spectrometer today. Visit www.thermo.com/advantx to receive your complimentary guide to the ARL ADVANT'X Series.

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circle pin. 106

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Complete XRF Analysis of Oil and Fuels

PANalytical (The Netherlands) has launched Oil-Trace, an innovative new package that enables complete XRF analysis of all types of fuels, oils and oil derivatives. Running under PANalytical's established SuperQ analysis software, Oil-Trace has been specifically designed to overcome the traditional challenges associated with XRF analysis of oils. By automatically correcting for dark-matrix composition as well as variations in sample density and volume, it dramatically reduces the number of calibrations normally needed for different sample types. Analysis is accurate and reliable over a wide concentration range (0-100%).

Oil-Trace is designed for use with PANalytical's high power wavelength-dispersive X-ray fluorescence (WDXRF) systems. It is a standard feature of the new Axios-Petro, and its predecessors "MagiX, PW2404 and PW2400 series" can be upgraded with Oil-Trace as required. Use of Oil-Trace is very straightforward. It is supplied complete with liquid standards for the characterisation of the sample matrix in terms of C, H and O, analysis templates and tools required for successful testing.

The pre-defined methods established with the software comply with international norms and methods and all the data generated is transferable to any of the other Super Q modules for further analysis. The easy and time-efficient analysis, often at-line, offered by Oil-Trace is set to prove particularly valuable for the analysis of: bio-fuels and fuel mixtures; restricted elements and wear metals in oils; chlorine in compressor oils; metals in catalysts; and catalyst poisons.

circle pin. 107



EDXRF Analysis for the Petrochemical Industry

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- S in coke and carbon
- S, Cl, As, Pb, Cd in waste oil

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circle pin. 108

Exploration for Oil and Gas in Israel

The country we now know as Israel was of course formally constituted in 1948 as a homeland for persons of the Jewish race, in particular those uprooted from their native countries during Nazi occupation. The territory was previously under British mandate. The Standard Oil Company of New York (SOCONY, later SOCONY-Mobil) was one of the first companies to be awarded an exploration licence in the country, a few years before WW1. After the War a British consortium in which BP and Shell were represented was also involved in exploration which took the form of geological surveys only, there being no drilling of wells at this stage. In the early 1930s the British Persian Oil Company set up a refinery in Haifa, and fuel pipelined from Persia and from Iraq was processed there for the domestic market. This was the state of affairs at the beginning of WW2.

The first exploration well was drilled by the Iraq Petroleum Company in 1947, a year before statehood. The first discovery of oil, in 1955 at Heletz in the south of the country, was not followed by production. Further exploration wells were drilled however and by 1962 official estimates were that up to 2 billion barrels of oil were recoverable from the land occupied by the State of Israel. The war of 1967 led to a reduction in government support for further development.

Exploration resumed after the 1973 oil crisis but even by the late 1980s there had been no production to speak of. By that time the Zion Oil Company, with its HQ in Texas and a local office in Caesarea, had come into being. As its name suggests, Zion Oil Company has its aims and philosophies rooted in the Old Testament. Exploration has continued by Zion and also by other companies including Lapidoth and the Israel National Oil Company, but still there have been only very low levels of production and Israel remains dependent on imports of crude oil. There is however potential on two other fronts. One is the discovery of significant natural gas off the coast of Israel, about 100 billion m³. British Gas amongst other companies are involved in the development work on this resource. Also there are prospects of pressing Israel's shale reserves into service in a way which, in these days of unprecedentedly high crude oil prices, would be viable. Interestingly, crushed shale is used for power generation in Israel. Shale used in that way is in effect very high-ash solid fuel.

J C Jones, University of Aberdeen
j.c.jones@eng.abdn.ac.uk

circle pin. 109

New Instrument Supports Compliance with EU Regulations

Kratos Analytical (USA), a wholly owned subsidiary of Shimadzu Corporation, announces the launch of its new EDX-720 Energy Dispersive X-ray Fluorescence Spectrometer.

Equipped with new, specialised filters that enhance the detection of elements deemed hazardous by the European Union (EU), and other key regulatory bodies, the EDX-720 Energy Dispersive X-ray Fluorescence Spectrometer, facilitates the development and maintenance of proper product oversight procedures. Enabling – at parts-per-million (ppm) levels without pretreatment – analysis crucial to the EU's Waste Electrical & Electronic Equipment (WEEE), End of Life Vehicle (ELV), and Restriction of Hazardous Substances (RoHS) directives, the EDX-720 assists organisations seeking to investigate, maintain, and improve regulatory compliance.

"Companies are definitely feeling the pressure to comply with these regulations," noted Chris Moffitt, PhD, Applications Chemist at Kratos. "Products like the EDX-720, which represents the next step in assessing the presence of restricted substances, go a long way to alleviating some of that pressure, and easing efforts at compliance." Enabling simple, rapid screening, the bench-top EDX-720 combines the latest high count-rate electronics with intelligent software that stops measurements when the signal reaches the proper statistical threshold.

circle pin. 110

TANAKA automated petroleum testers

NEW

WDXRF
SULFUR ANALYZER
FOR ULS FUELS
FX-700
ASTM D2622 ISO20884



EASY OPERATION

Dedicated to ULS fuels: As easy to operate as a flash point tester

PROVEN PRECISION

Proven WDXRF technology yields 1.5mg/kg of LOD

BENCH TOP DESIGN

Small footprint: 60cmWx55cmDx50cmH
Light weight: 66kg

Tanaka Scientific Limited, Tokyo, Japan www.tanaka-sci.com

circle pin. 111

New X-ray Fluorescence Analyser

Spectro Analytical Instruments (Germany) introduces the next generation of XRF spectrometry instruments the Spectro iQ II. Introduced in 2005, it was specifically developed for demanding process control applications. It uses polarised excitation to perform multi-elemental analysis of solid, powder and liquid samples primarily for process control, where rapid analysis, reliable analytical results and simplified operation are especially important. The latest version of the Spectro iQ surpasses its predecessor by being easier to operate and incorporating a new detection system derived from the larger and more powerful Spectro XEPOS XRF instrument. Among the improvements is a new software control interface that allows the addition of an optional touch-screen computer. With the touch screen and the clearly structured menus, it is no problem for non-technical personnel to start, monitor, evaluate and document the analytical processes with only a few commands. In addition to its innovative control software, the Spectro iQ II is equipped with a new Silicon Drift Detector unit that is technically derived from the detector in the larger and more powerful Spectro XEPOS XRF spectrometer.

circle pin. 112

An XRF for all Requirements

Industry experts have come to expect superior performance from **Rigaku** (USA) wavelength dispersive X-ray fluorescence (WDXRF) spectrometers. Rigaku currently offers three benchtop WDXRF spectrometers: the Primini, the single-element Analysers, and the ZSXmini II. All represent a paradigm of providing outsized performance in small packages.

The new Primini benchtop spectrometer represents the next stage in the evolution of Rigaku's line of WDXRF instrumentation. Using just three crystals, the Primini is capable of analysis from F9 to U92 in a vacuum atmosphere. Since it is a WDXRF system, the Primini does not have the resolution problems typically associated with EDXRF instruments, nor does it suffer from a lack of light element sensitivity.

The Mini-Z series of benchtop WDXRF analysers are designed

for analyzing specific element(s). Since the optics are configured to a particular element(s), this series allows for high precision and ease of analysis. The Sulphur Analyser, configured for analysis of S in fuel oil, gasoline, diesel, etc., meets the 15 ppm EPA regulation, and has a LLD (lower limit of detection) of 0.3 ppm. This instrument can also be configured as a Si or Al Analyser (e.g., for coated Si or Al on paper or plastic), an Ni Analyser, (e.g., for Ni coating of plating) or a Zr Analyser (e.g., for Zr coating).

The ZSXmini II is an affordable, full range, easy-to-use, air-cooled, benchtop WDXRF spectrometer. A perfect choice for mobile laboratories, research or teaching applications, this low-cost instrument is capable of performing quantitative analysis under vacuum or helium without standards using the included advanced fundamental parameters software.

circle pin. 113

Total Hydrocarbon Analysers Make Elemental Analysis of Petrochemicals as Easy as 1-2-3



At last, elemental analysis of fuels, oils, greases, lubricants, coal, coke, plastics, and oil-based combustibles is as easy as 1-2-3. Total Hydrocarbon Analysers from **Bruker AXS** (USA) -- consisting of an optimised S4 EXPLORER or S4 PIONEER wavelength dispersive X-ray fluorescence (WDXRF) spectrometer, safe liquid handling, and

dedicated PETRO-QUANT solution -- provide everything you need for fast, accurate, and efficient analysis of petrochemical samples.

The S4 EXPLORER and S4 PIONEER combine superior analytical performance with low cost of ownership. Able to measure sulphur of less than 300 ppb in oil, the S4 EXPLORER and S4 PIONEER can also quantify all elements from Na to U in concentrations from ppb to 100%. The S4 EXPLORER requires no compressed air, cooling water or detector gas, making its operation far less expensive than conventional ICP and AAS systems. The S4 PIONEER provides the ultimate in light element sensitivity and ultra-low measurement times for high sample throughput.

For petrochemical applications, both Analysers come with unique multilevel protection for safe liquid handling. The sample loader is equipped with colour-coded cells specifically designed for liquid sample cups. Software detects the presence of a liquid, automatically selecting a helium atmosphere, loading the sample directly into the measurement position, and sealing the sample chamber to prevent spillage and contamination of spectrometer parts. PETRO-QUANT on the S4 EXPLORER and S4 PIONEER allows you to obtain norms-compliant results with minimal training. With its universal pre-calibration, OIL-QUANT, you can run routine analyses of 26 elements with standard errors in the lowest ppm range. For analyses against international norms such as ASTM, DIN, or EN ISO, PETRO-QUANT supplies measurement methods and pre-calibrations to match your specific needs.

Save time, save money and boost your productivity with solutions uniquely tailored for your petrochemical applications. Bruker AXS' Total Hydrocarbon Analysers produce fast, accurate, and dependable results right out of the box.

circle pin. 115

Versatile Instrument for the Analysis of Ultra Low Sulphur Fuels and Other Petrochemical Products

Oxford Instruments' (Finland) Twin-XULS is a versatile analyser conforming to several ASTM methods, and is ideal for use in refineries and contract laboratories: Twin-X conforms to ASTM Method – D 7212 which is specifically for ULS applications (Sulfur content less than 10mg/kg), and also meets and exceeds the specifications stipulated by ASTM 4294 (and the expected revision D4294-7, ISO 20847 (IP496) and ISO 8754 (IP336)).

Flexibility is a key feature of the Twin-XULS which is the ideal system for different kinds of laboratories performing, S, Pb, K or Mn determinations in gasoline, wear metal analysis in used lubricating oils, S, Ni, V or Fe determinations in heavy/bunker and residual fuel oils and S determinations in aviation gas.

New oxygen-bearing biodiesels and reformulated gasoline will play a bigger role in the future. Analytically these new fuels are even more demanding than fuels processed today. The advanced technology in Twin-XULS enables the accurate quality control of these future fuels.

Quality of the results is ensured in many functions of the analyser. One of these is the SmartCheck procedure, which detects possible contamination. This system enables users to obtain quality data 24 hours a day.

The unique sample positioning system with 10 sample positions guarantees consistent repeatable results and unattended operation. Twin-XULS is a benchtop EDXRF spectrometer based on a unique, patented, low background proportional counter detector – with a PIN detector as option, providing the low cost, simplicity and ease of use of traditional EDXRF.

circle pin. 114

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Unrivalled precision.**

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Sulfur Analyzer

Sindie bench-top sulfur analyzers deliver reliability and ease-of-use, with the detection performance of

Monochromatic WD XRF. From ultra-low sulfur diesel and gasoline to heavy fuel oil and crudes, **Sindie** analyzers provide the ultimate plug-it-in and measure solution without the need for consumable gasses, or the complications of high temperature operations.

Clora
Chlorine Analyzer

The **Clora** bench-top analyzer is a breakthrough analytical solution for determination of chlorides in liquid hydrocarbon samples, such as aromatics, distillates, and heavy fuels, as well as aqueous solutions. Using the same MWD XRF analytical technique as the **Sindie** line of analyzers, **Clora** provides a

limit of detection of 0.15 ppm wt. (at 300 s).

Contact us to schedule a **Sindie** or **Clora** demo at your site, or for more detailed information visit us at www.xos.com.

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Inert Sample Cylinders for Trace Levels of Sulphur Compounds

At parts-per-billion levels, active sulphur-containing compounds quickly and completely react with stainless steel surfaces, making it impossible to accurately quantify these important refinery products and natural gas contaminants when using conventional sample cylinders, sample loops and valves, and tubing systems.



Sulfinitert[®]-treated systems permit accurate determination of these compounds, even after prolonged storage. Data in Restek's (USA) 4-page application note show greater than 85% to greater than 90% recovery of 17ppb hydrogen sulphide and other sulphur compounds after 54 hours in a Sulfinitert[®]-treated sample cylinder.

circle pin. 119

Online Environmental Resource Centre for Trace Element Analysis Launched



Thermo Fisher Scientific Inc., (USA) announces the launch of its information-rich Environmental Resource Center for trace element analysis, the most recent addition to its extensive collection of online resources for industry professionals. The comprehensive forum is an essential source of information for those in the environmental field, providing the necessary tools and technical advice to help scientists performing trace element analysis. The Thermo Scientific Environmental Resource Center is designed to benefit industry professionals from a variety of sectors including laboratory managers, instrument users and scientists in environmental trace element analysis.

For laboratory personnel and scientists that perform environmental trace element analysis it can be a difficult task to stay up-to-date with pertinent changes in legislation, regulation, methodology and research. The resource centre enables users to tap into Thermo Fisher's extensive knowledge of trace elemental analysis within the environmental trace industry and offers users and potential customers an easy to use source for accessing this information. The new resource centre also allows users to view and download a wide variety of new environmental application notes, scientific posters, and technical guides.

In addition, the online library features up-to-date information on the latest legislation, regulations and method news while also providing information regarding the latest research in environmental trace element analysis. There is also the possibility for customers to subscribe to the free environmental e-newsletter for regular industry updates. Users also have access to all the latest environmental news from Thermo Fisher Scientific and any upcoming events relating to the environmental industry.

circle pin. 120

New Disposable Filter for AA & ICP Analysis



SCP Science (Canada), launches DigiFilter, a productivity aid for sample preparation. This patent-pending, disposable filter, available with Teflon[®] membranes of 0.45 or 1.0-micron porosity fitted into a metal free polypropylene

housing, fits easily into a laboratory's sample preparation routine when digesting samples for ICP or AA analysis.

To operate, simply attach the disposable filter to the threaded end of a DigiTube digestion tube and insert into the luer connector from the vacuum manifold. Within seconds, a sample is completely filtered with no entrapment of residual sample avoiding the pitfall of other systems where the entrapped, acidified samples must be considered as dangerous material for disposal.

Users will appreciate the simplicity and ease of use while ensuring that their expensive ICP nebulisation systems are unaffected by particle damage.

A DigiFilter system includes 0.45 or 1.0 micron DigiFilters, DigiTube digestion tubes, a vacuum manifold and a vacuum source.

circle pin. 121

When Oil Is Struck, Viscolab PVT Helps Schlumberger-DBR Technology Analyze It

DBR Technology Center, a division of Schlumberger Canada Limited, provides quality phase behavior and other forms of analysis on petroleum hydrocarbon fluids. One of the key attributes that the company's engineers need to measure under high-pressure and controlled temperature conditions is viscosity. The company had developed its own measurement system, a huge machine that consumed half the floor space of a typical conference room, and had traditionally used it to conduct the measurements.

Some 15 years ago, DBR recognized that Cambridge Viscosity's (USA) technology had characteristics of significant value in analyzing live oil, including requiring very small sample volumes to produce highly accurate measurements without using mercury, and began mounting high-pressure versions of Cambridge Viscosity series 300 sensors in its oil analysis system. Cambridge Viscosity sensors are distinctive in their design: two electromagnetic coils act upon a single moving part – a piston – at a constant force, while proprietary circuitry analyzes the piston's movements to measure absolute viscosity. Over the course of a few years, Cambridge Viscosity worked closely with DBR to modify and upgrade the viscometer design to meet DBR's evolving requirements.

This work ultimately led to the development of the Cambridge Viscosity 440 sensor, which offers a tenfold improvement in accuracy over other high-pressure sensors, requires a very small sample size (<2ml), and is self-cleaning, thereby offering both high reliability and low maintenance.

"Through the course of our relationship with Cambridge Viscosity, we have asked them to innovate on our behalf and they have done so many times," says Jatinder Kalra, manufacturing manager at DBR. "The 440 was the first major advance, and it continues to be an integral part of our fluid behavior laboratory package."

In 2005, DBR came to Cambridge Viscosity with a significant request: to create a full PVT (Pressure Volume Temperature) system to meet DBR's needs and specifications. Cambridge Viscosity's expert engineers developed the VISCOLab PVT Airbath. A fraction of the size of DBR's home-grown solution, the Airbath uses a simple three-valve plumbing configuration to control sample flow. Pressure is monitored with a digital pressure gauge, and temperature is controlled with an isothermal oven. This Airbath system was designed to require only 10-15 ml of fluid (including cleaning) and heat up to the desired temperature in 4-6 hours. It is now successfully being used by a variety of industry labs.

DBR then realized that the Cambridge Viscolab PVT system could be further improved with additional capabilities. These included operating at lower temperatures along with high temperatures, further reducing the amount of sample required and shortening the system stabilizing time. Cambridge Viscosity engineers went back to their workshop and produced the VISCOLab PVT Recirculating Bath system.

"Cambridge Viscosity has always been responsive to our needs," says Kalra. "It's truly a very collaborative relationship and we're grateful for their excellent service and work."

A complete yet compact isothermal unit with pressure transducer, the Recirculating Bath system offered a number of important improvements over DBR's home-grown solution and the Airbath system. The Recirculating Bath stabilizes temperature in about 30 minutes, and performs accurate viscosity measurement with as little as 3-4 ml of sample (6 ml is average).

These performance capabilities are especially critical given the nature of the application. When DRB tests an oil sample, its analysis is a key data point in a billion-dollar decision made by an oil company. Samples have to be forced from rock as much as 20,000 feet below ground. These samples are very expensive to acquire and typically are in limited volumes. The smaller the sample required and the faster that the analysis can be performed, the more cost-effective and efficient it is to test potential drilling sites. Additionally, the accuracy and reliability of the viscosity measurement system helps to build the confidence needed to make such weighty decisions.

Another valuable attribute of the Viscolab PVT Recirculating Bath system is its portability. Often, testing labs are small, mobile units that can be based near the typically remote locations chosen to drill for samples. The Recirculating Bath system is easy to transport and has a fairly small footprint, making it a very practical solution. In addition, because it can fit in any lab, the system assures consistency of readings between labs.

Aside from the hardware aspect of the solution, the VISCOLab PVT Recirculating Bath comes with software that is powerful yet easy to use. The intuitive graphical user interface enables operators to easily set temperatures and other parameters, providing the real-time monitoring and control capabilities they need. The software also includes critical temperature- and pressure-correction equations to ensure more accurate data. The sensor and piston can distort with changes in temperature and pressure, so being able to automatically apply temperature-compensated viscosity (TCV) and pressure-compensated viscosity (PCV) is an important innovation.

Over the course of the 15-year relationship, DRB has undergone many changes; but its focus has stayed the same and its reliance on and loyalty towards Cambridge Viscosity have remained consistent throughout. Today, approximately 25 Cambridge Viscosity systems are used by DBR and other Schlumberger divisions.

"Our customers like the units because they're compact enough to be taken out to the field easily," says Kalra. "But mostly they like them because they're efficient and accurate. Anything less would mean a loss of money and our reputation, so we have a lot invested in the Cambridge Viscosity systems."

circle pin. 222

Annual Informatics Users Meeting Conferences for 2007

Thermo Fisher Scientific Inc., (USA) has announced its annual Thermo Scientific informatics software user group meetings for 2007. Thermo Informatics World (TIW) 2007 North America has been scheduled to take place October 15-19, 2007 at the Marriott Doral hotel in Miami, Florida while Thermo Informatics World 2007 Europe will be held November 12-16, 2007 at the Dom Pedro hotel in Lisbon, Portugal. With the theme "You Can Count on Us", the conferences will focus on how Thermo Scientific's informatics solutions enable organizations to maximize the productivity of their laboratories, with particular emphasis on process harmonization, interoperability and lower total cost of ownership.

The TIW 2007 conferences have been designed to provide industry professionals with the opportunity to network with each other and with the Thermo Fisher informatics experts to discuss the ever changing environment and the emerging business requirements that influence the future direction of informatics solutions. Attendees at the TIW 2007 conferences can pre-register for product breakout sessions including customer presentations, product launches and onsite training.

Showcased at the conferences will be the Company's latest developments of proven Thermo Scientific Laboratory Information Management Systems (LIMS) and Chromatography Data Systems (CDS) informatics solutions. Thermo Fisher designs and manufactures customer specific informatics solutions suitable for even the most demanding applications in a wide range of industries such as the petrochemical, pharmaceutical, forensics, chemicals, environmental, metals and mining, waste water and food and beverage.

circle pin. 122

Real-time Viscosity Instrument Displayed at OTC

Brookfield Engineering Laboratories, Inc. (USA) recently showcased their TT100 in-line viscometer at the OTC Show in Houston, April 30th-May 3rd. Brookfield created great interest with this device for continuous real-time drilling fluid Viscosity measurement.

Brookfield showed the audience how to obtain continuous real-time Viscosity measurements and how to do so at multiple RPM speeds/shear rates. This instrument provides data that allows customers the potential to determine real-time annular hydraulics as well. With this information, Drilling Engineers have the ability to reduce drilling cost, prevent well control problems and drastically increase efficiency.

Brookfield's TT100 with Couette geometry now provides a way to create and communicate a new level of data for Rig Operators, Owners, and Drilling Fluid Suppliers that is extremely valuable and provides new efficiency while reducing time and costs. The viscometer, combined with a data logging system can provide real-time Yield Point, Plastic Viscosity, and Apparent Viscosity information, which gives customers the opportunity to view Power Law and other calculations continuously. This instrument, which has been the workhorse of the stimulation industry for decades, has been adapted over the past few years to meet the needs of the drilling fluids applications. It is currently in use at various drilling sites throughout the world.

circle pin. 123

New Standards for Biofuel Analysis

Chiron AS (Norway) are now offering new standards designed for biofuel analysis. Dr. Jon E. Johansen and Chiron are previously known as a world leader of hydrocarbon reference standards and are now happy to introduce these new standards on the market.

The Bio-fuel and FAME analysis is described in new methods introduced by ASTM (D 6584) and the EN-system (EN 14103-14105). Chiron is offering complete sets of standards following the requirements of these international methods. These products include internal standards as well as FAME components for the determination of FAME in mixed fuels containing fatty acid methyl esters.

The new standards will be included in the new updated product catalogue available from Chiron by the end of summer 2007.

circle pin. 124

New Automatic High Speed Viscometer for Used Oil Samples

Spectro Inc. (USA) announces a new Automatic High Speed Viscometer, Model A-HSV 802, a bench-top unit with two baths and four viscometer tubes in each bath. Capable of running as many as 37 samples per hour at two temperatures, the A-HSV was designed specifically for used oil samples. A unique feature of the A-HSV is that 2 independent viscosity measurements are made in each tube for every sample. Each viscometer tube has two sections with different diameters thus subjecting the sample to two different shear rates as the sample flows through the tube. Results from each section must agree closely. This built-in, patented, quality control process virtually eliminates inaccurate viscosity measurements or re-running samples for verification. An optional preheating module is available to handle samples with higher viscosities to manage samples up to 1,000 cSt @40°C and 80 cSt @100°C. The autosampler is capable of holding 200+ samples depending on the configuration and requires only 7 ml for the two temperature measurements.

System design eliminates sample carry over. The last portion of oil drawn up is that which is measured. The probe is submerged in the sample only as far as needed as the software tracks sample vial content.

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circle pin. 126

Cou-Lo Formula Reagents



Recently developed by **GR Scientific** (UK), Cou-Lo Formula reagents offer optimum performance with all makes of coulometric Karl Fischer titrators. The unique packaging concept has been based on advice from the Health & Safety Executive to enable non laboratory personnel to work more safely.

"Cou-Lo Formula A" anode reagent is suitable for most routine applications and is especially useful for water content determination of oil samples as it already contains the required amount of xylene and other solubilisers to improve sample miscibility and solubility. Supplied in 100ml "single-shot" bottles, no volume measurement or mixing with other solvents is required. The cathode reagent, "Formula C", is supplied in "single-shot" 5ml ampoules which have safety snappers pre-fitted thereby reducing risk to the operator.

Each pack contains 8 x 100ml bottles anode reagent plus 8 x 5ml ampoules of cathode reagent plus two water standards. Weighing only 3 kilo, the total volume is less than one litre so they can be shipped as limited quantity. Safer to use – Safer to store.

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circle pin. 129

Groundbreaking Portable FT-IR Spectrometers

A2 Technologies (USA) introduces the revolutionary Mobility Series of FT-IR spectrometers. Developed for use in the field, these portable, rugged spectrometers are purpose-built to move FT-IR spectroscopy out of the conventional analytical laboratory and closer to the source of the sample. Consisting of three systems, the MLp, the ML and the MLx, the intuitive Mobility series has been designed to survive in rugged environments and be operated with little to no training by the user. This combination of ruggedization and simplicity of use makes it an ideal real-time process monitoring tool for the petrochemical industry, lubrication condition monitoring, food analysis and mining applications.

Featuring an intuitive operating system and easy-to-use sample interface, the rugged and compact design of the A2 Technologies spectrometers provide users with actionable information so that decisions can be made on-the-spot. The Mobility Series FT-IR spectrometers incorporate two new diamond based sampling systems, one utilising the principle of internal reflection and the other features a completely new type of transmission cell. Between these two diamond-based systems, a broad range of liquids, solids, oils, gels and pastes can be easily analysed.

A2 Technologies' innovative portable FT-IR spectrometers offer a breakthrough in FT-IR analysis, extending the capabilities of traditional lab-based analyses by delivering accurate and precise information more efficiently. The portability of these analysers significantly reduces the need to send samples to a remote laboratory, alleviating the problems associated with sample throughput and minimising bottlenecks. By enabling analytical information to be obtained in real-time, these innovative spectrometers allow for instant results which is highly critical for cost savings, particularly in manufacturing processes.



circle pin. 132

GC and GC/MS Training and Application Web Casts

PerkinElmer (USA) has developed a new online Web cast library focused on training and advances in GC and GC/MS applications. The Web casts address pressing issues and analysis challenges labs face in a broad range of application areas. Industry experts discuss and demonstrate solutions provided by PerkinElmer's Clarus® GC and GC/MS instrumentation and market-leading TurboMatrix® Headspace and Thermal Desorption samplers. Market segments covered include; environmental, industrial hygiene, materials testing and hydrocarbon processing/biofuels.

circle pin. 133

Viscosity Measurement of Used Oil

Spectro-Visc Automatic Viscometer

"A fast, accurate and cost effective instrument for the determination of kinematic viscosity in used oils and other fluids."



Compliant with ASTM D 445, D 7279 and related specifications.

The Spectro-Visc is a self-contained viscometer system that consists of a thermostatic bath with circular heater and control column. The bath contains 4 viscometer tubes together with optical sensors to detect the flow of oil through the tubes. The measuring tubes operate independently of each other and the control column has an LCD display and an array of LED's that provide the user information about the system's status.

Features:

- **High Throughput** - Up to 60 samples per hour to ASTM precision
- **Small Sample Volume** - 0.3 to 0.6 ml
- **Low Solvent Consumption** - 2.5 ml per sample
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circle pin. 130

Modular Multi Sensor System for Rapid Classification and Identification of Gas Mixtures, Odours and Aromas

MOSES II is a MODular SEnsor System, from **GSG Mess und Analysegeräte GmbH** (Germany), which can be used for analysing and classifying gas mixtures and odours. Such systems are frequently referred to as "electronic noses". Classification and identification of odours and aromas have, until very recently, been tackled by classical analytical methods (GC, GC-MS). Due to limitations, like inconvenient sample preparation and lengthy analysis cycle times, the use of such techniques in daily routine work is only possible to a minor extent.

Contrary to classical analysis tools such as gas chromatography (GC) or mass spectrometry (MS), MOSES II does not attempt to dissect a gas mixture into its individual components; rather, a "fingerprint" of an odour is taken.

MOSES II is based on sensor modules. Each module is a self-contained unit that can be exchanged by the user. Besides the sensors proper, a sensor module contains the complete auxiliary circuitry required for operating the sensors (such as amplifiers, filters, thermostats, signal processors etc.). In addition, each module has an on-board microcontroller. The μC is in charge of all sensor and module specific controls and functions. The analyte gas flows through one or several sensor modules; the sensors' reaction is used to derive a "fingerprint" of the odour.

Consequently, MOSES II can be used in a laboratory environment (for individual samples as well as in a fully automatic setup) and as an autonomous, in-situ instrument.

MOSES II is particularly suitable for objective and reproducible odour comparison. Although the standard sensor configuration allows a huge range of substances to be detected, there may be cases where sufficient selectivity can not be achieved.

With this new development GSG has broadened its product portfolio after the successful market introduction of their Products Curie-Point-Pyrolyser, LC/MS/MS, PTR-MS, MALDI-TOF-MS and FT-ICR-MS.

circle pin. 134

The New Cou-Lo Aquamax KF Moisture Meter



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GRScientific

circle pin. 131

Rugged and Reliable Temperature Measurement

The TL-1W is a modified field version of **ThermoProbe's** (USA) successful TL-1 thermometer. It features a rugged frame for reinforcement and is designed for continuous operation but can be easily powered off if desired.

The TL-1W thermometer is intended to be used anywhere a precision glass stem thermometer or other type thermometer may be used. The TL-1W incorporates glass thermometer simplicity and reliability with the ease of a digital display. Like precision mercury thermometers, the TL-1W has accuracy, repeatability and long-term stability. But unlike those thermometers there will never be problems with mercury separation or hazardous material cleanup. Different from most precision electronic thermometers, the "Cordless" TL-1W has no wires to get in the way or break. Battery replacement is easily done through a sealed cover. Encoded calibration is unaffected by temperature, vibration or battery removal. Low battery display, and failure mode indications protect the user from false data.

The TL-1 includes 4 Point NIST Traceable Calibration and a one year warranty. Users will also benefit from minimum reading, maximum reading, averaging, easier °F to °C switching and an optional serial output. In addition, the new display constantly indicates temperature increasing or decreasing activity.

circle pin. 135

Dramatically Different ICP



The recently introduced Thermo Scientific iCAP 6000 Series is the world's most compact inductively coupled plasma (ICP) spectrometer. The iCAP 6000 Series extends the company's long-standing leadership in ICP technology, offering reduced cost of ownership and unmatched performance in resolution, sensitivity and results accuracy. The iCAP 6300 and iCAP 6500 are the latest additions to the company's broad range of spectrometers designed to help laboratories carry out the most demanding analyses while maximizing productivity and profitability. Enhanced performance in quantifying trace elements in both solid and liquid samples means laboratories can achieve their analytical objectives even faster.

circle pin. 157

Thermo Scientific S and M Series Atomic Absorption Spectrometers

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- Use of lab space, the smallest footprint of any AAS.
- SOLAAR Software Wizards, to guide novice users through spectrometer and method optimisation.
- Auto Optimisation procedures, for the spectrometer, burner positions and gas flows.



Add more intelligence with GFTV to simplify furnace method development and choose from a range of accessories including the ID100 for autodilution and VP100 for Vapour Generation.

circle pin. 160

All Your Requirements... Without Compromises



The Thermo Scientific XSERIES 2 is a major update to the successful X SERIES quadrupole ICP-MS.

Quadrupole ICP-MS performance has been improved with the development of Protective Ion Optics design in conjunction with patented 3rd generation Collision Cell Technology, which significantly reduces blank levels and considerably improves interference removal. Matrix tolerance has also been improved with new cone designs. Crucially, reduced user maintenance designs on all XSERIES 2 components improve productivity – so you no longer have to compromise productivity for performance.

circle pin. 158

ELEMENT XR Sector Field ICP-MS



Magnetic sector field technology represents the gold standard for the elemental analysis of solids or liquid samples, isotope ratios or species. Double focusing sector field analyzers with their inherent high performance are vital tools for research related applications and have matured to be a workhorse in the modern laboratory. The new Thermo Scientific ELEMENT XR is the only ICP-MS with a linear dynamic range of more than 12 orders of magnitude; revolutionary for applications such as laser ablation and isotope ratio analysis.

circle pin. 159



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Biodiesel Concentration Measurements Using Spectrum OilExpress

David Armstrong - PerkinElmer (USA), Sharon Williams - PerkinElmer (UK), Dave Wooten - Wooten Consulting
PerkinElmer 710 Bridgeport Ave. Shelton, CT 06484 Phone: 1-203-925-4602 Fax: 1-203-925-4654



Introduction

Reducing our dependence on fossil fuels and our reliance on oil and petroleum supplies are worldwide issues. Many see increasing the use of biodiesel fuel as a key initiative to meet these global needs. However, the move to include proportions of Biodiesel in everyday fuel has created a host of unresolved issues for both engine manufacturers and diesel consumers. Uppermost among these are questions concerning the concentration of the biofuel (Fatty Acid, Methyl Ester – FAME) and its quality. This application note describes how infrared transmission measurements can be used to address the concentration measurements.

Biodiesel fuels are often blended compositions of diesel fuel and esterified soy-bean oils, rapeseed oils or other potential vegetable oils, as well as fats. The physical and combustion properties of these biofuels have allowed them to achieve similar performance to diesel fuel. However, there are several characteristics (including cetane number, oxidation stability, and corrosion potential) that are of concern. These differences, especially the cetane reduction, require that adequate control of the biofuel concentration be implemented.

In addition, there are now tax incentives available in some parts of the world for the use of biodiesel. For example: in the USA this tax credit is presently in the form of a \$0.01 per FAME-% per gallon of fuel used. Therefore, the difference between 19% or 20% FAME in diesel fuel can result in a considerable tax value. A recent investigation of commercially available biofuel blends identified that 18 out of 50 splash-blended samples were not the specified 20% FAME value¹. It can be seen that there are financial justifications for an accurate biofuel concentration determination and characterization.

This work was performed using the Spectrum OilExpress system which consists of four elements:

- The PerkinElmer Spectrum™ 100 FT-IR spectrometer with high sensitivity, sampling speed and stability.
- A sealed transmission cell with zinc selenide (ZnSe) windows with a 100 μ m pathlength.
- The Molecular Spectroscopy Liquid Autosampler which provides unattended operation and rapid sample throughput of up to 50 samples per hour. The system is fitted with syringe pumps and is designed to handle samples with a wide range of viscosities, ensuring virtually no sample carryover (<0.1%).
- The PerkinElmer infrared quantitative software suite which allows analysis by various methodologies. These include Beer's law concentration calculations using Peak Height measurements and full Principal Component Regression (PCR) chemometric analysis.

The primary advantage of this system is the ability to automate the procedure from sample aspiration through report generation, including cleaning between samples. Secondly, the infrared transmission spectra carry the most information-rich data available, enabling more robust methods to be calculated.

AFNOR Method using Beer's Law

One of the few defined methods for measuring the concentration of FAME is AFNOR NF EN 14078 (July 2004) – "Liquid petroleum products - Determination of fatty acid methyl esters (FAME) in middle distillates - Infrared spectroscopy method".²

The principle of the AFNOR method is the application of a simple quantitative model of FAME content using the 1745 cm^{-1} carbonyl absorbance. When using the AFNOR methods, samples are diluted in cyclohexane to a final analysis concentration of 0 – 1.14% FAME. This produces a carbonyl peak intensity range between 0.1 – 1.1 Abs, using a 0.5 mm cell pathlength. The peak height of the carbonyl band at or near 1745 cm^{-1} is measured to a baseline drawn between 1820 and 1670 cm^{-1} . This peak height is used with a Beer's Law plot (absorbance versus concentration) to develop the calibration curve used for calculating the unknown concentrations.

While it is possible to achieve good concentration measurement, the disadvantages of this method are the need for sample dilution and the inability of the simple methodology to cope with variances in the source of the biofuel. An improved solution utilizes the more common 100 μ m flow-cell, avoiding the sample dilution errors. With the potential for increasing variance in feedstocks used to produce the FAME (namely: soybean, rapeseed or yellow-grease), peak area is proposed as a preferred calculation technique.

Peak Area Method

The modifications of this method that were employed in this study included:

- Cell pathlength – 0.1 mm
- Peak area calculation – range: 1820 – 1670 cm^{-1} with baseline set at the same range
- No Dilution – samples were not diluted to allow for the determination of the usable range

For a concentration method to be valid, the peak maximum cannot exceed the absorbance range of the spectrometer. Figures 1 and 2 demonstrate that the Beer's Law curve for this spectral region is limited to approximately 18% FAME.

In this study we took a baseline as defined in the AFNOR method at 1820 - 1670 cm^{-1} and a peak area in the same range. The sample concentration range for this method was B0 to B16 (0% to 16% FAME). The method produced a linear graph with a correlation coefficient of 0.9988. Calculating the concentration of the standards by the method yielded a Pearson's correlation of 0.9990 and a standard error of prediction (SEP) of better than 0.30%. These results indicate an acceptable method for the quantitation of FAME up to B16.

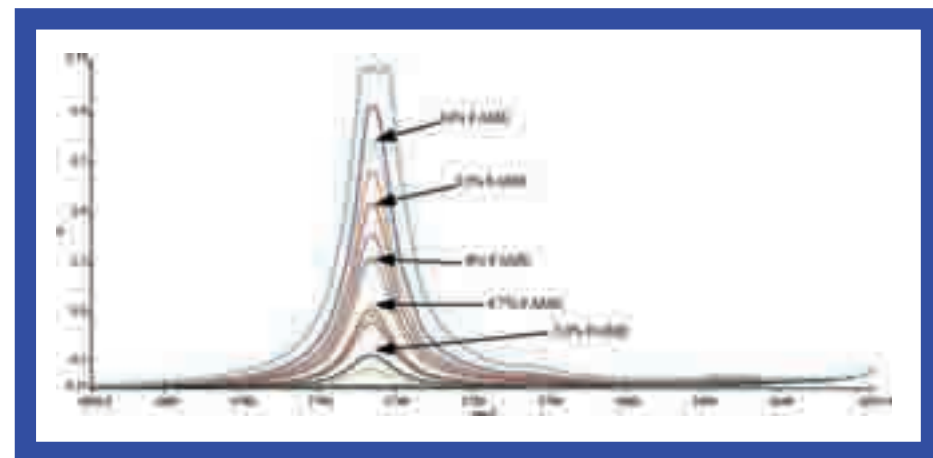


Figure 1: FTIR Spectra of varying FAME concentrations in diesel fuel.

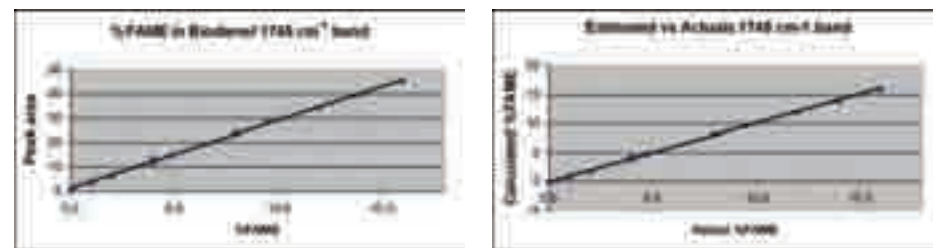


Figure 2: Beer's Law Calibration Method for 1745 cm^{-1} Peak

Further analysis of the FT-IR spectra shows additional spectral regions attributed to the FAME chemistry; for example 1300–1130 cm^{-1} (see Figure 3). The peak maximum for this spectral region does not exceed the system absorbance limit even at 49% FAME. The associated Beer's Law method uses the peak area between 1300 and 1130 cm^{-1} . Figure 4 shows the capability of this method for an extended sample concentration range from B0 to B50. The method produced a linear correlation with a correlation coefficient of 0.9997 and a standard error of prediction (SEP) of 0.38%. This is a capable method for the determination of a wider range of FAME concentrations.

Principal Component Regression Method

The peak area model is able to yield very capable calculations of the FAME concentration using short ranges of the full IR spectrum. To fully utilize all the relevant information from the whole spectrum, we moved to a chemometric analysis. In this case we used Principal Component Regression (PCR) to provide a more robust concentration assay. Samples with varying FAME

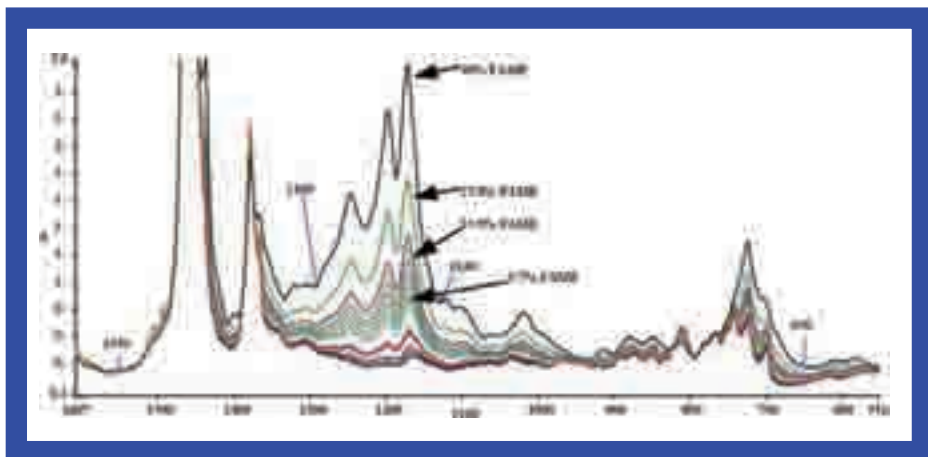


Figure 3: Fingerprint region of FAME/diesel samples.

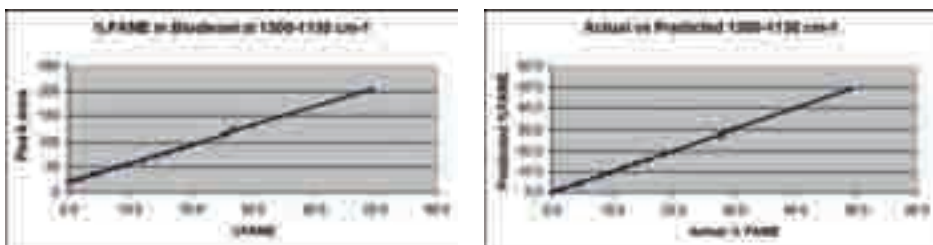


Figure 4: Beer's Law Calibration Method for 1300 – 1130 cm^{-1} .

concentrations between 0 and 20% were used in the calibration of the PCR model. The model employed as much of the entire spectrum as available. The quantitative prediction utilized only one principal component (the Regression Spectrum for the method). This spectrum (Figure 5) shows that the entire spectrum was used except the top of the 1745 cm^{-1} FAME carbonyl peak and the C-H peaks at 2900, 1460 and 1370 cm^{-1} region.

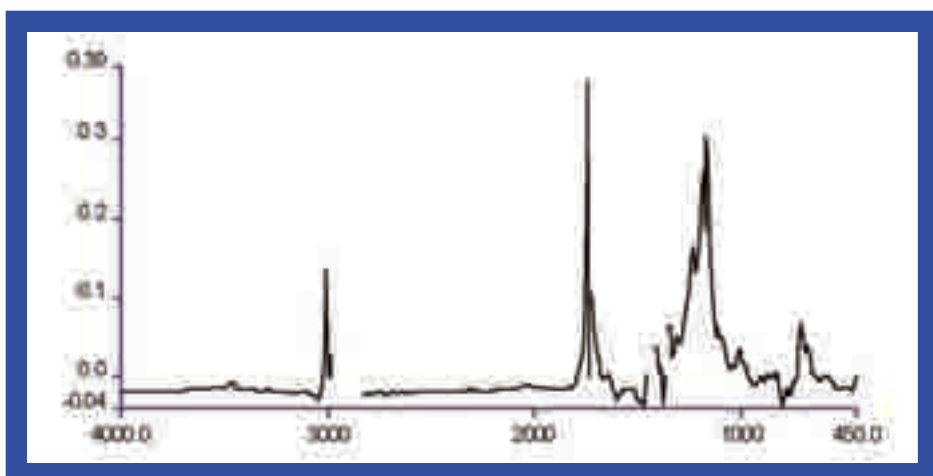


Figure 5: FAME PCR Regression Spectrum.

By using the entire spectral region, a more robust model can be generated. The statistics of this model showed a correlation coefficient of 0.9995, Pearson's correlation of 0.9997 and SEP of 0.17%. The actual against predicted results for this model is shown in Figure 6 also confirm a good prediction model.

This chemometric approach to the analyses is equal to or better than the Beer's Law methods. Although this modeling method for developing a calibration of the concentration of FAME in a biodiesel is more difficult to design, it is more robust over larger concentrations. Additionally it will allow extending the calibration range with additional samples to even higher concentrations.

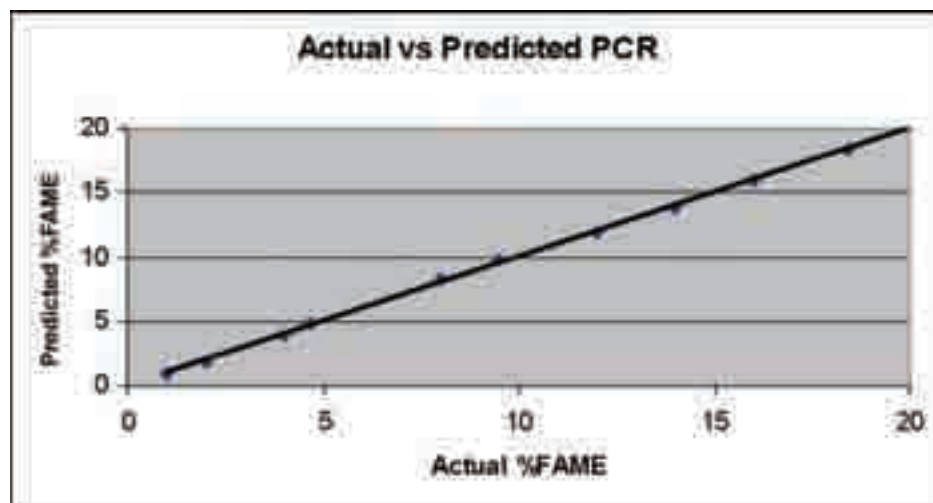


Figure 6: PCR calibration Method.

Conclusions

We have shown how infrared transmission techniques can be used to address FAME concentration measurements. All the methodologies presented achieve a standard error of prediction of less than 0.4%. This compares well with the concentration measurement of FAME in a typical "splash blend" operation, where an error of 0.5% is usually acceptable. Data analysis using either Beer's Law or Principal Component Regression (PCR) is capable of meeting this requirement.

A key advantage to using the transmission cell sampling method is that it allows auto-sampling, which can ease the routine laboratory's manpower needs. The choice of either Beer's Law or chemometrics will be determined by the particular situation. The Beer's Law approach, using peak area, benefits from being a simpler approach and is recommended for situations where there are relatively few standards and low throughput of samples. The chemometrics approach has the advantage of being more robust with respect to known constituents in the blend, better handling of interferences and reducing effect from noise contributions. Overall, PCA offers higher confidence in the quantitative prediction than is found the Beer's Law methods.

Note:

While the procedures provided in this application note may not have yet found their way into methodologies set by standard organizations or government agencies, they have been fully tested and have been demonstrated to provide quality data in numerous laboratories performing routine FAME analysis.

References:

1. NREL Technical Report TP-540-38836, Survey Of The Quality and Stability of Biodiesel and Biodiesel Blends in the United States in 2004; R.L McCormick, T.L. Alleman, M. Ratcliff, L. Moens, and R. Lawrence October, 2005
2. AFNOR NF EN 14078 Liquid Petroleum Products - Determination of Fatty Acid Methyl Esters (FAME) in Middle Distillates - Infrared Spectroscopy Method, July 2004.
3. ASTM Proposed Standard Test Method for "Determination of Biodiesel (Fatty Acid Methyl Esters) Content in Diesel Fuel Oil Using Mid Infrared Spectroscopy"

Acknowledgements:

This work was performed for PerkinElmer by David L. Wooton, PhD, of Wooton-Consulting, Beaverdam, VA, USA.

New Analyser for In-the-field Biodiesel Screening

Zeltex (USA) is proud to announce its ZX-101XL portable fuel analyser is now able to screen biodiesel in the field and at the pump. For over thirteen years, state and federal governments, as well as numerous private companies have been using the Zeltex ZX-101 line of fuel analysers to accurately test octane and cetane in the field. Now the ZX-101XL can perform the same test on biodiesel fuel. With calibrations for biodiesel percentage and ethanol percentage, the ZX-101XL will prove to be the only choice for in-the-field fuel screening. Across the United States and in forty countries worldwide, Zeltex's fuel analysers have established themselves as the analyser of choice. Their analysers will provide you with lab-accurate and dependable readings within sixty seconds. Operating on "AA" batteries, the ZX-101XL can be used to test biodiesel and ethanol-blended fuels.

New, Specifically Designed Instrument to Analyse the Oxidative Stability of Biodiesel, Diesel And Blends

For the last year **Metrohm** (Switzerland) have been developing a new instrument for analysis of diesel and biodiesel. They have improved on the existing technology of the 743 Rancimat to specifically design an instrument for the biofuels market.

During the measurement a stream of air is passed through the sample which is contained within a sealed and heated reaction vessel. These conditions accelerate the rate of oxidation of the fatty acid methyl esters in the sample, with peroxides being initially formed as the primary oxidation products. After some time the fatty acid methyl esters disintegrate completely; the second oxidation products formed include low-molecular organic acids in addition to other volatile organic compounds. These are transported in a stream of air to a second vessel containing distilled water. The conductivity in this vessel is recorded continuously. The organic acids can be detected by the increase in conductivity. The time elapsed until these secondary reaction products appear is known as the induction time or induction period.

The 873 has been modified to manage the very aggressive nature of biodiesel. Modifications include chemically resistant iso-versinic tubing and chemically resistant glass measuring vessels.

Metrohm have also proved that this principle method can be used to measure the oxidative stability of diesel and biodiesel/diesel blends. When developing the method, it was found that with volatile oils, mineral diesel and diesel blends there was a degree of evaporation on heating, resulting in wrong determination values. This was overcome by developing longer (250 mm) reaction vessels for measurements with these particular samples. These longer vessels reduce evaporation loss through the refluxer condensation principle which occurs within the longer vessels giving accurate reproducible results.

The updated software includes flexible and comfortable user administration with login functions; this can be used to define detailed access rights for groups of users and individuals. The software parameters are now also specific for biodiesel and diesel analysis.



Setaflash Meets Biofuel Testing Requirements

Biofuels, such as automotive biodiesel and bio-heating fuel, have different characteristics to traditional refined fuels, and testing as an additive or a finished blend is of great importance.

These biofuels are manufactured from many types of oils extracted from soya, rape seed, and other natural materials. At the end of the manufacturing process a very small amount of methanol or ethanol can remain that has the effect of reducing the flash point of the fuel from 180°C to well below 100°C. Specifications require that specified flash point criteria are met prior to blending for the purpose of assuring that the biofuel component does not contain methanol or ethanol. As with all fuels, flash point temperature is also important in determining safety and handling characteristics.

Flash point tests of biofuels using **Stanhope Seta's** (UK) Setaflash (small scale) established that the 'flash, no-flash' test method, combined with an automatic flash detector, gave a more reliable result than other flash point test methods. This is mainly due to the small sample size and the unique equilibrium type test. The flash detector was required because Methanol burns with a colourless flame that is particularly difficult to detect by eye. A European inter-laboratory programme resulted in the Setaflash method (EN ISO 3679) being adopted into the two European biofuel specifications (EN 14213 and EN 14214) as the only accepted test method for flash point.

Stanhope-Seta's 'Active Cool' is the latest addition to the popular range of Setaflash testers that test the flash point of liquids and semi-solids using the Rapid Equilibrium method. It is a reliable, low cost and compact instrument designed for use in the laboratory, production line and portable applications. The tester has a simple-to-use display panel, precise temperature control and automatic flash detection with results being displayed in either °C or °F.

Active Cool is the first Small Scale flash point tester to provide a rapid electronic cool down facility without the need for external services. It has integral electronic peltier coolers that allow testing at low temperatures and rapidly reduce the test cup temperature after a test is completed. This enables fast sample removal and preparation for the next test. These features, combined with the 2ml sample size and 1 minute test time, dramatically reduce overall test time resulting in improved throughput and reduced waste disposal.

Today Setaflash small scale test methods are approved in more than 50 international product specifications and regulations. Test results being endorsed by inter-laboratory cross-check programmes have established excellent correlation with other Flash Point test methods including Pensky-Martens (ASTM D93) and TAG (ASTM D56).

circle pin. 145

BioFuel Blending Technology Secures Global Purchasing Agreement with Royal Dutch Shell

Enraf Fluid Technology (The Netherlands) has finalised a global purchasing agreement with Royal Dutch Shell for the worldwide supply and support for its MicroBlender and Multi-Stream Blender for BioFuels blending.

The agreement allows Shell to achieve their goals of securing the most advanced blending solutions on the market along with a worldwide service support network. Enraf's MicroBlender uses the latest intelligent blend controller for all single stream Ethanol and BioDiesel blending applications. The multi-Stream Blender uses the same intelligent control electronics and the same accurate linear control valves, but can be configured in any arrangement for between 2 and 6 loading arms.

Enraf reports that its success in winning the agreement was very much based on Shell's use of Enraf blending equipment over many years. The confidence that Shell has in the high levels of accuracy and reliability, coupled with Enraf's international field support arrangements, were highly influential in Enraf becoming the company of choice.

With more than 100 sales, service and distribution facilities worldwide, Enraf is more than capable of providing the highest level of after sales support that Shell required. Standardising on the Enraf product range also allows Shell to capitalise on in-house engineering expertise and spares procurement processes, due to a common architecture.

Enraf's centralised procurement process facilitates the rapid implementation of both Ethanol and BioDiesel blending solutions for Shell and its subsidiaries. Assisted on the ground by local Enraf engineers, Shell is able to take the building blocks of the blending system virtually off the shelf and to integrate them with site specific application requirements.



circle pin. 147

Total Inorganic Sulphate in Bioethanol Analysis for Quality Assurance of Biomass Fuels



With the search for alternative renewable energy sources, biofuels are fast becoming a viable alternative. Bioethanol is already used for combustion engines mainly in two ways: hydrous ethanol (95%) as gasoline substitute and anhydrous (or dehydrated, 99%) ethanol blended with conventional fuels in proportions of between 5 and 85 percent (E85). An important quality criterion is the sulphate content of this ethanol, because sulphates form deposits in the engine and may contribute to sulphuric acid emissions. This quality parameter is easily determined by titration with **Metrohm's** (Switzerland) 809 Titrande with a Pb²⁺ crystal membrane Ion Selective Electrode as the indicator electrode, the system being controlled by the tiamo PC software.

This titration is based on the precipitation of lead sulphate, whereby the equivalence point is detected by means of the Metrosensor Pb²⁺ crystal membrane Ion Selective Electrode.

This method performed with Metrohm equipment fulfils the requirements of international standardized test procedures as

mentioned in the new ASTM D4806-06c at the highest level of quality.

circle pin. 148

Biofuel Measurements... on-site and under a minute!



The InfraCal Filtometer and InfraSpec VFA-IR Spectrometer from Wilks Enterprise are the ideal choices for easy, on-site biofuel analyses to help you ensure product quality. They have been specifically designed as field portable instruments – to be operated by personnel having little or no knowledge of infrared analytical techniques.

Typical biofuel measurements include:

- Percent biodiesel in diesel blend
- Percent ethanol in gasoline blend
- Water in ethanol
- Total glycerides
- Free fatty acids
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circle pin. 146

New Online Tool for Biofuels Application Solutions



PAC (USA) has introduced an innovative information resource for Biodiesel professionals interested in biofuels testing. The new PAC Biodiesel Applications Assistance Chart defines solutions, matching each required application to specific PAC instrumentation that will satisfy compliance in both American (ASTM) for B5, B20 and B100 and European (EN) standards for B5 and B100.

From aromaticity to water & sediments and ester content to Viscosity, the chart acts as a single source for numerous applications, applying a broad range of Biodiesel blends.

circle pin. 149

MXT®-Biodiesel TG Capillary Columns



Restek's unique Siltek® surface deactivation is used in combination with stainless steel capillary tubing to make the MXT®-Biodiesel TG column. This column is specifically tested for use in the analysis of total glycerin in biodiesel oils, assuring that every column meets method

requirements. The MXT®-Biodiesel TG column exhibits low bleed at its maximum operating temperature (430°C) and outperforms fused silica columns above 380°C, offering greater inertness and column lifetime.

For more information about total glycerin in biodiesel oils or other methods such as fatty acid methyl esters or methanol in biodiesel oils contact Restek at www.restek.com or at 800-356-1688, ext. 4.

circle pin. 150

MXT®-1Sim Dist Capillary Column

Using Restek's unique Siltek® deactivation with metal capillary columns the MXT®-1Sim Dist column exhibits very low bleed and excellent coating efficiency. This column is designed for high temperature oven programs of up to 430°C. The column is routinely used for the analysis of hydrocarbons ranging from C6 through C120. The MXT®-1Sim Dist column is specially tested to assure that it exhibits low bleed at 430°C and that it meets the coating efficiency required by simulated distillation methods.

For more information about the MXT®-1Sim Dist column or a complete listing of all our unique metal column phases contact Restek at www.restek.com or at 800-356-1688, ext. 4.

circle pin. 151

Rtx®-1PONA Capillary Column



Restek offers a unique column for the detailed hydrocarbon analysis in gasoline. This column is highly inert giving excellent peak shape for alcohols, as well as other oxygenates. The Rtx®-1PONA column meets all

method requirements for DHA and the columns have been used to characterize all the chromatographic peaks found in gasoline.

For more information about the Rtx®-1PONA column and the labeled chromatogram of gasoline contact Restek at www.restek.com or at 800-356-1688, ext. 4.

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Fused Silica Capillary PLOT Columns

Restek offers an extensive line of GC PLOT capillary columns. Columns include the Rt-Alumina™, Rt-MSieve™ 5A, Rt-MSieve™ 13X, Rt-QPLOT™, Rt-SPLOT™, and Rt-UPLOT™ columns. For applications and additional information about the PLOT columns contact Restek at www.restek.com or at 800-356-1688, ext. 4.

circle pin. 153

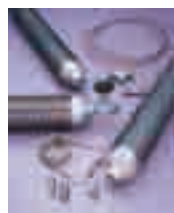
GC Packed Columns & Packing Material

Restek has the most complete line of packed columns, liquid phases, and packing materials in the industry. Our packed column chemists take pride in developing solutions to complicated analytical problems. We offer our own packing materials, including our Res-Sil™, which is a direct replacement for Porasil B and Porasil C. We also make our own hard to obtain liquid phases, such as XE-60.

For more information about Restek's unique packed column offering contact Restek at www.restek.com or at 800-356-1688, ext. 4.



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Siltek® & Sulfinert® Deactivation

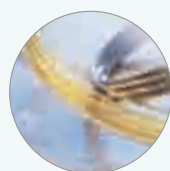
Restek's unique surface deactivation treatments improve chromatography across a broad range of applications. The Siltek® process has been applied to many chromatographic components producing a level of inertness that can lower limits of detection. Restek's Sulfinert® surface treatment is vital in today's petrochemical, refining, and natural gas industries for providing reliable transfer and storage for sulfur and mercury containing streams which can stick to conventional stainless steel equipment.

For more information about Restek's Siltek® and Sulfinert® coatings contact Restek at www.restek.com or at 800-356-1688, ext. 4.

circle pin. 155

Biodiesel Solutions

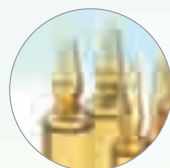
Chromatography Products & Technical Literature



GC & HPLC columns



Instrument accessories



Analytical reference materials

For complete biodiesel solutions visit us online

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Chromatography Products

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circle pin. 156



Biodiesel Fuels

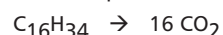
J C Jones University of Aberdeen Email: j.c.jones@eng.abdn.ac.uk

1. Background.

Biodiesel fuels are alternatives to conventional diesel for use in compression ignition engines. Their use is not new: Japanese vessels taking part in the Battle of Okinawa in 1945 are known to have been powered by Soybean oil, which remains one of the most important biodiesel fuels. Japan's paucity of fuel reserves was a factor in the course of WW2. Japan previously imported fuel from the Dutch East Indies (later Indonesia) and also from the US. For very obvious reasons US supply ended after Pearl Harbor and it was then that biodiesel fuels were brought into use for the Japanese Navy. Research and development into biodiesels was carried out and before the War ended not only Soybean oil but coconut oil had been so used by Japanese vessels.

Biodiesels came into use at that time because of shortage of conventional fuel and that remains a factor in their use sixty years after the War. Use of such fuels clearly reduces demand on conventional diesel and therefore on crude oil. The calorific value of biodiesel is something like 85% that of conventional diesel, the precise value depending on the origin and on the chemical processing if any. The Japanese development chemists whose efforts enabled the Japanese Navy to continue to function would not have been concerned with what is now seen as the major advantage of biodiesel that has led to a revival of interest in them, that is, the fact that they are carbon neutral. That means that their use leads to reductions in net carbon dioxide emissions which translates very directly into financial benefits as 'carbon credits'. The calculation in the boxed area below illustrates this.

Approximating the composition of diesel to that of the reference compound n-cetane:



where of course the above simply represents the fate of the carbon and is in no sense a balanced chemical equation. The carbon dioxide resulting from combustion of a tonne of n-cetane is calculable from the above as 3.1 tonne so replacement of a tonne of conventional diesel with about:

$$1/0.85 \text{ tonne} = 1.2 \text{ tonne}$$

of biodiesel would result in a saving of approximately 3 tonne of carbon dioxide worth in saleable carbon credit terms something like £50.

A £50 return on every one-and-a-fifth tonne of fuel used, say by an organisation like a bus fleet, is an attractive bonus indeed.

2. Sources of biodiesel and necessary chemical processing.

The table below taken from a previous publication by the author [1] gives details of several sources of biodiesel.

The following points, also in [1], can be made. Plant oil without any form of processing is sometimes suitable for use as a biodiesel otherwise its properties, not only the chemical reactivity but also certain physical properties including viscosity, can be modified by esterification of the carboxylic acids present in the oil. The extent of esterification can be matched to a desired cetane number according to a correlation of the form:

$$\text{cetane number} = (\text{cetane number of the unprocessed fuel}) + Z X (\% \text{ esters})$$

where Z is a constant.

All of the fuels described in the table are of course carbon neutral, although esterification might involve some loss of carbon neutrality if the alcohol used as a reagent is not itself carbon neutral. Soybean oil has the advantage that it can often be used without processing. The Jatropha tree, indigenous to Africa but successfully cultivated in several Asian countries, is seen as a very promising source of biodiesel for the future. Opponents of restrictions on hemp cultivation in the US like to point out that George Washington himself was a hemp farmer!

In view of the enhancement of biodiesel performance by esterification it is inevitable that esters have become model compounds in the study of biodiesels. Such esters usually in the C8 to C18 range, e.g. methyl oleate. There are difficulties with comparisons of esters with biodiesels [2]. Whereas an ester such as methyl oleate has a single-valued vapour pressure at any particular temperature a biodiesel (or a mineral diesel) does not: the measured vapour pressure depends on the space into which the vapour expands and all that can be measured for a biodiesel is some analogue of the Reid Vapour Pressure for a petroleum

fraction. Nor does a biodiesel have a 'normal boiling point' as has sometimes been asserted. There have been attempts to correlate ester and biodiesel vapour pressures using the Clausius-Clapeyron (C-C) equation for each. This is unsound as the C-C equation is for two phases of a pure chemical substance and does not apply to a mixture of compounds such as a biodiesel.

3. Selected examples of biodiesel production and usage.

The BioMer Project is a scheme whereby biodiesel will, for a specified trial period, be used to power a fleet of 12 vessels in use in parts of Ontario including the Port of Montreal and the Lachine Canal. Eleven of the vessels will be powered on neat biodiesel and the other on a blend of biodiesel and conventional fuel, the requirement over the duration of the trial being about a quarter of a million litres of biodiesel. At Velva, North Dakota USA there is a plant where 50 million US gallons per year of biodiesel are made from Canola seed. The operators of the Velva facility have plans to establish a presence on Jurong Island, Singapore with an expected output of two million barrels per year of biodiesel. Jurong Island is the scene of massive conventional oil and gas activity. Co-existence of these with a biodiesel facility sends out a dual message. First, the major oil producers are supportive of such fuels as biodiesels. Secondly, even if and when CO₂ reduction targets are met there will still be massive amounts of conventional oil and gas in use. Similarly at Grangemouth, Scotland there is a conventional refining facility, long predating North Sea oil, where biodiesel manufacture will shortly commence.

Spent cooking oil from fast food outlets has been used to power vehicles with compression ignition engines although, as noted in the entry in the above table for SVO, this is illegal in many countries. A vehicle has been driven from coast to coast in the US with such a fuel though this was probably more of a stunt than a serious performance trial. Interestingly, waste cooking oil is a fuel of 'negative value'. If not used as a fuel it incurs professional disposal charges therefore its value is negative as a supplier will reasonably pay a user to take it away if he charges less to do so than the disposal costs would otherwise have been. Add to this that waste cooking oil being plant derived is carbon neutral and therefore generates carbon credits some potential for serious usage can be perceived. Serious R&D into the use of spent cooking oil as an automotive fuel is taking place in countries including Greece.

4. Concluding remarks.

This author has been involved with fuels and combustion for about 30 years and has over that time been a frequent user of the research literature over that period and two or three decades earlier. As he has perused recent literature he has sensed a certain similarity with the 1950s literature. Then the space race was on and there was a tendency for propellants if not to dominate the literature certainly to be very evident. At the present time 50 years on, when carbon dioxide emission reductions are so high on the world agenda, there are very many papers on biodiesel in the fuel technology and fuel processing journals. A reader with access to 'Science Direct' can easily confirm this for him/herself.

References.

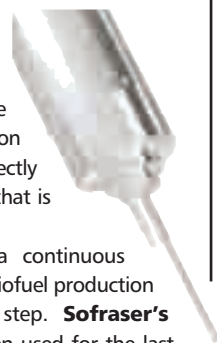
- [1] Jones J.C. 'Reflections on combustion principles as they relate to a miscellany of practical fuels' (Plenary lecture) *Book of Abstracts, International Conference Non-isothermal Phenomena and Processes* pp. 10-11 *National Academy of Sciences of Armenia (2006)*, soon to be published in full in 'Chemical Journal of Armenia'.
- [2] Jones J.C. 'Possible difficulties with calculation of vapour pressures of biodiesel fuels' *Fuel* 84 1721 (2005)

Source	Description
Hemp.	Oil from hemp a possible biodiesel. Because of possible misuse of hemp to make a narcotic drug its cultivation requires a licence in many parts of the world including the EU and the US.
Jatropha tree.	'Beans' from the Jatropha tree, which occurs in a number of African countries, produce oil at 40% yield which can be made into biodiesel. The Jatropha tree can grow under quite poor conditions of irrigation and nutrient supply.
Oil palm.	Palm oil currently being widely produced internationally as a component of biodiesel. The world's major producer at present is Malaysia where 9 million tonne of the material are being produced each year. Fluctuations in the demand for palm oil are due largely to the competition from soybean oil.
Rapeseed. (a.k.a. Canola seed)	A major source of biodiesel, 10 million tonnes grown annually in the EU.
Soybean.	Soybean oil is currently the most expensive of the liquids used as a basis for biodiesel but has some advantages over its competitors one being that Soybean-derived biodiesel is particularly suitable for use in colder regions.
Straight vegetable oil (SVO).	Vegetable oil sold for culinary purposes requiring no stringent viscosity specification. Vehicles can be adapted to run on this sort of oil in unused or in waste form, though in the latter case filtration is necessary. The adaptations to make a diesel vehicle run reliably on SVO are fairly major. Vehicular use of SVO purchased for kitchen use is illegal in many countries including the UK.

Process Viscometers Improve Biofuels Production

Viscosity is an important working property of biofuel blends as it will be handled by the injection system and sprayed into the engine cylinders. Efficiency of the combustion and yield of the engine are directly related to the quality of the spray that is linked to biofuel viscosity.

This explains the need for a continuous control of the viscosity during the Biofuel production cycle and during the blending step. **Sofraser's** (France) MIVI viscometers have been used for the last thirty years by all kind of process industries in the world. Owing to its wide working temperature and pressure areas and its ruggedness, MIVI suits perfectly for oils' and fuels' manufacturing processes. The vibrating rod at resonance frequency working principle gives to MIVI a very good repeatability and reliability that are the main advantages for controlling the extent of reactions and blending processes. As there are no moving parts, MIVI is maintenance free and the absence of drift reduces the periodical checking at its minimum level.



circle pin. 136

New Biofuels Analysis Brochure

For laboratories already engaged in biofuels analysis or for laboratories just starting up in this rapidly growing industry, **PerkinElmer** (USA) has developed a new brochure to help outline and navigate the range of analysis tools available to test biofuels according to required methods and to ensure regulatory compliance.

The Biofuels Analysis brochure is a one-stop resource for biofuels analysis. It outlines the standards required to meet ASTM, EN and other compliance requirements for biodiesel and ethanol used for fuel. The brochure also includes a comparison of various methods for bio-content analysis and information regarding robust, easy-to-use and cost-effective laboratory information management systems for efficient monitoring and reporting of critical data.

circle pin. 137

Standards for Testing Biodiesel: ASTM D-6584 and EN 14105

Chemical Reference Standards for testing Biodiesel for glycerin are now available from **AccuStandard** (USA).

AccuStandard Biodiesel impurity Standards are designed to meet ASTM method D-6584 and EN 14105.

These Standards provide laboratories the ability to quantify actual content of free and total glycerol and mono-, di-, and triglycerides. AccuStandard offers over 37,000 Organic and Inorganic Chemical Reference Standards, and stocks in several locations around the world for quick delivery. AccuStandard synthesizes Standards for supply to the Environmental and Petrochemical industries.

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products featured in this issue

Automated ASTM D 445 Testing of Biofuels & Diesels



The kinematic viscosity will be calculated and displayed on the computer screen. Data can be printed, stored or sent to a LIMS system.

Biodiesel fuels are required to be certified to ASTM specification D 6751, which states that kinematic viscosity must be measured in accordance with ASTM D 445. This is a time-consuming test to perform in the laboratory.

Now a completely automated system is available. **Rheotek's** (USA) BioVis Automated Viscometer is specifically designed for Biofuels and Diesels and it complies fully with ASTM D 445 in every respect.

The Rheotek BioVis boasts a number of unique features making it the number one choice among laboratory professionals who want expediency without compromising precision or compliance to the method. The instrument is incredibly easy to use and has been designed with operator friendly software.

The instrument will automatically: equilibrate the temperature of the sample in an ASTM Ubbelohde viscometer tube, measure the flow time of the sample, obtain two consecutive flow times, remove the sample and clean and dry the viscometer tube.

circle pin. 139

Ultra Fast GC-2010



Shimadzu Scientific Instruments has introduced the GC-2010 Series, which combines ease of use with extraordinary speed and precision to offer enhanced productivity and performance flexibility for a wide range of applications. The GC-2010 features a fast-heating oven up to 130C/min and can accommodate up to 4 columns. New

high sensitivity detectors make this the new standard for the industry. The system has RSD for repeated injection accuracy up to 0.2% and automatic retention time updating. A third generation Automatic Flow Control (AFC) coupled with electronic control of detector gases results in superior retention time stability. High-speed GC is standard with the GC-2010, which can provide a six-fold decrease in analysis time. Twenty temperature ramps and Constant Linear Velocity enable superior separation capability. A large LCD window shows graphically all of the operation of the GC including the chromatogram in progress.

GC Solution software for the new GC-2010 offers the most comprehensive data system capabilities of any GC system available. With GC Solution the system can be connected to the Internet or local LAN. Target compound, peak grouping, multiple calibration fits are all standard. A wide variety of autosamplers can be controlled with GC Solution software. For petrochemical applications, Shimadzu makes dedicated software available, which can improve productivity.

For more information, call 800-477-1227, Fax: 410-381-1222, visit our web site at www.ssi.shimadzu.com, or write Shimadzu Scientific Instruments, Inc., 7102 Riverwood Drive, Columbia, MD 21046-2502.

circle pin. 140

New Gas Chromatograph for Powerful Analysis in any Application



Shimadzu Scientific Instruments has introduced the GC-2014 Series Gas Chromatograph. Ideal for routine analysis, the GC-2014 utilizes the high-end technology of the GC-2010 to cover a wide range of applications from capillary to packed column analysis. Advanced Flow Controller (AFC) technology comes standard, offering users the precision of AFC, automatic and manual flow or pressure control. AFC provides superior retention time (0.0084% CV) repeatability. Flow

rate can be set easily by keypad input while a large LCD screen graphically monitors the flow rate and column inlet pressure. GCsolution Data Station also fully controls and processes GC-2014 data for any analysis.

Shimadzu's GC-2014 provides users with the flexibility to expand their systems for any application by installing up to four redesigned detectors and three injectors. The Series is equipped with a detector control system optimized for dual detectors (FID and TCD) and comes standard with auto-ignition and re-lite features. Simplified user controls include the ability to set all needed key parameters from a single screen. The large LCD window shows graphically all of the operation of the GC, including the data results, temperature profile, and the chromatogram in progress. The GC-2014 provides complete self-diagnostics functionality and complete logging functions, which are compliant with GLP/GMP requirements.

For more information, call 800-477-1227, Fax: 410-381-1222, visit our web site at www.ssi.shimadzu.com or write Shimadzu Scientific Instruments, Inc., 7102 Riverwood Drive, Columbia, MD 21046-2502.

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Shimadzu began building Gas Chromatography products in 1955 and remains committed to building the best GC products in the world. Throughout our long history, the customer's needs have always been central to all our design, manufacturing, and testing processes.

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circle pin. 142



High Temperature Stability Problem Solved with New Metal Columns - Analysis of Total Glycerides in Biodiesel Oils by ASTM D-6584

Barry L. Burger, Petroleum Chemist, and Jaap de Zeeuw, International GC Consumables Specialist, Restek Corporation, 110 Benner Circle, Bellefonte, PA 16823, USA

One of the biggest challenges in biodiesel fuel analysis is the accurate determination of residual triglyceride content. Triglycerides are present at low levels and elute at high chromatographic temperatures. Any suitable column must be operated at temperatures up to 380°C, which considerably strains conventional capillary tubing and stationary phases. Restek has developed new 0.32mm ID and 0.53mm ID MXT® stainless steel capillary columns—the MXT®-Biodiesel TG line—specifically for high temperature biodiesel analysis. Here we demonstrate the analytical advantages of full metal columns: unsurpassed stability at high temperatures, excellent peak symmetry for triglycerides, highly reproducible retention times, and unsurpassed column lifetimes.

Introduction

“Biodiesel”, “B100”, “B20”, “B10”, and “transesterification” are fast becoming everyday terminology. Biodiesel oil is biodegradable, nontoxic, does not contain aromatics, and the absence of sulfur from B100 precludes sulfur dioxide emissions. The “B” number designates the percentage of biodiesel in a biodiesel/petroleum diesel blend (e.g., B20 is 20% biodiesel / 80% petroleum diesel). Biodiesel is recognized as a desirable alternative energy source to petroleum-based products. However, excessive amounts of glycerides in biodiesel oil products can foul engine injectors and form deposits on valves, pistons, and injector nozzles. Also, separation of the glycerin during storage or in vehicle fuel tanks can reduce the shelf-life of the product. Clearly, accurate, efficient methods for quantifying glycerin and glycerides are critical to the biodiesel industry.

The American Society for Testing and Materials (ASTM) and the European method Deutsches Institut für Normung (DIN) describe several physical and chemical testing methods for biodiesel oil. Gas chromatography (GC) is ideal for measuring important parameters such as total glycerin, fatty acid methyl esters (FAMES) and methanol levels in biodiesel fuel. Methods like ASTM D-6584 and EN14105 set the industry standards for testing total glycerin and glycerides in biodiesel oil. The gas chromatographic column recommended for the analysis is a 10m x 0.32mm ID column with a 0.1µm film of 5% diphenyl/95% dimethyl polysiloxane, connected to a 0.53mm retention gap. The high temperatures required by these methods to elute triglycerides are a significant challenge to column stability and restrict column material choice to fused silica or metal.

Full Metal Advantage

Typically the fused silica column is the first choice for GC analysis, however at higher oven temperatures (>380°C) the polyamide coating on the fused silica tubing deteriorates, reducing column lifetimes (Figure 1). Even fused silica columns designed for high temperature applications (HT equivalents) become unpredictable and breakdown relatively quickly. In response, Restek has developed the MXT®-Biodiesel TG column line, a line of metal columns designed with stainless steel tubing and our patented Siltek® deactivation technology, ensuring maximum heat tolerance. The metal MXT® tubing does not degrade, even under temperatures up to 430°C, which allows analysts to “bake out” any residue eluting out after the triglycerides without damaging the column. This “bake out” process keeps the analytical system clean so subsequent injections do not have carry over from previous samples.

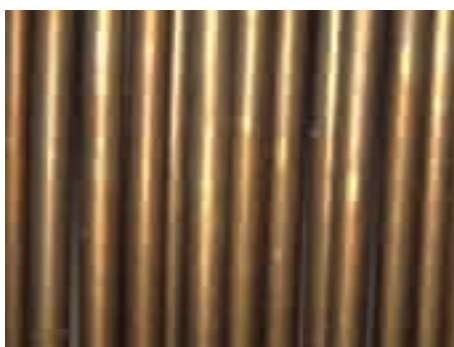


Figure 1a: MXT®-Biodiesel TG columns



Figure 1b: HT fused silica columns

Figure 1a & 1b: MXT®-Biodiesel TG columns (Figure 1a) are undamaged by high temperature heat cycles compared to HT fused silica columns (Figure 1b) which breakdown under the same conditions (100 temperature cycles to 430°C totaling 500 minutes at maximum temperature.) Note extensive pitting on the fused silica column.

Stability Solutions

The MXT® Biodiesel TG columns are deactivated using Siltek® technology, which creates a unique intermediate layer that stabilizes the stationary phase and provides unsurpassed inertness. Due to Siltek deactivation, the stationary phase is extremely stable, exhibiting virtually no bleed even at temperatures as high as 430°C. Column inertness is demonstrated by evaluating peak shape and retention time stability.

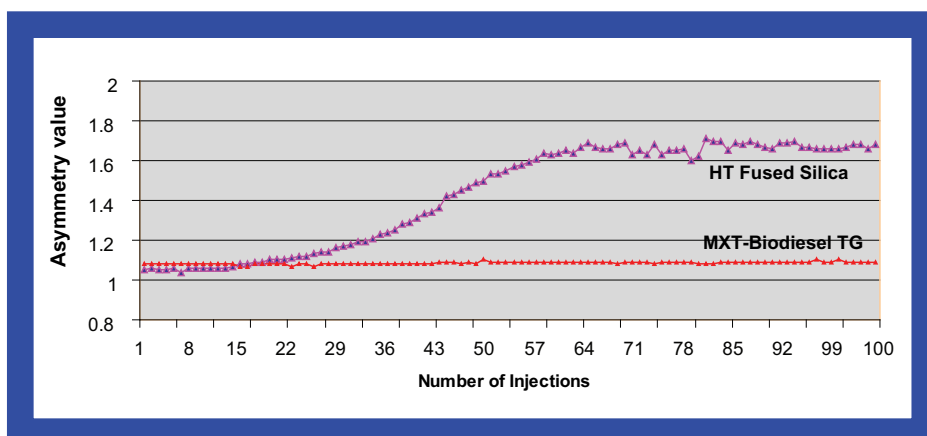


Figure 2: Metal MXT®-Biodiesel TG columns are more stable and inert than commercially available fused silica columns as evidenced by symmetric and consistent peak shape for the internal standard butanetriol.

Peak shape can be affected by active sites in the analytical column; higher asymmetry values indicate greater exposure to active sites, meaning the column is less inert. Peak symmetry of butanetriol on a commercial HT equivalent fused silica column deteriorates after just 20 injections, compared to the excellent symmetry that is maintained on the MXT®-Biodiesel column (Figure 2). While the HT column was specified to be stable up to 430°C the metal MXT®-Biodiesel TG column shows no sign of activity and is clearly more inert and stable than the fused silica column.

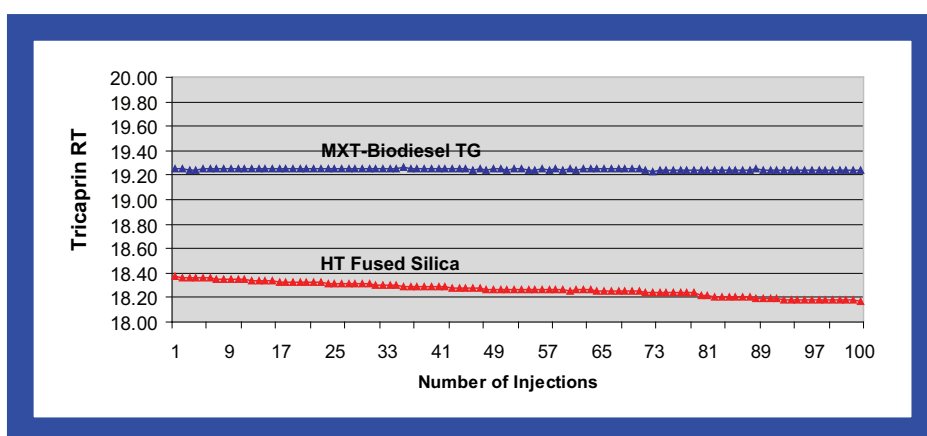


Figure 3: Retention time is stable on metal MXT®-Biodiesel TG column, even under high temperature cycling.

In addition to peak shape, consistent analyte retention times can be used to demonstrate column stability. The data in Figure 3 show the retention time of tricaprins over 100 injections for the fused silica column and the MXT®-Biodiesel TG column. The decrease in retention time of tricaprins on the fused silica column indicates liquid phase is being lost from the column. In contrast, the retention time for tricaprins on the MXT®-Biodiesel TG column stays consistent, indicating no phase loss due to cycling the column at high temperature. Practically, this translates into reliable performance and longer column lifetimes.

Unique Solutions that Simplify Practical Operation

Factory connected 0.32mm MXT®-Biodiesel TG columns & 0.53mm retention gaps

For accurate analysis of heavy triglycerides, on-column or PTV injection is required. Analytical methods ASTM D-6584 and EN-14105 describe the use of a 0.32mm analytical column coupled with a 0.53mm retention gap. The 0.53mm ID retention gap allows the on-column technique to be used, but care must

be taken to minimize dead volume and to establish a leak-tight connection. Restek's 0.32mm MXT®-Biodiesel TG columns are factory-coupled to a 0.53mm MXT® retention gap with an Alumaseal™ connector, ensuring a leak-tight connection. Target analytes resolve well and the solvent and triglyceride peaks show excellent symmetry (Figure 4).

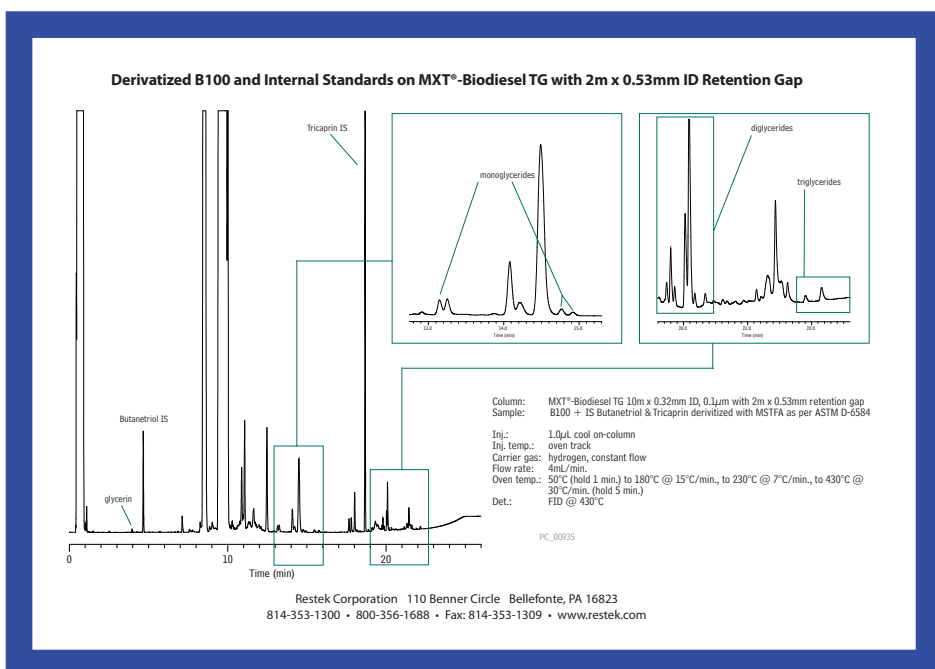


Figure 4: Glycerin and glycerides in derivitized B100 samples resolve well and show excellent peak symmetry on the 0.32mm MXT®-Biodiesel TG column, which is factory-coupled to a 0.53mm MXT® retention gap.

0.53mm MXT®-Biodiesel TG columns

The 0.53mm MXT®-Biodiesel TG columns are a simpler alternative to using a 0.32mm column coupled to a 0.53mm retention gap. Restek applied the Integra Gap™ technology to the 0.53mm MXT® Biodiesel TG columns, eliminating the column coupling. These 100% leak-proof columns feature a built-in retention gap, reducing the risk of peak broadening and tailing, and guaranteeing the user many analyses without downtime. Chromatography from the 0.53mm MXT®-Biodiesel TG with Integra Gap™ technology (Figure 5) is excellent and comparable to that obtained on the 0.32mm ID column in (Figure 4).

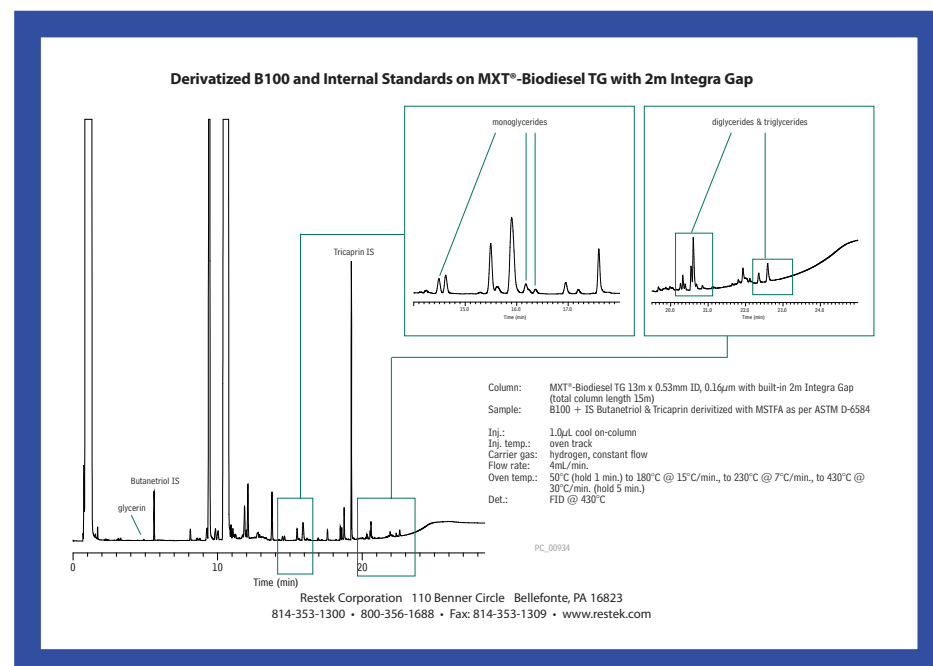


Figure 5: Equivalent chromatographic quality can be obtained on the 0.53mm MXT®-Biodiesel TG analytical column. The built-in retention gap eliminates the need for a connector, thus preventing peak tailing from dead volume.

Conclusion

As demonstrated, for high temperature GC analysis, the metal MXT-Biodiesel TG column is a rugged column that withstands the harsh temperatures required for total residual glycerin analysis. The column has the resolution needed for accurate, reliable results and is more stable at high temperatures than competitive fused silica columns. This high temperature stability leads to longer column lifetimes and less down time for maintenance and/or column change outs.

For additional information about the MXT®-Biodiesel TG capillary column or other analytical needs for biodiesel analysis contact your nearest Restek Sales Representative or Distributor.

New Biodiesel Analyser



Globally, public authorities promote the use of blends of biofuel and conventional fuel through directives and by setting ambitious goals. Standardization bodies, such as ASTM and CEN, have already published methods that outline specifications for biodiesel as blending component and test methods are available to determine the quality of the biodiesel.

AC Analytical Controls (The Netherlands) offers a new chromatographic solution that complies with all ASTM & EN test methods for biodiesel analysis.

The AC Biodiesel Systems use an Agilent Technologies high performance 7890 or the more compact, easy to use 6850 gas chromatograph equipped with: a Electronic Pneumatics Control (EPC) for setting flow and pressure parameters, a Flame Ionization Detector (FID) for signal generation, an Automatic Liquid Sampler and an a Capillary Column.

Companies Warned Ignoring the Environment on Biofuels Could Cost Future Profits

Companies are jeopardising future performance by ploughing headlong into biofuels without considering the long-term issues according to a new report launched on 14 May by **Co-operative Insurance**.

Investment in biofuels has surged in recent years because of its attraction as a supposedly eco-friendly alternative to fossil fuels. While Co-operative Insurance supports the use of biofuels it is concerned about the potential environmental and social dangers if growth continues at its current rate. It is therefore warning companies that investing in biofuels could backfire unless sustainability criteria are built into the supply chains.

Biofuel production is heavily supported worldwide by governments keen to reduce their reliance on oil as well as provide additional income to farmers. However, the area of land required to grow biofuels is so great that it could cause serious environmental problems if not managed correctly. For example, meeting increased demand could lead to deforestation, as has been the case with palm oil production in South East Asia (palm oil is a key ingredient for some biofuels). It may also push up global food prices and have disastrous effects on biodiversity. These concerns were echoed in a separate recent report issued by the UN.*

As a responsible shareholder, Co-operative Insurance wants companies in which it invests to develop effective approaches to address the challenges. It will now use the report's recommendations to engage with companies and seek reassurance that they will put strategies in place to mitigate the risks. As a shareholder Co-operative Insurance has an interest in protecting long term shareholder value by ensuring companies fully address their risks and opportunities.

Sam Lacey, Responsible Shareholding Analyst at Co-operative Insurance and author of the report, said: "Biofuels are not a panacea for climate change but can play their part if governments and companies start thoroughly managing the social and environmental impacts.

"The current growth of the industry is happening without paying attention to long-term impacts. It must be pushed in a more sustainable direction and complemented by fuel efficiency measures and reducing our use of fossil fuels."

The report makes a number of recommendations in three key areas: Examples include: Environmental and Social – Ensure that conversion of land to grow biofuels does not cause significant environmental damage. Conduct thorough stakeholder consultation prior to land conversion to avoid civil unrest. Strategic – Incorporate sustainability criteria into decision-making processes and contracts throughout the supply chain and consult with stakeholders affected. Sector Specific – Food Retailers: Prioritise sustainability in biofuels approved and seek to mitigate risks of increasing commodity prices.

Co-operative Insurance has already encouraged investee companies involved in the palm oil supply chain to join the Roundtable for Sustainable Palm Oil (RSPO). Palm oil is a key ingredient in a huge number of everyday products, such as margarine, crisps, lipstick and soap, as well as biodiesel. Many major UK businesses joined up and are working towards sustainable supply chains following engagement with CIS.



Biodiesel Analysis with Mid Infrared - From Feedstock to Fuel

Joe Boyd, Imperial Western Products and Sandy Rintoul, Wilks Enterprise, Inc.

Introduction

The biofuels industry is growing rapidly and so is the need for analysis to ensure quality product. The parameters for quality biodiesel require different types of instruments and measurement systems, such as gas chromatographs (GC), titrators, centrifuges, infrared spectrometers... Although claims are out there for the analyzer that will do it all, unfortunately there is no one instrument, or even type of instrument, that can make all the measurements to ensure product quality.

The bottom line is bad product can cause problems in a diesel engine such as filter plugging and injector coking. These problems have made engine manufacturers wary of extending warranties to high ratios of biofuels. Product quality begins at the production facility and extends to the final burn in the engine. Some of these analyses are for process control or quality verification and can be done with quick and simple verification tests while others require a more complete test according to the ASTM or EN approved methods. Many crucial measurements can be performed by mid-infrared (IR) analysis. These measurements include free fatty acids and water in the incoming feedstock, total glycerin during transesterification in production, to measuring blend ratios (biodiesel in diesel or ethanol in gasoline) and contamination of the finished fuel on the distribution end.

The Production Facility

There are three areas where analysis is useful or necessary in the production of biodiesel; testing incoming feed stock, monitoring the reaction process and verifying the quality of the finished product.

Incoming Feed Stock

Biodiesel is typically made from animal fats or vegetable oils that are chemically reacted with an alcohol (methanol or ethanol)

and a catalyst (sodium or potassium hydroxide) to produce an ester or biodiesel. The process is called transesterification. Knowing the amount of Free Fatty Acid (FFA) and water in the incoming feedstock helps the producer to adjust the amount of alcohol and catalyst for a complete reaction. FFA's in oil react with the alkaline catalyst to form soap and can cause a reduction in yield. Water deactivates the catalyst.

FFA and water measurements are for the producer and do not need to be approved methods. The approved method is a non-aqueous potentiometric acid-base titration to determine the acid number. Moisture is typically measured by Karl Fischer Titration. Both of these analyses can also be done with infrared spectroscopy. Water can be extracted from the biodiesel with acetonitrile and measured in the 6 micron region. Measuring FFA involves adding a weak base to form a salt whose carbonyl absorption band is shifted away from that of the biodiesel ester. Even with sample preparation, either measurement takes under 5 minutes and does not require a skilled technician.

During the Reaction Process

Imperial Western Products (IWP) is a manufacturer of alkyl methyl esters, better known as biodiesel. IWP utilizes multiple feedstocks, including yellow grease, soybean oil and corn oil. IWP has been producing biodiesel for over 5 years and is a BQ-9000 accredited manufacturer. They recently pioneered using a small portable mid infrared analyzer with a variable filter array, the Wilks InfraSpec VFA-IR Spectrometer (shown in the picture above right), for measuring bound glycerin during the transesterification reaction. The InfraSpec incorporates a patented design consisting of an Attenuated Total Reflection (ATR) sample plate with an electronically modulated source on one end and a linear variable filter (LVF) coupled with a linear variable array on the other. The result is a compact spectrometer with no moving parts and no optical path exposed to air that is portable and rugged.



There are several reactors used in a batch process in which the feedstock oil is transesterified into biodiesel. The transesterification reaction in their process takes 3-4 hours. To determine when the reaction is complete, a sample must be taken from the reactor and the mass % of bound glycerin (mono-, di- and triglycerides) determined on the sample. The ASTM standard D 6751, specifies that the total glycerin, which is the sum of free and bound glycerin, must be below 0.240 mass %. Since virtually all of the free glycerin is removed downstream they are concerned only with the bound glycerin. Therefore, if bound glycerin is below 0.240 mass % the reaction is considered to be complete. If greater than 0.240 mass % the reaction is allowed to continue possibly with the addition of more reactant or catalyst.

Before testing the sample, the excess methanol and sodium hydroxide catalyst are removed by washing the sample several times with water and then drying on a hotplate. After the sample has been washed and dried it is ready for testing by either gas chromatography or the InfraSpec VFA-IR Spectrometer. Running a gas chromatogram takes approximately 45 minutes. The sample can be run on the InfraSpec Spectrometer in less than 5 minutes.

IWP found that the use of the InfraSpec Spectrometer for making pass/fail determinations can significantly reduce analysis time, by about 40 minutes, and thereby decreasing wait time and increasing throughput. It is estimated that use of the InfraSpec increased reactor throughput by 15 -20 %. Although the InfraSpec instrument can not achieve the performance of a gas chromatograph, it can be useful for quickly giving a pass/fail determination for biodiesel while in-process. Testing by gas chromatography per ASTM specifications is still necessary for finished lots of biodiesel.

Distribution Center

Ensuring Product Quality at the Buyers End

A buyer should insist on a complete Certificate of Analysis that guarantees that the fuel meets ASTM D6751 requirements or buy from a BQ-9000 certified producer. Listed in the table (left) are the primary concerns for engine performance and the associated official test method. For their own peace of mind they may want to verify the most important parameters for engine performance. The last column lists potential test options, some of which are different from the ASTM method and may be quicker or simpler.

Parameter	Testing for	Engine problem	Official test method	Test Options
Residual Glycerin	Free and total glycerin	Injector coking, filter plugging, shortened shelf life, sediment formation,	ASTM D6584 (GC)	GC or IR
Residual Catalyst	Sulfated ash	Injector plugging, filter plugging, ring wear issues with lubricant	ASTM D874 (gravimetric)	Gravimetric
Residual alcohol	Flash point or % methanol (GC)	Degrades some plastics and elastomers, corrosive, can lower flashpoint (fire safety)	ASTM D93 (Pensky-Martens Closed Cup Tester)	Pensky-Martens Closed Cup Tester, GC or IR
FFA	Acid number	Poor cold flow properties, deposits on injectors and in cylinders	ASTM D664 potentiometric titration	Titration or IR
Water and Sediment	Water and sediment	Accelerated oxidation, filter plugging	ASTM D2709 (centrifuge)	Centrifuge
Cloud point		Reduced fuel flow in cold climates	ASTM D2500 (visual test)	Cooling system, visual test
Bacterial growth (in storage tanks)		Clogs filters, deteriorates fuel	ASTM D6974-04 (membrane filter)	Membrane filter procedure

Analytical Instrumentation (Focus on Biodiesel)

Storage

The main concerns for storage are water, sediments, bacterial growth and old fuel contamination. Water and sediments can be tested with a centrifuge while bacterial growth requires a membrane filter procedure.

Biodiesel/diesel Blend Ratio

Knowing the biodiesel/diesel blend is important to distributors, engine manufacturers, fleet operators, and regulatory agencies. Many engine warranties are not valid above a specified biodiesel percentage and fleet operators need to know the blend to ensure compliance with the warranty terms. The Volumetric "Blend" Tax Credit at the blender level makes the IRS concerned about the percent blend. Many regulatory Weights and Measures agencies are also required to know the blend ratio. In the mid infrared region, the biofuel ester has a characteristic absorption at the carbonyl group frequency (5.8 um) and therefore is a quick and accurate way to measure the blend ratio. Inexpensive filter based analyzers that select the 5.8 micron

wavelength, such as the InfraCal Filtometer (shown in the photo), allow for portable and easy analysis, ideal for onsite measurements. EN 14078 and the ASTM method currently in progress, both specify mid infrared for the biodiesel blend ratio.

Conclusion

No one method can satisfy all the measurement criteria to ensure that biodiesel meets the required standard. Mid infrared analysis is often a quicker method that can be used for production monitoring, to verify product quality on the buyers end, and to determine biodiesel blend. Filter based mid infrared analyzers offer the ease of use, portability and ruggedness that is required for in plant or field analysis. More time consuming methods such as GC and titration are sometimes required to meet ASTM or EN standard requirements. Determining whether your analysis has regulatory requirements or time, cost and labor requirements will help you decide what equipment you need for your specific analyses.



Measurement of % Biodiesel in Fuel with New Portable Infrared Spectrometer

The growing trend towards alternative fuels has resulted in increased biodiesel production to blend with diesel fuel - typically 20% biodiesel to 80% diesel fuel. With the new portable infrared spectrometer - the InfraSpec VFA-IR Spectrometer from **Wilks Enterprise, Inc.** (USA) it is now possible to easily and accurately measure this blend ratio on-site in the manufacturing plant by non-technical personnel. Percent concentration results are displayed on a PC in less than one minute.

The InfraSpec Spectrometer represents a new concept in portable mid-infrared instrumentation that provides spectral, quantitative or qualitative information on a wide variety of materials wherever the measurement is required - at the production line, in the field or in the laboratory. The InfraSpec VFA-IR Spectrometer to measure percent biodiesel in diesel fuel utilizes attenuated total reflection (ATR) sampling technique to make the analysis. The exposed ATR crystal on the built-in sample stage makes analysis and cleaning quick and easy. With a simple interface for non-technical operators, the material is placed on the ATR sample stage and a readout in % biodiesel is displayed within one minute. The measurement range is 0.05 to 100% with an accuracy of 0.05% of scale.

The InfraSpec VFA-IR Spectrometer incorporates a patented design consisting of an ATR sample plate with an elongated, electronically modulated source on one end and a linear variable filter (LVF) and linear variable array on the other. The result is a compact spectrometer with no moving parts and no optical path exposed to air that is portable and rugged. The software includes an internal calibration program that allows for simplified screen interface that give a digital readout in % biodiesel for non-technical end users.

Miliband visits Ensus Bioethanol Project as Construction Starts on World-scale Facility



UK Environment Minister David Miliband has marked the beginning of the construction of one of Europe's largest biofuel developments, the **Ensus** (UK) plant on Teesside, with a visit to the Wilton International petrochemical site in the North East of England. The Minister visited the Wilton Centre to talk to biofuels firm Ensus about their intention to make the green, petrol ad-

ditive, bioethanol.

The UK company announced in March that it had secured investment from The Carlyle Group to build a world scale plant at Wilton with an annual capacity of more than 400 million litres of the environmentally friendly fuel. The product will be made from around a million tonnes of wheat a year using a process of fermentation and distillation. Bioethanol is a renewable alternative for petrol driven vehicles produced using farm crops as the raw material. Due to the carbon dioxide absorbed by the crops as they grow, use of bioethanol as a transport fuel results in a substantial net carbon saving relative to the oil-based alternatives.

During his visit Mr Miliband, the Secretary of State for Environment, Food and Rural Affairs, was briefed on the company and the project and lead a ceremony to mark the beginning of construction work on Ensus 1. Mr Miliband spoke of the need to "kick our addiction to oil-based fuels" and embrace renewable energy. The UK Government has announced that from April 2008 it will be introducing the Renewable Transport Fuels Obligation ("RTFO"). The RTFO will ensure a significant and stable market for biofuels in the UK, setting a mandatory target of 5% of transport fuels to be made up of biofuels by 2010.

The plant will begin commercial operation in 2009 and will supply around one third of the UK's anticipated bioethanol needs by 2010. The investment will create 100 new jobs on the site and sustain more than 1,500 jobs in farming as well as hundreds of others in construction and supply industries.

Ensus has plans to build other similar units in Europe over the next few years to meet anticipated demand.

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New Level Sensor Has Accuracy to the Drop!

The new Jupiter® 200 from **Magnetrol** (Belgium) is the safest magnetostrictive liquid level transmitter on the market today. With a SFF of > 90%, the Jupiter is suitable for SIL 2 instrumented loops as a 1oo1 device and exceeds the rating of any other equivalent device. Jupiter is a highly accurate (0,4mm) transmitter with repeatable measurement (0,13mm) over a measuring range of 5,7m.

The Jupiter is a loop-powered level transmitter and simultaneously measures top and liquid-liquid interface levels. The end user can easily select which primary variable should control the loop signal via the Eclipse® look alike menu. The use of a Moore HIM® loop card enables both top and liquid-liquid interface levels to be available as an analog output.

The Jupiter 200 series direct insertion model can be mounted directly on the vessel or inside a stillwell, bridle or bypass cage. The direct insertion model is suitable for clean liquids only and handles process temperatures up to +260°C.

The external mount version of the Jupiter 200 clamps on Magnetrol's Atlas™ magnetic level indicator. As an external mount model, the Jupiter handles any type of liquid including slurries and process temperatures up to +455°C.

The Jupiter 200 series is designed for pressure ranges from full vacuum up to 26.2 bar @ +40°C (direct insertion models). External mount models are not affected by any process condition (viscosity, density, temperature, pressure...) but rely on the float limits of the MLI on which the unit is mounted.

The Jupiter 200 performs a continuous diagnosis on the float integrity and electronic circuitry. It also guards the ambient temperature of the electronics and records any diagnostic message. The Jupiter 200 is compatible with HART®/AMS®, PACTware™ and Foundation Fieldbus™ communication protocols.

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Gas Metering You Can Trust



At the Interkama last April, **Krohne** (Germany) presented the new generation of ultrasonic gas flowmeters for custody transfer applications. The Altosonic V12 sets new standards for accuracy and cost efficiency. The flowmeter has twelve measurement chords of which two are reserved exclusively for diagnostic functions. Once in operation, the Altosonic V12 continuously

monitors its own operating status. The layout of the chords on each of the five parallel levels compensates for any turbulence and therefore guarantees reliable measurement results even with turbulent flow profiles. The diagnostic functions reliably detect any deposits, dirt or changes in surface roughness and thus reduce maintenance to the absolute minimum.

Krohne was the first to separate fiscal data from diagnostic data in an ultrasonic gas flowmeter used for custody-transfer applications. Two separate signal outputs transmit diagnostic data directly to the user and to the Krohne Care™ Web server. The Web server has all the Altosonic V12 status information required. For the Altosonic V12, the user can receive information not only about the measuring instrument itself but also about the instrument's application conditions. The system is based on the "condition-based maintenance" design whereby maintenance is performed only when required by process conditions. Krohne processes the information in a database and informs the user as soon as any intervention is required. Krohne Care™ has a user-friendly graphic interface which is truly easy to use. The Altosonic V12 is available in standard widths from DN100 to DN600 and with an installation length of 3D. The flowmeter is compatible with most commercial protocols and can therefore be used with any type of existing infrastructure.

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Mass Flow Meters Receive ATEX Approval for Air/Gas Service



With their intelligent microprocessor-based design and no-moving part thermal mass flow sensors that deliver high accuracy gas flow measurement, the precision GF90 Insertion and GF92 Inline Mass Flow Meters from **Fluid Components International** (USA) have now received ATEX approval for use in potentially explosive environments classified as EExd IIC T4.

FCI's newly ATEX-approved GF90 and GF92 Mass Flow Meters are air/gas flow meters that have been designed to isolate their electronics from the danger of explosive hydrocarbon gases and other dangerous gases. The ATEX directive requires flow meters and other electrically-powered instruments and control devices meet specific design criteria to prevent explosions and fires in the presence of combustible gases.

FCI's newly ATEX-approved GF90 and GF92 Flow Meters are designed with a precision thermal mass gas flow sensing element manufactured with 316 stainless steel and nickel-braze construction for superior performance in rugged environments. They feature turndowns of 1000:1, repeatability of +0.5 percent of reading or better and a flow rate accuracy of +1 percent of reading plus 0.5 percent full scale.

The GF90 and GF92 were developed for complex multi-gas or variable flow processes with an advanced microprocessor-based programmable transmitter. The GF Series transmitter can store up to three calibration groups. Each group can be independently configured for a specific calibration range, fluid, switch point settings, etc., to provide accuracy in complicated gas processes. These instruments are also inherently multi-variable, providing both flow and temperature measurements without any additional tap points.

The GF90 and GF92 each come with a standard NEMA Type 4X (IP66) rated transmitter enclosure, with configuration options for local or remote mount application. Optional Class I and II, Division 1 and 2, Groups B, C, D, E, F and G [EEx d IIC] transmitter enclosures are also available with agency approvals for FM, CSA and ATEX.

The GF90 is a heavy-duty industrial flow meter designed for applications that include: flare gas, combustion air to boilers, scrubber balancing, exhaust stacks and more. It is suitable for use in ducts or pipes with a minimum 2-inch (50 mm) nominal inside diameter. Flow sensitivity ranges from 0.25 to 1600 SFPS (0.08 to 488 NMPS) at a standard temperature of 70°F (21.1°C) and pressure of 14.7 psia (1.013 bar (a)). It is available for service in fluid temperatures from -100 to 850°F (-73 to 454°C) and pressures to 1000 psig [69 bar (g)].

The GF92 is a heavy-duty flow meter that offers excellent low-flow measurement characteristics and is ideal for applications such as compressor fuel monitoring, nitrogen purge monitoring, digester gas monitoring and hydrogen make-up gas. It can be used in tubing or pipe lines ranging in size from 0.125 to 3 inches (3.2 to 76mm). Flow sensitivity ranges from 0.006 to 2000 SCFM (0.01 to 3398 NCMH) at a standard temperature of 70°F (21.1°C) and a pressure of 14.7 psia [1.013 bar (a)]. It operates in fluid temperatures from -50 to +350°F (-45 to 177°C) and at pressures to 1000 psig [69 bar (g)].

circle pin. 170

Multi-Variable Level Sensor for Level, Interface and Temperature Measurements



At the heart of the new high-accuracy, level measurement system from **Ametek Automation & Process Technologies** (USA), is the 7230 Series HT Digital Probe—a versatile, multi-variable level sensor that provides total level, interface level and up to 5 temperature readings and a diagnostic function.

The 7230 HT Series Digital Level Sensor was specifically designed to provide a single sensor for the measurement of multiple layers of oil products and gas condensates, including water layers, making it ideal for oil and gas pipeline applications. The sensor requires no calibration and only one process connection. It provides the highest level of accuracy available for materials that are difficult to measure using most other level technologies. These include mixed hydrocarbons and other low dielectric liquids.

The 7230 HT Series utilizes field-proven magnetostrictive position sensing technology in a unique design that makes it more reliable and easier to install and maintain. The probe's accuracy is an impressive 0.01% of measured span. A patented reflector increases signal resolution and repeatability to 0.0001 inch.

The probe's performance is unaffected by changes in the process material's electrical characteristics or densities. Hydrocarbon-based condensates have a predictable range of specific gravities that are well within the range of the sensor's standard floats. The probe and floats are made from 316 Stainless Steel and easily mount in a two-inch NPT process connection, using either a flange or adapter bushing. The sensor has an explosion-proof approval rating from FM and CSA for Class1, Div 1, Group A, B, C, D hazardous locations.

A choice of two communications protocols is available. The 7231's standard protocol is Modbus RTU and is also available with an optional Modbus to Analogue output converter. The 7235 provides a proprietary ASCII digital output suitable for OEM and wireless applications. Product differentiators, such as multi-variable output, no calibration, minimal maintenance and very high accuracy, distinguish the 7230 Series from non-contact and guided wave radar level sensors that are commonly used for petroleum applications.

circle pin. 171

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Flow Level Pressure

Web Based Tank Inventory System - Tankvision



Tankvision is a modern tank inventory management system with unique abilities. Using Tankvision to access tank farm inventory data will not only result in improved material availability but also in significantly increased safety. Tankvision is the first specific tank inventory management system featuring universal browser access via your network. The system is based on a consistently modular concept, which results in scalable solutions geared to your requirements. Small yet efficient boxes

perform as the heart and information platform of tank farms, connecting sensors, and both transporting and visualizing data. With Tankvision, it's all in the cube.

circle pin. 172

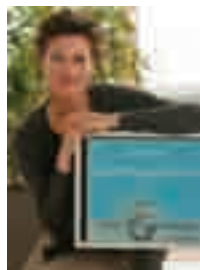


Displacer Replacer – Levelflex High Temperature/High Pressure

Smart guided wave radar transmitter for continuous level measurement and overspill protection. Levelflex FMP45 high pressure/high temperature version provides automatic gas phase compensation as a unique and most accurate solution to compensate for changing radar signal speeds and thus, large measuring errors that can occur due to high temperatures and high pressures, especially in polar gases/steam, e.g. boiler drum. Levelflex sees the error in the application and updates the output reading to the highest accuracy every second. Thus, Levelflex provides peace of mind and confidence in the accuracy of the level measurement, even in temperatures of $-200\text{ }^{\circ}\text{C} \dots +400\text{ }^{\circ}\text{C}$ / $-328\text{ }^{\circ}\text{F} \dots +752\text{ }^{\circ}\text{F}$ and pressures of vacuum to 400 bar / 5800 psi.

circle pin. 173

Applicator - Engineering with Answers



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circle pin. 174

iTemp TMT162 and TMT142 Temperature Field Transmitters



Compact temperature assemblies providing high reliability and excellent performance in harsh industrial environments. Both transmitters feature backlit illuminated displays. Both are available with a die cast stainless steel housing made of SS316L/1.4404 designed for demanding applications within the oil and gas industry.

TMT162 also features HART® or FOUNDATION™ Fieldbus communications with dual sensor input for resistance thermometers, thermocouples and resistance and voltage transmitters. Sensor breakdown information and backup, drift alarm and corrosion monitoring avoids shutdowns and ensures high process availability.

TMT142 is a more affordable alternative to the TMT162 where limited features are required.

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Loewel, new.de

Promass Coriolis Mass Flow

Reduce uncertainty, increase savings

Minimum space, maximum savings

- Smallest footprint – single, compact device with no straight runs, flow conditioner or filter required

Load the right mass

- Highest accuracy and repeatability
- Reduce claims in ship loading – less discrepancies between onshore and tanker figures

No on-site proving required

- Precalibrated with oil
- Integrated advanced diagnostics for constant monitoring

Life cycle cost savings

- Maintenance free – no moving parts, no wear and tear

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Endress+Hauser 

People for Process Automation

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New Range of Coriolis High Temperature Flowmeters

Completing its family of high temperature Coriolis flowmeters, **Emerson Process Management** has introduced the Micro Motion F-Series range of high temperature products. The Models F025, F050 and F100, are now available in Stainless Steel or Hastelloy, all rated to 350° C for best-in-class measurement in a compact, drainable style.

Together with the highly-acclaimed ELITE™ high temperature meters, the new F-Series high temperature meters complete the range of line sizes from Micro Motion for high temperature applications, offering 6mm to 100mm (1/4" to 4") in 316L Stainless Steel or Hastelloy C-22 (available in all sizes up to 80mm/3" size). The electronics for both meter lines are attached at the end of a flexible conduit and away from the heat of the sensor. This means that customers are able to choose any transmitter option for integral transmitter mounting.

Micro Motion F-Series high temperature Coriolis meters are especially suited to harsh operating environments and applications, such as hard to refine heavy crude, where alternative flow measurement devices cannot handle the high temperature process fluids. Other applications include high temperature processes such as asphalt, bitumen, monomers, polymers, wax and cooking oils that are difficult to control and keep below a set temperature limit.

With Micro Motion high temperature Coriolis meters, customers can run heavy refined products hotter for a more productive and repeatable process. And, because Micro Motion high temperature meters have higher operating limits, there is no need to keep temperatures from exceeding an upper limit.

With the added confidence in the reliability of a meter designed especially for high temperature service, users can realise greater profitability through lower operating costs and reduced raw material costs.

Whereas the accuracy of all other Coriolis meters is dependent on the flow rate, only Micro Motion meters with patented MVD™ technology are flow rate independent, delivering stated accuracy without additional uncertainty caused by "zero stability" over the typical flow range. Use of this rigorous specification methodology means that the Micro Motion F-Series meter, with improved sensor design and advanced Micro Motion MVD technology, is more accurate across its overall flow range than any Coriolis meter in the compact, drainable class.

The new high temperature Micro Motion Coriolis meters are part of the broad range of intelligent, digital field devices from Emerson that power the PlantWeb® digital plant architecture to improve plant efficiency by 2% and more through delivering asset optimisation, process automation, and management execution. Further cost savings, increased plant availability, and enhanced safety and environmental compliance are achieved when the meters are integrated into the PlantWeb architecture.



Flare Gas Flow Meter Accurately Measures Hydrocarbon Gases With Variable And Low Flows



Oil/gas process engineers seeking a reliable solution to measure the flow of combustible hydrocarbon waste gases for flare gas system disposal on offshore production platforms will find the GF90 Flare Gas Flow Meter from **Fluid Components International** (USA) precisely measures gases of varying compositions. These dangerous toxic gases often flow at such varying and/or low levels that they become a serious challenge to sense, measure and eliminate.

With its highly sensitive thermal mass flow sensing element and microprocessor-based intelligence featuring multiple calibration groups, the advanced GF90 Flare Gas Flow Meter delivers precision flow measurement to 0.25 SFPS. Accurately measuring combustible hydrocarbon waste gases for flare system disposal ensures that these dangerous byproducts are safely and efficiently eliminated from the environment. The disposal of flare gases protects people, equipment and air quality.

The versatile GF90 features a thermal mass gas flow sensing element designed with 316 stainless steel and nickel-braze construction. It also can be specified with corrosion and abrasion-resistant alloys, including Hastelloy, Monel and tantalum, and with all-welded construction for service in the harshest environments. It is available for service in broad range of fluid temperature applications, from -100 to 850°F (-73 to 454°C) and pressure applications to 1000 psig [69 bar (g)].

Designed for complex multi-gas or variable flow processes, the GF90 Flow Meter includes an advanced microprocessor-based programmable transmitter. The transmitter can store up to three calibration groups. Each group can be independently configured for a specific calibration range, fluid, switch point settings, etc., to provide accuracy in complicated gas processes. The instrument is also inherently multi-variable, providing both flow and temperature measurements without any additional tap points.

Developed with constant power technology, the GF90 features turndowns from 1000:1, accuracy of +1 percent of reading plus 0.5 percent of scale, with repeatability of +0.5 percent of reading or better. Flow sensitivity is from 0.25 to 1600 SFPS [ft/sec at a standard temperature of 70°F and pressure of 14.7 psia] or 0.08 to 487.7 NMPS [m/sec at a normal temperature of 21.1°C and pressure of 1.013 bar absolute].

The GF90's transmitter electronics are addressable via a built-in LCD display and keypad or through its RS-232C and RS-485 serial ports. This allows the user to perform in-field programming to change zero, span, switch points and engineering units, or to perform instrumentation verification, troubleshooting and other critical functions. The serial I/O ports support access to computers or ASCII terminals.

The GF90's transmitter features two independent, field programmable analog signal outputs of 4-20 mA, 0-10 Vdc, 0-5 Vdc, and/or 1-5 Vdc., which can be assigned to any combination of flow and/or temperature. It also offers dual alarm switch points with relay outputs. The switch points are user, field programmable to alarm at high, low or windowed and can also be assigned to flow and/or temperature readings. Dual 10A relay outputs are provided for contact closures to lamps, alarm and control systems.

A NEMA Type 4X (IP66) rated transmitter enclosure is standard. Optional Class I and II, Division 1 and 2, Groups B, C, D, E, F and G [Ex d IIC] transmitter enclosures are also available with agency approvals for Factory Mutual Research, ATEX, CSA, GOST/RTN, IEC, CPA and NEPSI.



Space-Saving Flow Meter for FPSO Vessels Delivers High Accuracy In Marine Applications

The Cerabar S pressure transmitter and Deltabar S differential pressure transmitter from **Endress + Hauser** (Germany) offer excellent linearity (0.075% as standard) and also meet the latest industry legislation and directives such as ATEX and NACE. They are also SIL compliant to IEC61508/61511.

Both Cerabar S and Deltabar S are built to last: the robust, dual-chambered stainless steel or epoxy coated aluminium housing offers protection against the elements to IP67 (IP68 optional). The transmitters are designed and manufactured according to IEC61508/SIL2 – from firmware to hardware and software – and are TÜV certified. In addition, the devices feature ATEX Ex ia, Ex d or dual certification hazardous area protection. And, with NACE conformity, they are even suitable for the harsh environments encountered in the oil & gas industry.

For additional functionality, the optional integrated HistoROM®/M-DAT memory chip allows simple acquisition, back-up and display of key process data – and the identical configuration of other Endress+Hauser Evolution pressure instruments. It also offers diagnostic functions, additional process information, simulation and analysis for improved process control.

It's an Endress+Hauser hallmark: sophisticated technology that's easy to use. Both Cerabar S and Deltabar S include a Quick Setup menu to make configuration easy and reliable. Just select pressure, level or flow using the menu-driven display according to your application – and you're away. Should there be a problem, you'll know straight away as there are no confusing error codes – it's all in plain English! The three pushbuttons give complete functionality for easy, safe commissioning and the pushbutton recess gives excellent protection against contamination and moisture ingress into the main housing. What's more, with HART, PROFIBUS and FOUNDATION Fieldbus compatibility, these clever transmitters can be easily retrofitted into existing systems.

Statoil Pick Wetgas Meters for Norwegian Shelf

Roxar (Norway) have announced that it has signed a deal to supply its industry leading Roxar subsea Wetgas meters to FMC Technologies for several key Statoil key gas fields in the Norwegian Continental Shelf (NCS), including the Alve field. The announcement came on the opening day of the 2007 Offshore Technology Conference, which took place in Houston.

The contract was signed with FMC Technologies, one of the world's leading EPC (Engineering Procurement Construction) companies, who is supplying the subsea systems to Statoil. The deal reflects FMC Technologies and Statoil's continued focus on innovation and development in the NCS.

The Roxar subsea Wetgas meter is the latest in wet gas metering technology, providing real-time, accurate measurement of hydrocarbon flow rates and water production as well as online detection of formation water breakthrough.

The meter's ability to measure water in very small amounts is an important input parameter for Statoil in the Alve field in gaining a further understanding of the reservoir, guaranteeing continuous flow, optimizing equipment, and allowing for preventative or remedial action to be taken, such as optimizing chemical injection.

In addition, controlling hydrates in the subsea production system and ensuring the correct composition of the pipeline prior to entering the transport systems was a key driver in the selection process for the other fields.

The Alve field is a gas/condensate/oil field, which lies 16 kilometers south-west of the Norne field in water depths of 390 meters, and will be developed as a satellite tie-back to the existing Norne FPSO (Floating, Production, Storage and Offloading) vessel. Recoverable reserves are estimated to be 6.78 billion cubic meters of gas and 8.3 million barrels of condensate with output expected to commence in December 2008.

The Roxar subsea Wetgas meter is a compact, state of the art meter for the inline measurement of wet gas flow and is designed for installation in wells with GVF more than 95 per cent volume. Performance tests have shown the meter is able to detect changes in the water production with sensitivity better than +0.005 per cent volume while the absolute accuracy is +0.1 per cent volume in high GVF (more than 98.5 per cent) cases.

Roxar creates value for its customers through its Reservoir Interpretation, Reservoir Modeling, Reservoir Simulation, Well and Completion, Production and Process Solutions and Consultancy Services.

Roxar is a key provider of multiphase metering to Statoil, with Roxar subsea Wetgas meters in place in the Snøhvit and Mikkel wet gas fields. In September 2005, Roxar installed the largest multiphase meter (12%) ever to be delivered to the oil and gas industry at Statoil's Norne field on the FPSO vessel.

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Daniel® Gas Metering System Upgrades Fiscal Monitoring for Makpetrol

Emerson Process Management has recently completed a major modernisation programme at a Custody Transfer Gas Metering Installation at the Makpetrol Border Station in Macedonia. The scope of work undertaken by Emerson included design, fabrication, inspection, test, and delivery of a complete Daniel gas metering system.

The existing measurement system at the station consisted of three streams utilising orifice measurement technology and Makpetrol wanted to confirm the ability of the Daniel SeniorSonic™ Gas Ultrasonic meter as an accurate, reliable, cost-effective alternative for Custody Transfer measurement.

The new metering system was commissioned throughout 2005 and since then, the difference between orifice and SeniorSonic base volume flows has been typically 0.5% or less. This confidence in the metering accuracy, along with the stable accurate performance of the meter, led to the Daniel SeniorSonic being approved for use for primary flow measurement by Makpetrol and Gazprom.



The Makpetrol Border Station in Macedonia uses Daniel SeniorSonic meters for primary flow measurement

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Emerson Delivers Unique Custody Transfer Flow Metering Solution

In early 2006, a leading global oil & gas customer approached Emerson for help with enhancing its custody transfer measurement on a pipeline that transported diesel and gasoline through the state of Texas, USA.



The Daniel Model 3804 liquid ultrasonic meter maintains high accuracy in varying pipeline conditions

Emerson's Daniel division, the global leader in custody transfer solutions evaluated the existing measurement technologies and recommended the newly introduced Daniel Model 3804 Liquid Ultrasonic Meter. The customer already had a turbine meter in line at site for custody transfer measurement. The objective was to help the customer with a highly accurate and repeatable measurement, reduce their maintenance costs and provide them with an easy to use and configure meter with a full suite of remote diagnostics and communication.

The Daniel Model 3804 ultrasonic meter was installed in series with an 8" turbine meter and a comparison of proving data over the past year is impressive. The two meters show a difference of just 50 barrels over the 15+ million barrels that have flowed through the two meters representing a difference of 0.0003%.

In fact, the customer is so impressed with the long term stability of the ultrasonic meter, the lack of required maintenance, and the meter's ease of use that the customer plans to remove the turbine meter and use it elsewhere.

For more information visit www.EmersonProcess.com/daniel

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You offloaded 2,091,038 barrels of oil from your tanker. Or did you?

When 0.10% costs you \$13.1 million per year*, there is no room for inaccurate measurement. The Daniel® Model 3804 Liquid Ultrasonic Meter assures you accurate measurement with real time diagnostics and a graphical representation of the flow rate and flow profile. The Daniel CUI (Customer Ultrasonic Interface) Windows® - based software offers you a comprehensive remote dashboard, "Playback and Capture" functionality, and a maintenance reporting feature that makes the Daniel Model 3804 Liquid Ultrasonic Meter easy to use. The diagnostics allow you to improve your asset uptime and lower your operating costs. See how much you can save at www.EmersonProcess.com/Daniel/3804.htm



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*Calculation based on crude oil at \$60 per barrel and assumes two tanker loads per week. The Emerson logo is a trademark and service mark of Emerson Electric Co. © 2007 Emerson Electric Co. The Daniel logo is a registered trademark of Daniel Industries Inc. Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Smart Thinking for Tank Gauging



Enraf (The Netherlands) is establishing new benchmarks in tank gauging accuracy, flexibility and reliability with the introduction of Enraf SmartRadar FlexLine.

The modular design of the SmartRadar FlexLine and accessories assures the integration with existing tank inventory management systems to optimise existing tank gauging. SmartRadar FlexLine combines Enraf's new software algorithms with its internationally acclaimed planar antennae technology. Together, they offer new opportunities for operators to make greater use of tanks and introduce higher levels of operating efficiency. With SmartRadar FlexLine operators are ensured that the levels of precision demanded for custody

transfer accuracy, stock management, quality control and transhipment are fully complied with at all times. In addition; the system's FlexConn architecture can adapt to either legacy or future functionality

Even in the most challenging circumstances, including unstable dome roofs and the worst possible stilling wells, SmartRadar Flexline maintains its ultra-high performance levels. In many cases there is no need for a costly stilling well, as a free space nozzle can be located close to a tank shell and custody transfer accuracy remains uncompromised.

SmartRadar Flexline performs where other radar systems fail: obstruction effects, tank wall effects, nearby effects, near-bottom effects, mismatch effects, large slot effects on stilling wells and changes in temperature and thermal expansion conditions are all of no consequence. Maintaining certified accuracy innage levels as low as 10cm and ullage distances of 30cm means the creation of a tank operating volume that is larger than with any other radar gauge available on the market.

True operating flexibility however is not the result of measuring accuracy alone: it is assured through the wide availability of antennae that take into account the requirements of the installation and customers' needs, together with the provision of a broad set of communications protocols that match existing tank gauging systems and offer a comprehensive range of I/O options. Complete digital signalling processing technology, optimum connectivity and compact, innovative and field proven planar antennae create the ultimate measuring system for all eventualities.

With compliance to API, OIML, IEC Ex, ATEX, CSA and FM, Enraf's SmartRadar Flexline is a customer orientated building block enabling end-users to upgrade and optimise their existing tank gauging systems and plan for all future eventualities.

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Reliable Pressure Measurement

The Cerabar S pressure transmitter and Deltabar S differential pressure transmitter from **Endress + Hauser (UK)** offer excellent linearity (0.075% as standard) and also meet the latest industry legislation and directives such as ATEX and NACE. They are also SIL compliant to IEC61508/61511.

Both Cerabar S and Deltabar S are built to last: the robust, dual-chambered stainless steel or epoxy coated aluminium housing offers protection against the elements to IP67 (IP68 optional). The transmitters are designed and manufactured according to IEC61508/SIL2 – from firmware to hardware and software – and are TÜV certified. In addition, the devices feature ATEX Ex ia, Ex d or dual certification hazardous area protection. And, with NACE conformity, they are even suitable for the harsh environments encountered in the oil & gas industry.

For additional functionality, the optional integrated HistoROM®/M-DAT memory chip allows simple acquisition, back-up and display of key process data – and the identical configuration of other Endress+Hauser Evolution pressure instruments. It also offers diagnostic functions, additional process information, simulation and analysis for improved process control.

It's an Endress+Hauser hallmark: sophisticated technology that's easy to use. Both Cerabar S and Deltabar S include a Quick Setup menu to make configuration easy and reliable. Just select pressure, level or flow using the menu-driven display according to your application – and you're away. Should there be a problem, you'll know straight away as there are no confusing error codes – it's all in plain English! The three pushbuttons give complete functionality for easy, safe commissioning and the pushbutton recess gives excellent protection against contamination and moisture ingress into the main housing. What's more, with HART, PROFIBUS and FOUNDATION Fieldbus compatibility, these clever transmitters can be easily retrofitted into existing systems.

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Solartron® density is now called Micro Motion

The clear leader in flow and density measurement

Learn more at www.EmersonProcess.com/MicroMotion

EMERSON
Process Management

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Rugged V-Cone Flow Meter Ideal For Gritty Oil Sands Separation Processes

Oil Sands process engineers looking for a rugged all-purpose flow meter that delivers high accuracy measurement in dirty liquid, natural gas or steam media will find the versatile V-Cone Flow Meter from **McCrometer** (USA) is the right fit for extreme process environments.

Extracting oil from tar sands, which include a combination of crude bitumen (a semi-solid form of crude oil), silica sand and clay minerals, requires three processes-- extraction, separation and upgrading. The tar sands are typically mined from open pits and sent to a plant, where a hot water process and agitation are used to separate bitumen droplets that are later upgraded into synthetic oil.

Other alternative oil sands processes inject heated steam directly into the sand for the purpose of separation where bitumen deposits are deep below the surface. No matter the process, large amounts of water and energy are required for heating and pumping purposes. Flow meters that can accurately and reliably measure liquids, natural gas and steam play an important role in controlling and optimizing these processes to produce oil with the highest efficiency.

McCrometer's V-Cone Flow Meter provides a high accuracy, dependable flow measurement solution for oil sands production and refining in all media. It operates in the most demanding conditions—including dirty flows, high temperatures and high pressures with superior accuracy of +0.5% of flow rate and repeatability of +0.1%.

The precision V-Cone's unique no-moving parts design provides built-in flow conditioning, which also nearly eliminates the upstream/downstream straight pipe runs required by nearly all other flow meter technologies. Typical flow meter installations require 10 to 40 straight pipe diameters upstream from the meter and 5 or more straight pipe diameters downstream to eliminate the effects of swirl and other pipeline disturbances caused by valves or elbows that negatively affect measurement accuracy.

The space-saving V-Cone reduces typical flow meter straight pipe run requirements by up to 70 percent or more and needs only 0-3 straight pipe diameters upstream and 0-1 downstream to operate effectively. It fits in crowded separation plant layouts as well as in refineries, while also reducing pipe material costs and installation labor costs dramatically.

The versatile V-Cone operates over a wide flow range of 10:1 and supports line sizes from 0.5 to 120 inches. Oil sands process engineers can rely on the V-Cone Flow Meter for long life and low cost of ownership because it requires virtually no recalibration or maintenance over an exceptionally long life.

McCrometer's versatile V-Cone Flow Meter is compatible with the demanding standards set by the oil/gas production, delivery and refining industry. The testing of the V-Cone Flow Meter now conforms to the American Petroleum Institute's API 22.2 Testing Protocol for differential pressure flow measurement devices.

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New Product Guide Features Six Meter Divisions



US Manufacturer, **Racine Federated, Inc** (RFI) introduces a new product guide listing the company's six flow meter divisions that offer a variety of measurement technology. The group includes Blancett®, Flo-Tech®, Hedland®, Dynasonics™, Preso®, and Racine Vortex™. With the unique product mix and a team of dedicated and experienced personnel, RFI offers high-quality and cost-effective solutions for most flow measurement applications.

This product guide was designed to incorporate the divisions into one brochure. The eight-page catalogue highlights Blancett's turbine meters; Dynasonics' transit time and Doppler meters; Flo-tech's hydraulic tester and sensor; Hedland's in-line variable area flow meters. The six divisions serve the industrial, municipal and commercial markets worldwide.

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june7leads@pin-pub.com

Request information on products featured in this issue

Siemens Clamp-on Pipeline Interface Detector



Siemens temperature compensated clamp-on pipeline interface detector provides exceptional repeatability over a wide range of liquids with different densities, independent of change in temperature, pressure or viscosity. Data outputs include API number, density, specific gravity, and product identification number.

The system uses ultrasonic and RTD temperature transducers to measure the sonic propagation velocity and liquid temperature of the liquid. These measurements facilitate identification of the liquid by its "sonic signature" which defines its density. The clamp-on installation is ideal for new construction, existing pipelines, and replacement of in-line densitometers.

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Siemens Pipeline Leak Detection & Location Systems

Siemens Leak Detection systems are fully non-intrusive; there is no need to shut down the pipeline for installation and they can be installed and in operation within days of being delivered.

These systems are supplied as complete packages. Siemens manufactures the hardware and designs the software and engineering services - assuming total responsibility for the commissioning, testing and startup training of the system, including its components for Batch Tracking, Pig Tracking and Product Quality Analysis.

The operation is real time, continuous, 24/7 pipeline surveillance under both flow and no flow conditions. The system offers the most sensitive detection available on the market.



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Siemens SITRANS FUG1010

Field Clamp-On Ultrasonic Gas Flowmeter



Siemens now offers WideBeam ultrasonic flow measurement technology for natural and process gas. Field clamp-on SITRANS FUG1010 is ideal for checkmetering, well testing, flow survey verification and allocation applications. Non-intrusive design offers exceptional performance and reduces maintenance expenses. Zeromatic Path eliminates zero drift for zero point setting continuously without shutting flow or blocking line. Built-in pipe configuration flow profile in-situ correction maintains accuracy in limited straight runs.

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Siemens SITRANS FUH1010

Non-intrusive Ultrasonic Temperature Compensated Mass Flowmeter



Siemens' SITRANS FUH1010 is an ideal flowmeter for pipelines carrying crude oil, refined petroleum or liquefied gas. It is easily installed in the field, using WideBeam transit-time ultrasonic transducers. The system provides the operator with reports regarding batch interface and product quality information. Its extremely high resolution, wide rangeability and stability make the unit ideal for leak detection applications.

Gross or net (standard) volume as well as mass flow can be displayed and outputted in RS232, pulse rate, 0-10 volt and 4-20 ma format. Communication protocols can be provided for customer or Siemens-supplied networks. An internal 1-MB datalogger stores system operation and condition diagnostics.

Two, Three, or Four Beam, NEMA 4X (Div 2) and NEMA 7 (Div 1) systems are available, depending on user specified performance and installation conditions.

circle pin. 192

Get the Advantage...
Highly accurate, non-intrusive, ultrasonic gas flowmeters.

sitrans f

EZ0001-F170-P730-X-7600

SITRANS F US clamp-on ultrasonic WideBeam, natural gas flowmeters. Field-proven for accuracy in installations around the world. They are ideal for lost and unaccounted for (LAUF) gas analysis, checkmetering, allocation, flow survey verification, production, and storage. Clamp-on design eliminates the need to cut pipes or interrupt operation and works well with short straight runs.



Lose Less. Keep More.
www.siemens.com/processautomation • www.siemens.com/flow

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Innovative Portable FT-IR Solution for Real-Time Oil Analysis



A2 Technologies (USA) announces the availability of Real-time Oil Analysis and Reporting (ROAR™) for its portable Mobility FT-IR spectrometer series. The combination of A2 Technologies' powerful ROAR software and the innovative diamond-based oil sample measurement Mobility FT-IR spectrometers, allows users of mining equipment, fleet trucking, earth moving equipment and power stations to get accurate real-time information about the condition of lubricating fluids directly, in the field.

Traditionally, virtually all analytical testing is carried out by taking lubricant fluids from the machinery and sending them to a commercial laboratory for testing, thus resulting in the analysis of samples being carried out hours or even days later. During this testing period, it is possible for additional oil breakdown to occur, potentially causing increased wear on expensive equipment. These lubricating fluids can be chemically complex and very expensive so, as the efficiency of the fluid changes with use, it is important for users to know whether to replace or to recharge them. This prevents malfunction and wear but also ensures an increase in lifetime of the fluids.

Featuring A2 Technologies' innovative ROAR capability, the novel spectrometers inform users of the types of samples being analysed, the results, any trends of the analyses, as well as a comparison on earlier analysis. The report is also capable of distinguishing and recommending steps to take following the analysis. ROAR is a great advance in the proactive maintenance approach of high value machinery, addressing problems before they occur. In addition, by analysing the samples in real-time, the wear on machinery caused by oil breakdown is held to a minimum.

By tracking key indicators, such as the levels of water, soot, glycol, oxidation, sulphation oxidation and nitration in real-time, users are able to ascertain the condition of lubricating fluids, on-the-spot. This provides users with a real insight into the status of the oil sample and identifies machinery requiring monitoring more frequently, thus reducing the amount of wear on the machinery. In addition, this solution provides users with the necessary information to know when they need replacing or refreshing. This significantly reduces downtime and results in increased efficiency, reducing costs.

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New Dual Stage Temperature Switch

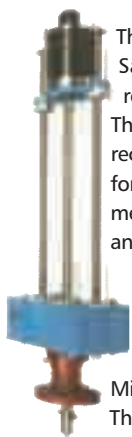


Dwyer Instruments, Inc., (USA) is announcing the release of its new series TSS2 dual stage digital temperature switch.

This digital temperature switch offers a 3 digit red LED display for easy viewing at a distance. The unit accepts up to two PTC thermistor temperature sensors to accurately control temperatures up to 302°F. The Series TSS2 offers two independent SPST 8 Amp relays. The TSS2 series is easily customized via 34 user programmable parameters. For quick programming of multiple switches, a configuration key is offered as an affordable accessory.

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Crude Oil Sampling & Flow Measurement Equipment



The **Maurer** (UK) range of world renowned Crude Oil Sampling and Flow Measurement equipment is recognised by the quality and size of Maurer customers. The NATO coded high pressure Turbine Meters have recently been supplied for use in hydraulic support trolleys for military aircraft to Saudi Arabia and Australia. The flow meter range now includes special two bladed rotors with an astonishing high accuracy 30:1 turn down ratio.

The flow metering activities includes traceable flow calibration test facilities. Orders for calibrating high pressure low flow flowmeters on various viscosity oils were recently received from the MOD, Dowding & Mills, Honeywell, Maersk, Petrofac and Apache etc.

The Maurer range of small volume piston provers together with their bespoke counter/ timer systems are considered to be the most accurate calibration facility to handle flowmeter calibration

Maurer (FPAL registered) has recently received orders for their crude oil sampling probes with the twin screw mechanical insertion /extraction mechanism for a major North Sea platform. The excellent servicing of Maurer and Maurer (FMA) sampling equipment employed in the N.Sea sector is appreciated by our customer base.

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Fibre Optic Distributed Strain and Temperature Sensors

OZ Optics (Canada) now offers the Foresight™ series of fibre optic distributed strain and temperature sensors. The new sensor system provides high resolution and accurate strain and temperature monitoring over very long distances. The sensor uses standard optical telecommunications fibre, thereby leveraging the enormous economies of scale from fibre optic communication networks.

The new system is ideal for temperature and strain monitoring of oil & gas pipelines, bridges, dams, security fences and power lines. Brillouin sensors are excellent for detecting corrosion, buckling and micro cracks in large structures.

The new Fibre Optic Distributed Strain and Temperature Sensor (DSTS) uses Brillouin scattering in optical fibres to measure changes simultaneously in both temperature and strain along the length of a standard, low-cost optical fibre. By wrapping or embedding a fibre inside a structure such as an oil pipeline or dam, users can detect when the structure is being strained or heated/cooled and allow the problem to be corrected before failure occurs. Such monitoring capability is invaluable in critical structures where failure could represent loss of lives or millions of dollars. The sensing fibre can also be used for telecommunications.

The sensing technology gives both temperature and strain readings along the length of the fibre, with spatial resolution as short as 5cm. Being able to monitor both temperature and strain changes is a key advantage, as it allows one to identify which changes in the strain on the fibre are temperature related, and which are caused by outside stresses. Depending on the configuration selected, the sensor range is up to 40km.

The system is fully compatible with the communications and monitoring solutions found in OZ Optics' Optical Network Safeguard™ (OZ-Guard) system. This provides wireless communication options for remote installations, automated monitoring, and real-time alerts with GPS coordinates via text message, email, instant message and the web. Escalating alarms, starting with the field engineer and rising to any level specified by the system operator, are a standard feature of the system.

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Field-Proven System Provides Ideal Solution for Difficult "Mixed" Hydrocarbon and other Oil & Gas Applications

At the heart of the new high-accuracy, level measurement system from **Ametek Automation & Process Technologies** (USA) is the 7230 Series HT Digital Probe--a versatile, multi-variable level sensor that provides total level, interface level and up to 5 temperature readings and a diagnostic function.

The 7230 HT Series Digital Level Sensor was specifically designed to provide a single sensor for the measurement of multiple layers of oil products and gas condensates, including water layers, making it ideal for oil and gas pipeline applications. The sensor requires no calibration and only one process connection. It provides the highest level of accuracy available for materials that are difficult to measure using most other level technologies. These include mixed hydrocarbons and other low dielectric liquids.

The 7230 HT Series utilizes field-proven magnetostrictive position sensing technology in a unique design that makes it more reliable and easier to install and maintain. The probe's accuracy is an impressive 0.01% of measured span. A patented reflector increases signal resolution and repeatability to 0.0001 inch.

The probe's performance is unaffected by changes in the process material's electrical characteristics or densities. Hydrocarbon-based condensates have a predictable range of specific gravities that are well within the range of the sensor's standard floats. The probe and floats are made from 316 Stainless Steel and easily mount in a two-inch NPT process connection, using either a flange or adapter bushing. The sensor has an explosion-proof approval rating from FM and CSA for Class1, Div 1, Group A, B, C, D hazardous locations.

A choice of two communications protocols is available. The 7231's standard protocol is Modbus RTU and is also available with an optional Modbus to Analog output converter. The 7235 provides a proprietary ASCII digital output suitable for OEM and wireless applications. Product differentiators, such as multi-variable output, no calibration, minimal maintenance and very high accuracy, distinguish the 7230 Series from non-contact and guided wave radar level sensors that are commonly used for petroleum applications.

circle pin. 198

World Class Hydrometers and Thermometers



AllaFrance (France) is one of the leading European manufacturers of high precision thermometers and hydrometers for use in the petroleum industry. These instruments are manufactured according to the most recent official standards and traceable to a national chain of calibration.

The ASTM, IP and other normalized thermometers possess an indelible, easily readable scale as well as an individual number.

The complete range of petroleum hydrometers (ISO, ASTM, API ...), possess the same characteristics as above but also feature an indelible mark engraved on the stem, enabling the user to notice any movement of the scale.

A complete calibration service is also available whether it be by an official laboratory or by the AllaFrance laboratory in accordance with EN-ISO9000 specifications.

Thanks to the continual collaboration between know-how and modernity AllaFrance continues to provide its worldwide distributors with a complete range of high quality, precision instruments.

circle pin. 199

On-line Viscometer Ensures Best Burn

The on-line viscometer from **Hydramotion Ltd** (UK) has significantly improved fuel oil burner performance for Hindustan Organic Chemicals Ltd (HOCL) of India.

Since 1987 HOCL, a Government of India enterprise, has been producing cumene, phenol and acetone at its Kochi Unit in Ambalamugal in the southern Indian state of Kerala. At this Unit, the boilers use low sulphur heavy stack (LSHS) oil or low sulphur furnace oil (LSFO), which is fired in steam-atomised burners. These burners are designed to operate most efficiently when the fuel oil is at a certain specified viscosity, generally much lower than that at which it is supplied. The suppliers provide data on the nominal temperature at which the required viscosity is reached and the oil has to be preheated accordingly.

The problem was undocumented variations in fuel composition affect the relationship between viscosity and temperature in ways that HOCL could not predict. Very often the fuel oil was not at the correct viscosity when heated to the temperature indicated by the data sheet. The company was faced with the problem of clinker formation at the burner tip.

To solve this problem, HOCL decided to install an on-line viscometer which would enable them to control the fuel oil viscosity directly. Information was collected on various viscosity meters and their suitability for the specific requirements of HOCL was carefully evaluated.

The choice was soon made. HOCL opted for the Hydramotion XL7, a versatile and powerful system for measuring the viscosity of any fluid in any process. The single solid-rod sensor is an all-welded 316L stainless steel construction with no seals, bearings or moving parts — a requirement of the HOCL specification. Outputs include a 4-20 mA analogue signal and an RS232 or RS422/485 serial data link for continuous viscosity monitoring and control.

The instrument went on-line in January 2007 and quickly proved its worth. Production engineers found the Hydramotion viscometer easy and simple to install and are very pleased with its performance. The fuel can now be preheated to exactly the desired viscosity, giving better control of the burner flame and more efficient burner performance and the burner tip needs less maintenance. Moreover fuel oil can be sourced from different outlets.

Unaffected by plant vibration, gas breakout or flow rate, the Hydramotion XL7 viscometer can be installed in any location and in any orientation, using any process fitting. No special cooling is required for high-temperature applications. Since every model is available in an Intrinsically Safe version to EEx 'ia' IIC T6, the XL7 can be used in the most hazardous Zone 0 (Class 1 Division 1 Group A) environments. With ATEX, CENELEC and TIIS certification, the XL7 gives excellent performance in the extreme conditions often encountered in the petrochemical industry.

circle pin. 201

New Diaphragm Metering Pump



MIDIDOS E is a cost-efficient diaphragm metering pump developed from **Lutz-Jesco** (Germany) which utilises a mechanical metering principle that has been used successfully for many years with low maintenance costs. MIDIDOS E is a single head metering pump, which is particularly suitable for metering toxic and aggressive media. Regardless of the material, it can be used at an ambient temperature of up to 45°C. The metering head

and valves are available in different materials (PVC, PP, PVDF, and stainless steel). The integrated double ball valves provide high metering accuracy, even in small volumes.

The low-noise and leak-free diaphragm metering pump is available in 4 types with a dosage range from 24 to 114 l/h at a pressure of 2 to 10 bar. The flow rate is continuously adjustable from 0 to 100%.

circle pin. 202

Extractive and Open Path Monitors for Real-Time Analysis of Multiple Compounds

Midac (USA) provides gas analysis solutions for extractive and open-path monitors for real-time analysis of multiple compounds. Midac offer an array of gas cells for various mixtures and concentrations. For high concentration or highly absorbant gases, optical path lengths are as short as 1 cm. For low concentrations, path lengths can be as high as 100 m. Cells are made with the materials that best fit the application. Cells can hold corrosive gases such as HF, HBr and HCl. To prevent hot gases from condensing, all metal cells can be heated to 150° C, with an accuracy within 1°, and are isothermally stabilized throughout the cell volume.

Whether a system is configured in the open path or extractive mode, there are an array of choices for FTIR components. At the heart of each spectrometer is the patented Midac interferometer. It is rugged enough to be used in an airborne platform for the detection of chemical warfare agents, yet has performance characteristics and resolution (0.5 cm⁻¹) which has made it a common choice for national labs, universities, and research institutions.



circle pin. 203

Alarm Annunciator with Optional Integrated Event Recorder



RTK Instrument's (UK) most advanced annunciator, the Series 725B, uses CANBUS® communication technology coupled with RTK Instruments' unique multi-redundant (no single point of system failure) design to you the best combination of reliability, flexibility and usability plus a low cost of ownership. The 725B can be supplied as a stand alone annunciator or with an integrated 1ms Event Recorder.

All alarm windows are illuminated by high reliability, ultra-bright white LEDs offering a maintenance-free solution. To reduce installation time and costs, the 725B can be supplied with integral, universal Power Supplies to connect directly to 85-264VAC or 88-360VDC.

The modular construction of the 725B Alarm Annunciator allows units to be assembled in almost any size and shape from one to 256 channels in a single housing with a choice of window sizes and colours.

Each alarm channel is fully programmable using the RTK supplied configuration utility and a standard USB programming port to connect directly to a PC or laptop.

circle pin. 204

Measuring Alkyd Resins Level with Radar Technology

SI Group, located in Scarborough, Ontario, Canada, is a leading manufacturer of Alkyd resins. A critical part of their production process is reliable and accurate level measurement of both raw materials and finished product. Operators must provide a sufficient supply of materials according to strict production planning and they must ensure that the storage tanks are not overfilled.

Internal dividers and structural support members in the tanks present challenging conditions for traditional non-contacting level measurement technologies. For accurate measurements, a narrow contained signal is required to ignore these obstructions. The tank has only one small nozzle available for installing a level measurement device and it is located close to the vessel wall. In addition, an extremely high concentration of vapor makes ultrasonic technology unsuitable. Differential pressure technology is also undesirable because it requires recalibration when the material density changes. With all these challenges, finding a reliable sensor to measure level in this vessel turned out to be easier than anticipated.

SI Group plant engineer, Mr. Sam Nguyen, contacted **Siemens'** area sales representative, Measuremax, and described the level measurement requirement. Given the physical challenges the compact 2-wire Sitrans LR250 radar transmitter was installed.

The high frequency Sitrans LR250 features a small horn antenna and a threaded connection allowing installation directly into the existing opening on the tank. There is no need to remove the lid for programming; the transmitter is configured using the non-intrusive infrared handheld programmer, allowing programming even during unfavorable weather conditions such as during the heavy rainstorm on the day of commissioning. The Sitrans LR250 provides level readings accurately in a matter of minutes.

A unique feature of the Process Intelligence echo processing software (built-into the device) is "Auto-False-Echo-Suppression". This enables the Sitrans LR250 to ignore the internal structural members inside the tank. The Sitrans LR250 is not influenced by vapor or material density changes, requiring no recalibration when the material inside the tank changes.

The Sitrans LR250 continues to provide continuous reliable and accurate level measurement. Unlike other radar transmitters used by SI Group, this transmitter has never required any readjustments or fine-tuning, which translates into zero maintenance costs. Production planners are highly confident with the level readings from the vessel and customer deliveries can be reliably promised. "It's nice to finally have a truly plug-n-play level transmitter like the Sitrans LR250," proclaims Sam Nguyen.

The compact SITRANS LR250 can be installed in small vessel openings and close to the vessel walls.

circle pin. 205

New and Advanced Loop Calibrator

US manufacturer, **Practical Instrument Electronics (PIE)** is pleased to announce the product release of their New and Advanced PIE Model 334 Milliamp Loop Calibrator. The PIE Model 334 Milliamp Loop Calibrator is a 100% functional replacement for the aging Altek Industries Model 334 and Model 334A with significant improvements. The accuracy is improved as well as the calibration stability.

The Model 334 offers significantly longer battery life - up to 1000% improvement driving a full loop voltage of 24V. This battery life is equivalent to approximately 10 battery changes in the some competitors' models. This means using thirty 9V batteries versus just 4 "AA" batteries, certainly a considerable cost and timesaving feature over the life of the product.

The display is much more responsive to adjustments and therefore makes it easier and faster to adjust. The switches are guaranteed non-breakable and splash resistant. A protective rubber boot covers the product that further protects the unit from nintended toolbox abuse. The size of the PIE Model 334 with the boot is approximately the same as the Altek Model 334 and Model 334A.



circle pin. 206

Intrinsically Safe On-line Viscometer Now Also Certified for Environments Containing Combustible Dust



Hydramotion Ltd (UK) is pleased to announce an important extension to the certification of its Intrinsically Safe XL7-15x series process viscometers. The instruments are

now available certified to ATEX Ex II 1GD for use in hazardous atmospheres where combustible dust as well as explosive gas may be present.

The extension certifies that the XL7 is fully compliant with IEC standards 61241-0:2004 (Dust General Requirements) and IEC 61241-11:2005 (protection by intrinsic safety "iD") and meets all the relevant Essential Health and Safety Requirements in Annex II of the ATEX Directive 94/9/EC. It widens still further the range of applications for the XL7-15x series, which is already certified for use in Zone 0 Hazardous Areas (presence of explosive gas), equivalent to Class 1, Div 1, Group A in north America.

Hydramotion intrinsically safe viscosity measurement systems have already been installed in many petrochemical plants around the world. With the extended certification, XL7 viscometers can

now also be used in applications such as the measurement of coal/oil slurries, where finely-divided coal dust presents a significant combustion hazard.

The XL7 is a field-hardened, rugged instrument that can be used in any fluid under any process conditions, including high temperatures and pressures. As the XL7 viscometer has no moving parts, seals or bearings that could wear out or fail in service, it needs virtually no maintenance and no on-site recalibration — ideal for hazardous or dangerous environments where it is desirable to restrict the degree of access.

The standard sensor is an all-welded 316 stainless steel construction which may be mounted in any orientation in any tank or pipe, no matter what size. The digital readout unit can be mounted up to 1000 metres from the transducer, and Hydramotion will even supply a suitable IS barrier on request. With very high sensitivity and excellent repeatability, the XL7 is the instrument of choice for on-line viscometry, no matter how harsh or hazardous the measurement conditions may be.

circle pin. 207

Portable Gauging and Sampling Equipment

Enraf Tankssystem (Switzerland), a member of the Delft Instruments Group, has supplied equipment, which is installed on board of more than half of the worldwide tanker fleet. Enraf Tankssystem reference consists of more than 500 tanker ship owners and 200 shipyards worldwide. Enraf Tankssystem has also supplied HERMetric equipment for more than 7000 tankers, inland barges and storage tanks. "

Enraf Tankssystem has concentrated its development and production facilities in Bulle (Switzerland) and coordinates its international sales from the Swiss location. All its portable gauging and sampling equipment is intrinsically safe and were subjected to the requirements and tests of the standards for electronic and non-electronic equipment intended for use in potentially explosive atmospheres according to ATEX directive 94/9/EC.

The line of HERMetric Sampler is designed for restricted or closed gas tight sampling of liquids or chemicals, which present a Fire-, Health- or Air pollution Hazard. The closed gas tight type of sampler avoids a pressure release from the tank and exposure to fumes during operation. One ball valve has to be permanently installed on each tank to permit connection of various type of HERMetric equipment, like portable level gauge, pressure gauge or sampler depending on the needs of the various customers. Most of the samplers can be supplied with required sampling bottle. 4 different sampling bottles are available to permit different kind of sample: Zone bottle (for sampling of the upper level inside the tank) , Spot bottle(for sampling at a determinate height) , Running bottle (for sampling all along the displacement of the bottle inside the tank) and Bottom bottle (for sampling of the tank bottom).

The sample is taken by a vertical move of the bottle inside the fluid. The bottle is linked with a graduated tape. A reading window allows monitoring the bottle location. After sampling, the liquid can be transferred into a laboratory bottle through a transfer valve.

The transfer of the liquid from the sampling bottle to a laboratory bottle occurs by gravity or over pressure of the upper chamber of the sampler. The opening of the bottle valve is realized by lowering the sampling bottle until its sitting on the ball of the valve. A pump can be connected to the winder to accelerate and complete the transfer of the fluid. All along the sampling process, the system remains tight and the operator is never exposed to VOC emissions. This helps to protect the operator and the environment.



circle pin. 208

Continuous Water in Oil Monitor



The EASZ-1 online water in oil monitor from **EESIFLO (Sweden)** is a device that is sampling water concentration levels every second of the day. It has the ability to measure water levels that cannot be seen by the naked eye e.g 60ppm water cannot be identified by by visual inspection. It also has the ability to determine higher contamination levels up to 250,000 ppm or 25%. The sensor is not damaged or destroyed by water contamination and can easily be retrofitted

into any water removal system or purifier. In a continuing effort to extend the applications on the EASZ-1 water oil concentration meter, EESIFLO International has committed itself to the task of building a database of test results with compatible liquids of varying dependancies over different temperature ranges and conditions. This additional type of testing allows us to experiment with phenomena seen in real life conditions. For example, water and oil may not completely mix readily in a large process stream unless the water is completely dissolved in the oil. This can be proven with the testing of water in oil with and without inline static mixers.

This means that there is the possibility of many users who have a reasonably dry oil but at the same time the presence of free water which could appear intermittently. The free water may not be picked up by other monitoring instruments in time. In a running plant, the presence free water can wreak havoc on expensive key components of a system including bearings and mechanical metal to metal elements causing damage and possibly complete shutdown. Several EESFLO clients have faced this particular problem even though they were carrying out extensive oil analysis regimes.

Their oil analysis program was deemed unreliable due to the fact that the contamination happened between spot sampling periods and the root problems went unidentified until equipment actually failed to operate. The addition of the EASZ-1 water in oil concentration meter enabled them to monitor build up of moisture or the presence of free water in real time as added insurance and equipped them with the ability to take preventative action before it was too late. The EASZ-1 water in oil sensor is currently manufactured in stainless steel 1 and 2 inch versions and currently in the process of receiving full ATEX certification EEx ia IIb T4 for hazardous areas.

circle pin. 209

New Infrared Thermometer Measures Lower Temperatures with More Accuracy Regardless of Emissivity

Raytek (Germany) has introduced the Marathon MM 3M infrared (IR)sensor. The Marathon MM 3M measures low-to-medium temperatures with more accuracy regardless of changing emissivity. This innovative sensor was specifically designed to meet temperature measurement challenges in the metals processing industry.

The Marathon MM 3M utilises shorter infrared wavelengths in order to minimise errors due to the uncertainty of emissivity -- the measure of an object's ability to emit infrared energy. The new thermometer is not as sensitive to changes in emissivity on the target material as long wavelength sensors, and as such, provides more accurate readings across varying targets, at varying temperatures.

The Marathon MM 3M features a NEMA-4 sealed user interface and precision variable focus optics. These features allow the sensor to be quickly and correctly installed. The precision variable focus optics allows the sensor to be accurately focused with just a touch of a button, while the sealed user interface guarantees the integrity of the electronics. Together these features make the Marathon MM one of the easiest IR sensors to correctly install.

The Marathon MM 3M is the latest addition to the growing Raytek Marathon MM Series--the "New Vision" in IR thermometry. It provides all of the advantages of this advanced sensor platform, including enhanced continuous remote temperature monitoring, ease of installation and sighting, video surveillance and documentation, remote PC interface, flexible configuration, and field calibration software.

The Marathon MM Series provides through-the-lens sighting with a choice of laser sighting or video sighting methods. This unique dual sighting feature makes correct sensor operation much easier. This premium IR sensor family is also available with simultaneous real-time video sighting and automated image recording and storage. The thermometer incorporates a live video feed into its data acquisition and sensor programming software, allowing for active frame capture--a unique capability delivering valuable new process information at a lower price than competitive products.

Rugged and reliable, the Marathon MM Series features an advanced electro-optical design, digital electronics and a user-friendly, push-button operator interface. The sensor can be easily set up for standalone operation, or configured for a multi-sensor network. The unit is housed in a sealed NEMA 4 enclosure to withstand the most demanding process environments.

Using the remote monitoring features of the Marathon MM, engineers can continuously observe and record temperature variations in their process in order to take immediate corrective action. Automatic image capture allows users to document exactly when temperatures fall outside of accepted parameters and shows which products were affected.

The Marathon MM Series platform, which covers a temperature range of -40 to 3000°C, now consists of six IR temperature sensor models, each with a specific measurement wavelength and temperature range appropriate for either low- (-40 to 800°C), medium- (250 to 1100°C), or high-temperature (300 to 3000°C) production monitoring. All sensors feature identical installation hardware and include Raytek Field Calibration software and DataTemp Multidrop software to enable easy and consistent installation, configuration and data capture across the full breadth of an application.

circle pin. 210

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New Digital Panel Meter Now on E-Bay

IMA (UK) have recently introduced a new range of digital panel meters. The Breeze Series 20 digital panel meters are simple to programme and offers excellent value and is set to take a significant share of both the end-user and OEM markets.

In a break with traditional distribution routes IMA have decided to place the display on E-Bay. Managing Director Paul Stockwell says "by putting the Breeze 20 on E-Bay it makes the unit easy for customers who wish to buy just one or two units, and keeping distribution costs down means we can pass these savings on to our customers".

The Breeze 20 is available with either AC power or 24VDC, and another useful standard feature of these panel meters is the 21VDC power output for loop-powered transmitters.

The Breeze 20 has a 13mm high 47-digit display, is supplied in a standard DIN case measuring 72 x 36 x 97mm and has a versatility which means the meters can be used for a wide range of applications, including: Current, Voltage, Pt100, and Modbus. While the display is small, it has 4 data manipulation functions that enable the input to be modified. Linear, square and square root functions are present while the user specified input allows up to 21 user-defined points to be entered to linearise a non-linear input – useful for applying deviations when an instrument is returned from calibration.

The display has an IP40 front panel, with IP65 as an option. The optional alarm relays are user-programmable, allowing the unit to switch up to 1A at 250VAC for the control of processes, with variable set point and hysteresis limits.



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Rugged Multi-Point Flow Meter Has A Thick Skin When It Comes To Abrasive Air/Gas Environments



Process engineers looking for a rugged instrument to measure complex stack gas flows precisely in accordance with clean air regulatory requirements will find the intelligent MT91 Multi-Point Mass Flow Meter from **Fluid Components International** (USA) is available with a tough chromium-carbide coating that protects it from dirty, abrasive and hot particulates for trouble-free, cost-effective operation over a long service life.

In petrochemical refining, coal-fired electric power generation, steel manufacturing and many other industrial processes, hot waste gas flows must be continuously monitored, treated and reported to meet government clean air requirements and to ensure process efficiency. Flow meters are placed directly in the stack where dirty, abrasive particulates may cause wear to the flow sensor element assembly, which over time can degrade measurement accuracy or excessive repairs.

FCI's MT91 Multi-Point Mass Flow Meter is designed specifically for rugged CEMS pollution control applications. The combination of FCI's no-moving parts thermal mass sensor technology and its chromium carbide coated sensor assembly delivers superior flow measurement reliability with virtually no maintenance over years of service for an exceptionally low life-cycle cost. This includes high temperature environments up to 850°F (455°C) in large line sizes greater than 24 inches.

MT91 flow meters are highly versatile, with a wide turndown range available from 5:1 to 100:1 and flow sensitivity from 0.25 to 150 SFPS (0.08 to 45.7 NMPS). With its smart digital flow transmitter and advanced thermal dispersion technology flow sensing element, the MT meets federal environmental requirements for CEMS, CFR40, Part 75.

With up to 16 independent thermal mass flow sensor arrays designed into a variable probe length assembly, the MT91 Flow Meter is ideal for applications in the oil/gas, chemical, electric power, steel and other heavy manufacturing industries. It also provides excellent flow measurement inside large line sizes of combustion or pre-heater systems, HVAC units, ducts or flue stacks, where unstable thermodynamic conditions make other flow meter techniques ineffective.

With no orifices to plug or foul, the MT91's flow sensor incorporates a fully temperature-compensated design that is highly stable with almost no drift for excellent repeatability. The sensor assembly is available with flanged, threaded and retractable process connections with a NEMA/CSA Type 4X (IP66) junction box and installed at the desired location with a choice of popular process connections.

The smart flow transmitter for the MT Series features a powerful microprocessor-driven design for superior signal processing and data collection. This design includes a user-friendly menu-driven interface with LCD screen and keypad for programming the control, monitoring, display and driver/alarm functions. A nonvolatile EEPROM chip stores applications and calibration data, and protects this data in the event of a power disturbance.

The electronics package is connected remotely by cable to the flow element assembly up to 1000 feet (304m) away. RS232C and HART communication ports offer easy links with controllers or other field devices. Signal outputs available are 4-20 mA, 0-5 Vdc, 1-5 Vdc, and 0-10 Vdc.

The International Centre building is a modern structure with a glass facade and a prominent sign that reads "the international centre". The sign is in a stylized font, with "the" in small letters above "international", which is in red, and "centre" in blue. The building is set against a clear blue sky.

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Portable S in Oil with ASTM D-4294 and ISO 8754

With more than 20 years history in EDXRF, technology, **HORIBA Jobin Yvon** have been enjoying good reputation among users thanks to high quality of products. Especially in the US market, HORIBA dominate the market providing more than 1,000 SLFA analyzers in the last 10 years.



Most of major oil refinery companies, testing companies and laboratories are using our SLFA analyzers.

This success is mainly due to the SLFA 20. Thanks to its very small size and weight, it is possible to do S in oil analysis very easily at any location. With very low consumption, it can even be plugged on car battery which allow full autonomy. It is able to measure S in the 20 ppm to 5 % range with a detection limit below 20 ppm.

circle pin. 213

S and N with ASTM D-5453, ASTM D-4629 and ISO 20846



The international regulations for low sulfur content in refined petroleum products such as gasoline or diesel are more and more demanding, and the levels are always pushing

lower. **HORIBA Jobin Yvon**, a member of the HORIBA Group, offers the appropriate solution with the introduction of the SLFA-UV21A series.

This new model SLFA-UV21 ANS is based on the principle of combustion of a fixed volume of sample in a tubular resistance furnace at 1100 °C. UV Fluorescence is used to analyze the SO₂ gas produced during combustion, and nitrogen is measured by chemiluminescence.

The SLFA-UV21 ANS, a Sulfur & Nitrogen in oil analyzer achieves a detection limit of 0.03 ppm S and 0.1 ppm N.

circle pin. 214

S in oil with ASTM D-4294 and ISO 8754

HORIBA Jobin Yvon introduced the SLFA-2100/2800 in order to reinforce its leading position for Sulfur analysis using EDXRF method, as described in ASTM D4294 and ISO 8754. This analyzer is simple to



operate and its repeatability and accuracy are high. It is able to measure S in the 5 ppm to 10 % range. It is particularly suitable for wide variety of petroleum products such as oils, fuels, diesel. The SLFA 2800 model is equipped with an 8 positions autosampler.

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Petroleum Products Analysis with a Radially Viewed, CCD Based ICP-AES Instrument

The petroleum industry requires sensitive, fast, stable techniques for elemental analysis. **HORIBA Jobin Yvon's** ACTIVA-M™ ICP-AES instrument is more than up to this task.

- This instrument is especially well suited to petrochemical analyses because of
- it offers a variety of sample introduction systems: Scott or cyclonic spray chamber with optional thermoregulation; a special nebulizer for wear metals in used oil, and the optional patented system that heats oil or wax to 80 °C, including a special autosampler (thermoregulated sample path),
 - radial viewing of the total plasma Normal Analytical Zone with a vertical torch,
 - unique sheath gas regulation to minimize sample deposits and memory effects, while improving long-term stability,
 - an optional computer controlled oxygen addition for optimization of trace Na determination,
 - efficient transfer optics and ultra-low noise, 2048 x 512 pixels CCD detector,
 - Statistical Process Control software for oil (wear metals in oil) and fuel monitoring.

The ACTIVA-M won the Bronze Award from Pittcon's Editor at Pittsburgh conference in March 2007.



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