

TECHNOLOGY

Accessories

Physics Bulletin welcomes communications about instruments, components and equipment as background information for this feature but accepts no responsibility for claims made by outside sources and repeated here in good faith. Information is published free of charge and correspondents should write to the Executive Editor. The bold numbers refer to the Enquiry Service at the back of this issue.

Spotting leaks

Remote overpressure leak testing of large plant is achieved without the customary lengthy delay in the response with the aid of the Visco Probe from Edwards High Vacuum. This device (which is intended for use in conjunction with a portable remote leak indicator, in particular the Edwards LT205 or LT203 helium mass spectrometer leak detectors) comprises a sniffer probe on the end of a long vacuum tube. At the end of the probe that connects with the detector is a port to which may be fitted any small rotary vacuum pump: the latter will accelerate the gas flow along the tube. There is also a capillary leak to control the gas flow into the mass spectrometer. Leaks down to 10^{-7} , 3.5×10^{-7} mbar l s $^{-1}$ are measured with a response time of just 4, 7 s when the vacuum tube is 12, 25 m long, respectively **T1**

Acoustic emission represents a sensitive method of detecting leaks, the sound coming from the fluctuating pressure field that is set up because the fluid close to the leak becomes turbulent. A leader in this field is Dunegan/Endevco, which markets a wide range of products – from 'black boxes' that have been designed for particular industrial applications to highly versatile computerised systems. The firm also offers a wide-ranging testing service. The power of the technique can be seen from a recent application report, available from Dunegan/Endevco, that cites the performance of two D/E transducers. Flows of around 0.025 ml s $^{-1}$ have been detected in the laboratory using both the D9203A and the S9204, a sensitivity well within that required, for example, by the US regulations with respect to light water reactors (63 ml s $^{-1}$) **T2**

Vacuum accessories

ISO sight glasses, which are easily replaceable and also have an additional protective glass sheet that prevents the sight glass

The EM dc nanovoltmeter (see 'Meters')

itself from becoming contaminated, are available from Balzers High Vacuum. The secondary glass sheet can be removed quite simply when it needs cleaning or replacing. Sight glasses are available in flange sizes DN 63, 100 or 160 ISO **T3**

Vacuum Generators will supply on request copies of a wall chart entitled 'Materials for clean and ultra-high vacuum applications'. The chart gives detailed information on material properties, as well as about viewports, UHV flanges and electrical feedthroughs **T4**

Fittings

Phase Separations can supply the complete range of Valco zero-dead-volume tube fittings, which are made from 300 series stainless steel and are suitable for use where the tolerances are low. The ferrule does not bite into the tube when making a compressive joint, and there is no reliance on crimping or pressure necking – even when the maximum operating pressure exceeds 69 MPa (10000 psi). The Valco fittings are made to industrial standard specifications and they are therefore almost universally applicable **T5**

New high pressure ball valves based on a trunnion ball design are available from Manchester Valve and Fitting. The Whitey '83' series of trunnion ball valves not only provides quick and positive switching at system pressures up to 40 MPa (6000 psi) but the valves also have a long cycle life and low operating torque. Spring loaded seats ensure that the sealing is leak tight throughout the pressure cycle, i.e. including changes of flow direction. Other features include proofing against blowout, a choice of seat materials to accommodate a range of pressure and temperature conditions and interchangeable end connections. In all, 316 stainless steel two- and three-way models are available **T6**

Combustion accessories

The Ametek Thermox Air-Mizer II is a microprocessor-based combustion oxygen trim control system. Its purpose is to adjust the air-fuel ratio in small or medium sized boilers (with mechanical controls), according to the way in which the fuel heat value, oil viscosity, gas density, barometric pressure, air temperature, humidity, etc are varying. The device incorporates a WDG-III oxygen analyser, and other optional fittings include an integral CO monitor and an over-

ride system that will clear the boiler of smoke and other high combustibles by increasing the oxygen supply for a while. A six-page brochure on the Air-Mizer is available from Auriema **T7**

The TSI ISS 3910 represents a very simple method of sampling particulate emissions from stacks and other ducts continuously. This is a new isokinetic emission sampling system, the operation of which is not adversely affected even by the random pulsating flows that come from roof ventilators. The air flow itself, in blowing over the sampler, creates enough suction to draw the required sample through the particle collector. Once the sample enters the inlet nozzle, an efficient electrostatic precipitator deposits the particles on to the removable collection tube. Under test, the collection efficiency was above 95% for particles 0.3–10 μ m across moving at up to 25 m s $^{-1}$. The instrument, which is rugged enough to operate in power plant stacks, is available from BIRAL **T8**

Motors

Back in July, ERA Technology began a study of power factor (PF) controllers for electric motors (ERA proposal 61/02/1095) and its initial findings have just been published. The devices sense the phase angle between the motor current and the input voltage, and use this to adjust the voltage so that the motor runs as efficiently as possible with the given load. The first of two reports covers laboratory tests designed to assess what savings of electrical energy can be made, while the second identifies potential applications in industry and looks at the economic aspects **T9**

The long term cost-effectiveness of industrial motors used in harsh environments is seen to have been enhanced with the advent of an extended range of Hi-Seal motors from Newman Electric Motors. The manufacturers will supply on request comprehensive catalogues and details of particular models, as well as introductory leaflets on each of the three types of Hi-Seal motor: GP, ExN-OCMA and ExD **T10**

Meters

The dc nanovoltmeter from EM Electronics may also be used as a sensitive null detector or to isolate low level signals. Alternatively small changes in comparatively large signals may be measured (using the zero offset control) or the range of measurement extended to 1 kV (with the aid of the attenuated input facility). The instrument presents a high input impedance (up to 1 G Ω on its 1 mV range) and has great stability, facilitating long term drift measurements. Power is supplied by an internal rechargeable battery giving 60 h operation from full charge **T11**

Beckman Instruments has recently introduced two portable bench-top multimeters, the 3050 average sensing meter (with sine-wave calibration) and the RMS 3060 true RMS (AC or DC) or AC-only meter. Selection from the total of eight functions and 31 ranges is by a single centre switch. Voltages of 200 mV–1500(1000) V, currents of 200 μ A–10 A and resistances of 20 Ω –20 M Ω may be measured. In addition there is a diode test function, as well as a continuity test function. The RMS 3060 can also measure temperature. Both instruments contain a band gap reference element and thin film voltage-divider networks. The 0.1% accuracy is guaranteed for one year without recalibration **T12**

