Far Reaching European Regulation Requiring Refrigerant Leak Detection Still Not Generally Known

Dr Lorcan Maher of Murco Ltd

A high proportion of the users of refrigeration and air-conditioning in the UK, and Europe generally are still simply unaware of the wide-ranging implications of the European Community Regulation that became legally binding on 1 October 2000 – and the same could be said of a surprising number of people in the equipment and service sectors." This was the challenging assertion by Dr Lorcan J. Maher, Managing Director of MURCO, one of Europe's leading manufacturers of advanced refrigerant leak detection equipment.

The key point of the EC Directive No. 2037/2000 is so all-embracing that it applies to all refrigeration and air conditioning installations in all circumstances," said Dr Maher. "The Directive on Ozone Depleting Substances states unambiguously: 'All precautionary measures practicable shall be taken to prevent and minimize leakages of refrigerant from refrigeration and air conditioning systems'''.

For the last year, Dr Maher points out, all users and all equipment manufacturers and installers have been under these new and legally binding obligations. Yet the seriousness of leaking systems was until recently – if not still – of little concern to the industry. Most plant operators found it easier to top up leaking systems with refrigerant rather than find leaks and operate tight systems. In fact historically some 70% of refrigerants were used for topping up leaks.

This started to change with the Montreal Protocol in 1987, which formalized a response to the damage being caused to the ozone layer by ozone depleting substances. With the subsequent international phase-out programme for CFCs and HCFCs the cost of refrigerant leaks started to become of concern but even still few operators took the positive step of installing gas leak monitors. A number of countries worldwide including the USA, Netherlands and South Africa, responded to the Protocol by introducing regulations or standards requiring the installation of fixed leak monitors in refrigeration and air conditioning machinery rooms.

Regulation 2037/2000 now represents the belated EC response and its requirements would normally be satisfied by compliance with the new European Standard EN378 which details a range of suitable and practicable measures. Dr Maher points out that since the end of 2000 it supersedes all national standards in EC countries.

EN378 Refrigerating Systems and Heat Pumps – Safety and Environmental Requirements requires the installation of fixed leak monitors in refrigeration and air-conditioning machinery rooms. However, it goes significantly further than earlier Standards worldwide by including the special requirement to ensure safety in air-conditioned spaces in Category A occupancy buildings if a sudden leak into an occupied space would exceed specified concentrations. Typically, this could occur with direct expansion split systems. Category A buildings include those that have restricted movement such as dwellings, residential institutions (hotels, hospitals, prisons, schools) and public places such as courts, theatres, public transport termini, supermarkets, restaurants, etc. Installation of appropriate gas leak detectors in such buildings should meet the requirement.

Climate Levy Adds Motivation

The EC is committed to introducing regulations in 2002 to implement its commitment to the Kyoto Protocol on Climate Change. The UK has already implemented taxation measures that are likely to serve as the European model.

The new UK Climate Change Levy on energy consumption adds an additional and very real cost motivation to install detectors. This is a reward/punishment measure aimed at ensuring the achievement of the UK's target reduction of emissions in line with the 1997 Kyoto Agreement to combat greenhouse gas emissions and global warming.

The Climate Change Levy affects a variety of energy products including electricity and includes refrigeration and air-conditioning plant. Inefficient plant, often caused by refrigerant leaks, consume excessive energy and this will result in a substantial tax penalty for the operator. The balancing incentives include the Enhanced Capital Allowance Scheme under which an operator can claim the full cost of an investment in specified qualifying technologies against taxable income in the period of the investment, i.e. 100% in the first year.

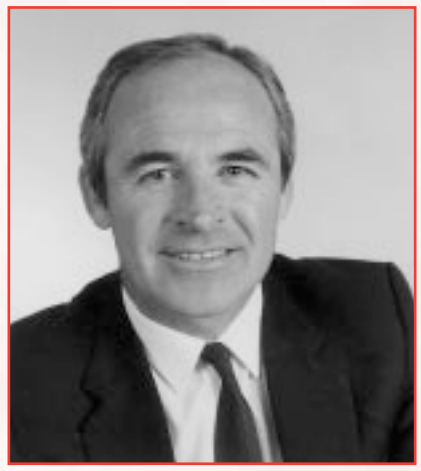
The Department of the Environment, Transport and the Regions (DETR) has published the list of qualifying technologies in an Energy Technology Product List, which includes Murco refrigerant leak detectors. Investment in these products will reduce costs under the Climate Change Levy and also qualify for the 100% Enhanced Capital Allowance.

If further incentive were needed, there is also a volume of EC and UK safety legislation covering occupational exposure that requires that workers not be exposed to harmful gases, including refrigerants, above the recommended limits. This should be complied with in the interests of worker safety. But in fact failure to do so could expose the operator to compensation claims. Gas leak monitors would show compliance and minimize this risk.

Smart Range of Systems

Gas leak detectors are the front line instruments in the industry's response to the challenging comprehensiveness of the EC Regulation and the Climate Change Levy. Dr Lorcan J. Maher announced that MURCO has launched a new generation of gas leak detection equipment, exhibited at the recent IKK 2001, including new products aimed specially at the air-conditioning compliance needs generated by the Regulation. These will complement what is already the most comprehensive range of machinery room gas leak detection equipment on the market. Murco's gas detectors are included in the DETR list and so qualify UK users for 100% enhanced capital allowances.

MURCO is a specialist manufacturer that has in recent years developed highly successful gas leak detection systems now used in thousands of refrigeration and air conditioning installations worldwide. Its sensor range includes state-of-the-art catalytic, semiconductor, electrochemical and infrared models and sensor transmitters to detect gas leaks in an area, room, zone,



Dr Lorcan J Maher

Fig 1 Sensor Transmitter Integrated Area Monitor Control Panel

Fig 2Sensor Transmitter Integrated Area Monitor

Fig 3 Integrated Area Monitor

airspace or airflow.

The extensive MURCO systems are based in the first instance on its state-of-the-art range of Gas Leak Monitors / Detectors, offering 1, 2, 4 and 6 channel monitors with remote sensors and a choice of one or two levels of detection. All have visual and audible alarms and relays for control or remote reporting. Available for all refrigerants and most other problem gases, they are used extensively in machinery room applications and in marine applications to ensure compliance with international maritime conventions and regulations. All MURCO units incorporate constant power and system fault monitoring as standard.

The MURCO Integrated Area Monitor detects gas leaks in an area, room, zone, airspace or airflow. It has constant power and fault monitoring and two relays to control external equipment, e.g. fans, air conditioning units, etc. It can function as a stand-alone area monitor/ detector but also has a dedicated output to report to a remote MURCO Control Panel that has audible and visual warning of alarms and a range of relays for control purposes.
These control panels may be linked to create very large systems.

The MURCO Sensor Transmitter Integrated Area Monitor series with linearized outputs is designed to interface with third party systems, equipment and controllers as well as a MURCO control panel using its selectable outputs of 0-5V, 0-10V, 4-20mA, RS485 and relays. This stand-alone monitor is also available in an explosion proof version. The MURCO control panel, which can monitor up to 99 remote sensor transmitters through its RS485 port, offers many features including visual and audible alarms with graphic display, data storage, printer interface and modem or PC connection to activate service or emergency call-outs.

MURCO products and designs are rapidly becoming the refrigeration industry standard. Based in Ireland, MURCO has developed systems that are distributed widely within Europe. They allow full compliance with EC Regulation 2037/2000 and EN378 and most insurance, work safety and maritime codes and best practice solutions. MURCO products are also exported to many countries worldwide, including the United States of America where they comply fully with the local standard, ANSI/ASHRAE 15-1994.

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New Fixed Gas Sensor Features Two Gas Monitoring Points

The WorksAlone 2™ from ***INDUSTRIAL SCIENTIFIC CORPORATION*** (USA) is a new generation of fixed-point gas detection monitors, which delivers superior performance, system flexibility and cost-savings advantages.

With its distinctive, dual-sensor design, the WorksAlone 2 is an independent sensor/monitor that displays gas concentrations levels and signals alarm conditions when programmed alarm points have been exceeded. The WorksAlone 2 provides one or two gas monitoring points installed either on-board or at a distance from electronic controllers, enabling users to combine nearly any sequence of oxygen, toxic or combustible gas monitoring without the cost of buying redundant electronics.

The WorksAlone 2 features simple set-up, automatic, non-intrusive calibration and is available with or without relay outputs to control external devices such as alarm indicators or ventilation fans. It has a large, split-screen, extended-temperature LCD display which shows simultaneous readings for two gases, and is approved by CSA, NRTL/C and CENELEC for Class I, Division I, Groups B, C and D hazardous locations for operation to -40°F (-40°C).

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New Pellistors for Industrial Gas Detection

Developed by Nemoto (www.nemototech.com) manufacturer of gas sensors, the NP-30 is now available with high performances at a very competitive price from ***SENSITRON*** (Italy).

The Nemoto NP-30 is a catalytic (pellistor) type flammable gas sensor supplied as a matched pair of elements mounted on TO4 size headers and protected by a metal can. The sensor detects and measures the presence of flammable gases and vapours in air, in the range 0-100% of the Lower Explosive Limit (LEL) of the gas or vapour being measured. Designed as a sensing platform for use in fixed flammable gas detection systems, the NP-30 exhibits excellent long term zero and sensitivity stability and a high level of resistance to catalytic poisons. The device is compatible with a wide range of commercially available Gas Detection Systems and remote flammable gas detection heads.

The highly automated manufacturing procedure employed by Nemoto results in a repeatable reliable sensor which, unlike similar devices, requires no trimming resistor to enable the detector to be matched with a compensator.

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Third Party Testing Results

In order to comply with a strict indoor air quality limit of 0.08 formaldehyde, the Japanese Ministry of Construction designed a test study to evaluate various instruments, each with different sensing technologies. The instruments used absorbtion tubes, colormetric, semiconductor, and electrochemical sensing elements. The tests were performed in air with controlled additions of formaldehyde and other binary and ternary mixtures.

Manufacture	Sensing Element
Brand A	Absorbtion Tubes
Brand B	Absorbtion Tubes
Brand C	Color Change
Brand D	Semi-Conductor
ESC Z-30	Electrochemical w/Filters

All instruments except the colormetric method were able to meet the low concentrations of formaldehyde (0.05-.010ppm). This changed when binary and ternary mixtures were added. The addition of ethylacetate and i-propanol posed difficulties for all but Brand B (absorption tubes) and Z-300. The presence of alpha-pinene caused severe problems for all but the Z-300. When acetaldehyde was added, all instruments except the Z-300 displayed a reading of close to a sum of both chemicals present. The chemical filter used by the Z-300 virtually eliminated the value of all binary and ternary gases added. Complete test results are available at www.environmentalsensors.com.