

# Refrigerant Leaks in Fishing Vessels – THE DANGER IS KNOWN, SO WHY SO LITTLE ACTION?



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**GAS** Detection

The inaction by fishing companies and vessel owners in relation to the well known hazards of refrigeration leaks on board commercial fishing boats is nothing short of extraordinary, according to a leading manufacturer of gas leak detection equipment. “There have been deaths and serious injuries to workers on board fishing vessels caused by leaking refrigerant gas, almost every fisheries authority in the world has documented the hazards and specified safety precautions and there are specific regulations in most jurisdictions, notably the European Union. The International Maritime Organization and trades unions have drawn attention to the risks – and still there is widespread failure by the fishing industry to address the problem,” says Dr Lorcan Maher, Managing Director of Murco, a European manufacturer of advanced gas leak detectors for a range of industrial and hazardous gases with its headquarters in Ireland.

The reasons for the widespread inaction cannot be lack of awareness, Dr Maher believes, because the hazards are widely understood and documented while all refrigeration and marine engineers, insurance inspectors and assessors are aware of the need for regulatory compliance in the countries in which they work. “Unfortunately, in matters of safety in all industries world wide it is often the fact that money speaks louder than formal regulation. So perhaps it will take a high-profile law suit by an injured crew member or the family of a dead one – or dismissal of a large insurance claim because of failure to take proper precautions – to change the mind set of management in the commercial fishing industry. The exasperating thing is that even from the point of view of good business, much less safety, systems to detect refrigerant leaks are actually quite inexpensive. In fact refrigerant replacement is such an ongoing expense for fishing vessels that the costs of leak detection systems can easily be recovered through savings in reduced refrigerant loss.”

Deaths as a result of refrigerant gas leaks have occurred as recently as last June, when one crew member died and the master was seriously injured aboard a fishing vessel at the quayside in Valdez, Alaska. In April 2002 two members of a Cape Town trawler were killed by an R22 leak while a couple of years earlier five Japanese crew members died in a similar accident off the coast of Ireland. Many similar accidents not involving death have gone unreported or received only local coverage. Ammonia, still used in many shipboard refrigeration systems, is poisonous, extremely corrosive and explosive in

certain conditions. Lighter than air, leaking ammonia can accumulate in the headspaces of enclosed areas. Other refrigerants such as R22 are heavier than air and will accumulate over time in any enclosed area such as working areas, holds and bilges. Since such refrigerants are odourless and colourless, the displacement of oxygen goes unnoticed and crewmembers can lose consciousness quickly. In rarer cases, the refrigerant can react with intense heat or open flame to produce the deadly phosgene gas.

Some level of refrigerant leakage is an inevitable consequence of extensive systems in marine conditions and aboard hardworking vessels. Corrosion, often concealed by insulation and lagging, is common as are pipe fractures caused over time by displacement or impacts. Good installation practice stresses that refrigeration pipe work should be secure, visible and routed so that it is unlikely to be damaged. An automatic alarm system involving gas leak detectors (with sensors for specific gases) is required for all such installations. The Torremolinos Protocol of 1993, Regulation 15 of the International Maritime Organization makes refrigerant leak detection on fishing vessels mandatory and has been adapted into national law in the European Union and many other countries. In the UK, for example, the Maritime and Coastguard Agency publishes codes of safe practice and the Sea Fish Industry Authority, responsible for construction standards and certification, has long recommended to the builders and owners of fishing vessels that they fit suitable fixed leak detection systems along with refrigeration systems. New Codes expected shortly will make detectors mandatory in vessels over 24 metres and in smaller vessels where practical.

Fishing vessels and other ships are generally required by law to be inspected by a third party and so register with a classification society such as Lloyds or other members of the International Association of Classification Societies. This is frequently a requirement for obtaining insurance. All have rules requiring the installation of refrigerant leak detection systems, e.g. Lloyds Rules and Regulations on the Classification of Ships have three independent requirements with regard to refrigerant leak detection equipment.

It should also be noted that in every country the worldwide standards concerning the safety of refrigeration systems such as ASHRAE 15 and EN 378 apply to fishing vessels as a place of work.

In South Africa SANS 10147(SABS 0147:2002) Code of Practice on Refrigerating Systems is the relevant Standard and applies to fishing vessels. This requires the installation of fixed refrigerant leak detectors and there are special requirements for ammonia.

Additionally in most countries Safety at Work legislation applies to fishing vessels. In South Africa the Occupational

Health and Safety Act 85:1993 requires compliance with SABS 0147 and so requires the installation of gas leak detectors.

Dr Lorcan Maher points out that pressure is also mounting on the fishing industry in regard to environmental regulations: “It can hardly be compared to the serious safety issues, but the fact is that there is increasing concern about the contribution made by leaking refrigerants from fishing fleets to ozone depletion. A Norwegian study suggested that country’s industry loses 136 tons of refrigerant annually while the Dutch government has identified its fishing industry as the worst offender of all industrial and commercial refrigeration users.”

## Smart Range of Systems

Gas leak detectors are the front line instruments in the fishing industry’s response to the challenging comprehensiveness of the requirements. Dr Lorcan J. Maher announced that MURCO has launched a new generation of gas leak detectors to complement what is already the most comprehensive range of detection equipment on the market. Sophisticated yet robust and reliable, these highly successful gas leak alarm systems are now used in thousands of refrigeration and air conditioning installations worldwide. The Murco Sensor Transmitter range includes state-of-the-art catalytic, semiconductor, electrochemical and infrared models to detect gas leaks in an area, room, zone, airspace or airflow.

The Murco MGD system has 1, 2, 4 or 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. All MURCO units incorporate constant power and system fault monitoring as standard. Available for all refrigerants and most other problem gases, they are used extensively in marine and machinery room applications to ensure compliance with international maritime conventions and regulations. MURCO products and designs are rapidly becoming the refrigeration industry standard. Based in Ireland, MURCO has developed systems that are distributed widely in the EU and worldwide. They allow full compliance with all relevant Standards including SABS 0147, EC Regulation 2037/2000 and EN378 and the US standards ANSI/ASHRAE 15 as well as meeting most insurance, maritime and work safety codes and best practice requirements.

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MURCO has prepared a short Guide to International Regulations and Best Practice in Refrigerant Use, which is available free on request.

