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Contaminated Refrigerant Gases in Reefer Containers – Industry Action

Introduction

During 2011, some reefer containers were re-gassed with counterfeit R134a refrigerant at certain depots in Ho Chi Minh in Vietnam. Since then, fake refrigerant has been found in some other countries and on board ships.

Some fake refrigerant can contain a blend of chemicals including R40 (Methyl Chloride). It is a poisonous and reactive chemical and it is understood that methyl chloride combines with aluminium components in the compressor to form a volatile chemical, Tri Methyl Aluminium (TMA), which burns spontaneously in air and water. It is reported that the compressor on five reefers filled with counterfeit refrigerant exploded and three service technicians were killed as result. It is believed that TMA reacted with other chemicals in the system to cause the explosions.

The counterfeit refrigerant is thought to be being manufactured in China by more than one company and cylinders have been found marked with the labels of international brands such as DuPont and Honeywell. While fake R134a refrigerant is now being widely used in the automotive industry across Asia and as far as Europe to service bus air conditioning systems, its use in the shipping sector is still thought to be minor.

Contamination with R40 is thought to affect less than 0.2% of the world reefer container fleet of 1.3 million units. Most of these potentially contaminated units are now isolated but it remains important that the industry acts together to ensure this low level of contamination does not increase and that the use of fake gas is eliminated.

Reasons for Continued Action

With a few fake R134a cylinders found on board ships and in depots in countries other than Vietnam, the importance of securing the supply of refrigerant gas remains paramount to avoid counterfeit gas being used.

Coordinating testing of refrigerant supplies can avoid refrigerated containers with fake refrigerant becoming more widespread. In fact the shipping industry, including refrigerated container service depots, has the opportunity to eliminate the use of counterfeit gas if it acts quickly and together, since:

- The shipping industry (and service companies supporting it) is relatively small and focused;
- Shipping is a specialist, regulated industry with trained technical staff at sea and in depots;
- Access to ships is restricted and they are isolated while at sea;
- The number of refrigerated container service depots around the world is limited and they are largely run in a professional manner.

Action Required

The COA believes the following action can eliminate the use of counterfeit R134a in the shipping industry:

1. **Testing of the contents of all R134a gas cylinders currently in use in depots and on ships, especially testing new gas cylinders before they are used.**
2. **Testing of gas samples from all refrigerated containers before any service work is carried out or prior to use to ensure the safety of service technicians.**
3. **Isolation and neutralizing of any refrigerated containers that test positive for R40 (methyl chloride) contamination.**

These actions are described in more detail overleaf.

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Action Required continued...

1. Identifying contaminated supply - Gas Cylinder Tests

Procedures are being used to quickly test samples of refrigerant from gas cylinders. A typical procedure can be found at the following links with information on the flame halide torch testing device:

<http://www.containerownersassociation.org/resources/CRT+Flame+Halide+Detector.pdf>

<http://www.containerownersassociation.org/resources/HalideTorchInformation.pdf>

Suitable safety precautions must be exercised at all times when testing gas samples.

2. Checking refrigerated container machines for contamination

While the relatively small number of higher-risk units are already being tested for contamination, some shipping lines and depots are planning to take a sample of gas and test for contamination before every PTI for a period of time. Procedures for taking gas samples from refrigerated container machines and testing for contaminants are being refined with the emphasis on minimising the risks to service technicians. It is hoped that copies of the guidelines in use will be made available on the COA website during January 2012. If a refrigerated container is suspected to be contaminated, it may be advisable to isolate the container and not operate it at all until a sampling and test procedure becomes available.

3. Managing Contaminated Machines

Isolation of any refrigerated containers that test positive for R40 (methyl chloride) contamination is essential. Tests carried out so far show that there are different fake gases in circulation and many do not contain the harmful R40. Where an initial test identifies 'chloride' contamination, a laboratory test is important to establish if R40 is present as opposed to other less harmful refrigerants.

If R40 is confirmed, the machine must be assumed dangerous and isolated immediately to await neutralization. Only specialists who are expert in neutralizing hazardous materials should carry out any further work.

Where laboratory checking of a sample shows the contamination is not due to R40 but to other refrigerants used in fake refrigerants such as R12, R142b, R22 the machine is unlikely to be dangerous and standard procedures can be followed to repair the machinery.

These three actions must continue to be implemented across the industry if the danger caused by fake refrigerants is to be eliminated from the shipping sector.

While improvements to packaging, labelling and other measures may be made over time by gas manufacturers to enable buyers of refrigerant to be more confident of its purity, testing samples from every cylinder is the only way to be totally sure the supply is not contaminated with R40.

The aim of these action items is to minimise the risks to service technicians and other personnel involved in the movement of reefers. No sampling method can be completely risk free but operators may consider that the risks of not sampling and testing before working on a machine are likely to be greater.

Information, Workshops and Demonstrations

There will be a demonstration workshop in Singapore on Thursday 9 February to enable interested parties to discuss and assess the latest techniques for sampling and testing. Other workshops are planned in the USA and Europe.

More information on this matter will in due course be posted on the website of the Container Owners Association (www.containerownersassociation.org) and on the website of the TT Club (www.ttclub.com)

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