

Trident Refrigeration Ltd

Calculating the Cost of Refrigerant Leaks

In our last article, we provided an overview of the F-Gas regulations, the importance as to why we should reduce our emissions, and how the F-Gas review proposals may affect refrigerant leak detection.

Following on from the last article, we feel that it's natural to then discuss some of the practical reasons (cost savings) that will encourage the industry to take action and reduce their F-Gas emissions.

“Who requires refrigerant leak detection under the F-Gas proposals?”

There are a number of reasons that will benefit the industry by taking the F-Gas regulations and legislation seriously. Realising the purpose of refrigerant leak detection is important, not only for ticking a box but calculating the cost savings associated with leak detection.

Refrigerant leak detection systems are required under the current F-Gas regulations should you have a site charge of over 300kg. We discussed the F-Gas review proposals and

how these are affecting the requirement for leak detection. Under the new proposals a leak detection system will be required if your charge is more than 500 tonnes per annum of CO₂ equivalent refrigerant gas. For R404a for example, this equates to a charge of just 128kg!

For applications where smaller refrigerant charges are present (less than 500 tonnes per annum of CO₂ equivalent refrigerant gas), manual leak detection is required and can be carried out using a handheld gas leak detector. This is often done by a service engineer as part of their routine, checking stress areas / cracked pipes for potential leaks.

“Under the new proposals a leak detection system will be required if your charge is more than 500 tonnes per annum of CO₂”

“How can leak detection equipment reduce costs?”

Companies who are required to have refrigerant gas leak detection equipment should not only see it as just complying with legislation and regard the outlay of leak detection equipment as a cost burden. Instead take the positives from this situation by using leak detection equipment as an effective method of:

- Reducing energy costs
- Reducing refrigerant gas consumption
- Reducing product stock loss
- And ultimately make huge cost savings

For example, when gas is leaking from a refrigeration system, the motor is forced to work harder to pump the remaining refrigerant around the system fast enough. If there is not enough refrigerant charge even with the motor running at full capacity, then a loss of cooling can occur, possibly resulting in product loss within the fridge/freezer pack.

Being able to quickly find a leak ensures that less refrigerant needs replacing and the energy consumption as the effect of not having to work harder to pump the remaining refrigerant around the system will be significantly less.

The popular calculation states ‘15% loss of refrigerant results in a 100% increase in energy consumption’. So it is important to know that your leak detection system reacts to gas leaks quickly to avoid growing costs.

Other cost that must be taken into consideration is the amount of downtime whilst a leak is being found / repaired and a service engineer’s time on site. The sooner a leak can be pinpointed, the more cost effective. The fixed leak detection system can help to achieve this.

“Calculating the real cost of refrigerant loss”

Using a calculator that provides you with an indicative cost of a refrigerant leak following minor / major leaks is an eye opener into the importance of monitoring for refrigerant leaks. As long as the information inputted is accurate, then the calculator will calculate how much cost you are likely to be faced with.

The carbon emissions calculator for The Real Zero campaign developed for the Institute of Refrigeration helps identify the cost of replacement refrigerant, engineer time to repair the refrigeration system, repair of materials and considers downtime costs.

Download the calculator here:

<http://www.realskillseurope.eu/real-skills-europe-toolbox>

Now it’s one thing working out the cost of replacement refrigerant gas following a gas leak, another way of thinking about the associated costs when a leak occurs, is to think about how much stock needs to be sold to cover the cost of replacing the loss of refrigerant gas. The following table (see over leaf) looks at the cost of replacement refrigerant and the amount of stock that needs to be sold to fund the cost of the refrigerant loss. Although it is designed by the United States Environment Protection Agency, and in dollars, the concept is the same and makes interesting reading.

Download the Greenchill financial impact calculator

<http://www.epa.gov/greenchill/ptnrresources.html#tools>

“15% loss of refrigerant results in a 100% increase in energy consumption”

1) Cost to Replace Leaked Refrigerant		2) Sales / Profit	
1. Refrigerant type:	R-404A	1. Item to be sold (milk, frozen, peas, hotdogs, etc)	Milk
2. Amount of refrigerant leaked (in pounds):	100	2. Units (gallons, packs, ounces, etc)	Gallons
3. Price per pound that you pay for refrigerant	\$6.83	3. Sales price per unit	\$3.50
		4. Profit margin per unit sold: (in percent)	1.00
Cost to replace leaked refrigerant: \$683		You have to sell <u>19,514</u> gallons of milk to pay the replacement cost of <u>100</u> pounds of refrigerant	

“Other forms of cost savings?”

ECA Scheme - The Enhanced Capital Allowance (ECA) scheme is a key part of the Government’s programme to manage climate change, and is designed to encourage businesses to invest in energy-saving equipment.

The Government introduced the ECA scheme in 2001 to encourage businesses to invest in low carbon, energy-saving equipment. As part of the Climate Change Levy Programme, it’s designed to help the UK reach its Kyoto target of reducing carbon emissions by 20%.

Climate change is becoming one of the biggest threats to our planet’s environment, and the biggest cause of this is carbon emissions produced by burning fossil fuels. Around half of these come from businesses and industrial processes, so it’s important that efforts to reduce emissions focus on these areas.

The ECA scheme allows businesses to write off the whole cost of the equipment against taxable profits in the year of purchase. This can provide a cash flow boost and an incentive to invest in energy saving equipment, which often carries a higher initial cost but lower whole life cost when compared to less efficient alternatives.

“What is the incentive to the ECA scheme?”

If your business pays corporation tax at 28%, every £10,000 spent on ECA qualifying equipment would reduce the tax bill corresponding to the year of purchase by £2,800. In contrast, for every £10,000 spent, the general available capital allowance for spending on plant and machinery would reduce your business’ tax bill corresponding to the year of purchase by £560. This means that an ECA can provide a cash flow boost of £2,240 for every £10,000 a business spends in the year of purchase.

Have you got any other questions about calculating the costs?

