



The Fri3Oil system: The Dyno-Rod for rac plant



Introduction

Fri3Oil is a “total cleaning system” for refrigeration and air conditioning plant. It saves field engineers and end users time and money, and helps minimise the impact of badly performing systems on the environment.

Compressor burn-outs are not common, fortunately. But when they happen, they can trigger a full-scale emergency for the end user and their refrigeration contractors.

There may be millions of pounds worth of stock at risk of meltdown, or an industrial process which depends on uninterrupted cooling. In the case of air conditioning, it could be a high-tech data system at stake, or a building full of people with fraying nerves and tempers as the temperature rises.

The urgent call-out may not have been precipitated by a total plant breakdown. Cooling performance can gradually be impaired as a result of a build up of system contaminants, such as acids, moisture or debris, until the plant is no longer able to deliver, and the shortfall becomes critical - and can no longer be ignored.

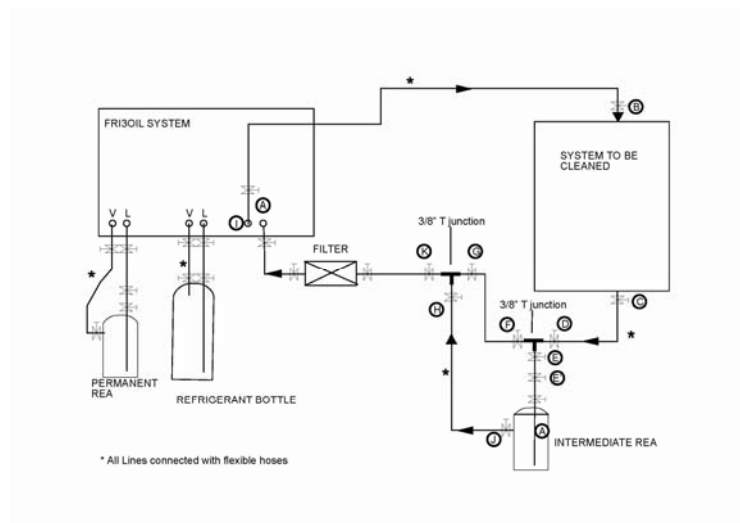
In such situations, without standby capacity, prompt action on the part of the contractor is vital. The conventional approach is detailed and time-consuming investigation, followed by a possible rebuild and repair onsite; if the damage is bad, it may require lifting and shifting for complete rebuilding offsite, with expensive temporary cooling moved in. This all takes valuable time and can put the end users business at risk.

Now, however, a new piece of technology has been developed that provides a “total cleaning solution” for refrigeration and air conditioning plant. It enables contractors to quickly clean up even badly contaminated systems, compressors, water chillers and heat pumps, on site, and restore full system performance.

The Fri3Oil (pronounced FreeOil) system has three functions:

- refrigerant recovery
- refrigerant recycling
- and oil and contaminant extraction, all carried out on site.

It is recommended for use in restoring plant performance, for example after a compressor burn-out, but is also highly effective in system conversions where a change of refrigerant and/or lubricant is required.



Schematic showing the process used by Fri3Oil

It uses the refrigerant charge itself to clean and scour the system, overcoming the need for a separate cleaning agent such as R141b.

The system uses a high specification separation technology to clean and remove contaminants, based on advanced refrigeration engineering and exploiting the miscibility and density characteristics of refrigerant and oil (see schematic above).

The refrigerant recycling function avoids the need for expensive refrigerant incineration or disposal. And its ability to remove acids, moisture, air debris and other contaminants on-site is claimed to be able to dramatically improve the energy performance of previously compromised plant.

The fully automatic system can be used with all fluorinated refrigerants, including CFC's, HCFC's and HFC's.

Fri3Oil has been developed by Spanish company CSF SA, a specialist refrigeration engineering firm established in 1999 with a background in high-tech approaches to system maintenance, cleaning and optimisation.

The designer and developer is Fernando Gutiérrez Antolín, a Spanish refrigeration pioneer with almost 40 years experience in the business, including serving with refrigerant manufacturer DuPont.



The Fri3Oil system being demonstrated to an audience of 70 leading industry figures at Business Edge's open day and technical conference in July

Mike Creamer, managing director of Business Edge which distributes Fri3Oil in the UK, said: "It's a fantastic piece of engineering, and has lots of applications in the acr field. We recently used the system on-site on an installation in Jersey, with contractor K2 Refrigeration, to recover and clean two badly compromised systems following breakdowns.

“It did a superb job, and got both systems back up and running quickly. Some 6.25 litres of oil and debris were removed from a 45kW vertical package reverse cycle heat pump, in spite of it being fitted with reversing valves, coil distributor capillaries, suction accumulator, and non-return valves.”

He added: “It is now a much-valued part of the Business Edge field service and trouble-shooting armoury. I have no doubt it will pay for itself many times over the coming months and years.”

The benefits for field engineers and end users:

- Enables quick and effective on-site cleaning of systems and complete oil / debris removal following burn-out or breakdown;
- Extends the life of plant by removing harmful contaminants;
- Improves the performance and operating efficiency of refrigeration plant, reducing running costs;
- Avoids costly refrigerant disposal by incineration;
- Overcomes the need to use a solvent such as R141b to clean systems, by using the refrigerant itself as the cleaning medium;
- Shortens the time required to carry out remedial maintenance to return system to full operating performance and efficiency;
- Prevents release of refrigerant to atmosphere;
- Delivers quick pay-back. Depending on the level of usage, this may be as rapid as three months.



Delegates watch a demonstration of Fr3Oil at BEL's recent launch event

How does it help protect the environment?

- Fri3Oil improves the performance and operating efficiency of refrigeration plant, reducing running costs and saving energy;
- Avoids costly and environmentally questionable refrigerant disposal by incineration;
- Overcomes the need to use a solvent such as R141b to clean systems, by using the refrigerant itself as the cleaning medium;
- Prevents release of refrigerant to atmosphere.
- Extends the life of existing plant, overcoming the need to replace with new with consequent savings in terms of the environmental impact of energy, production and materials.

Can the benefit be quantified?

Numerous projects attest to the effectiveness and widespread applicability of the system.

Is independent verification of claimed performance available? If so, please include it.

The performance of the system has been verified by several leading companies, who themselves have invested in Fri3Oil.

These include:

- Daikin
- Carrier
- Trane
- Mitsubishi Heavy Industries
- Johnson Controls

Are there any additional risks associated with the product?

No

If so, how have these been managed?

N/A

What are the costs and benefits of using the innovation?

The initial cost of can be recouped after a few uses of the machine. Its ability to save time on site through rapid plant rectification, coupled with savings in refrigerant disposal costs, delivers a guaranteed quick payback.

How widespread is use of the innovation?

It is increasingly being used by contractors and major manufacturers on the continent to restore plant performance of compromised systems. Its launch in the UK in July 2008 has created tremendous interest, and this is expected to translate into significant sales over coming months.

Does it have potential for more widespread use in future?

The potential is tremendous. We believe it will become a “must have” piece of kit for contractors, service companies and equipment manufacturers.

Why does this entry deserve to win this award?

It is an example of a superbly engineered product, addressing a critical industry need, with major environmental benefits.

Poor system performance is one of the major sources of energy waste. Fri3Oil quickly and cleanly restores the performance of compromised and contaminated plant, reducing power consumption and minimising environmental impact.

It would be a worthy winner of the award.

