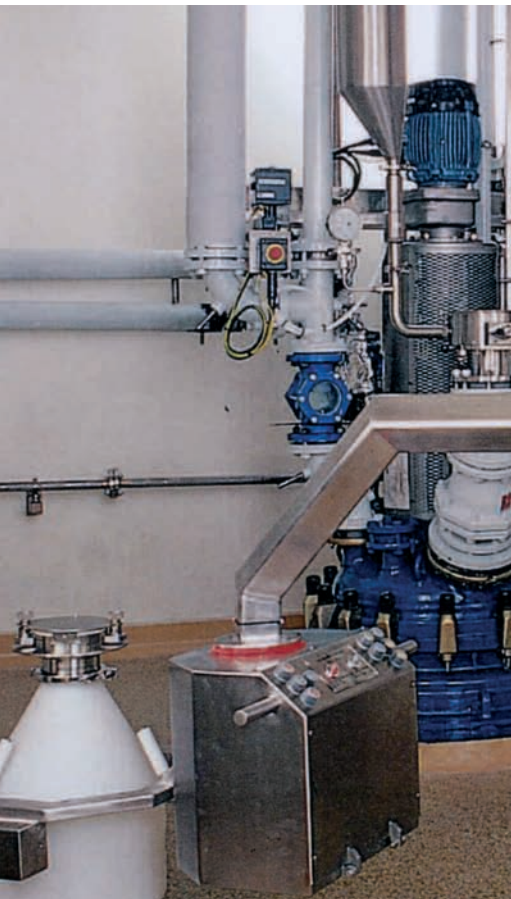


R22 Refrigerant Replacement



PROJEN

PROJECT MANAGEMENT AND ENGINEERING SOLUTIONS



BUSINESS IMPROVEMENT PRODUCTS/SERVICES

PROJEN PLC are a well established project management company recognised as being leaders in the delivery of industrial projects on a stand alone/turnkey basis or working alongside client companies.

As part of our service offering, PROJEN deliver a number of Business Improvement Products and Services, which have been carefully selected to add real benefits. These products/services have their foundation in the successful implementation of projects over the last three decades, a statement given credence

through the recognition of the 2005 Bentley BE Award for Excellence of New Technology Adoption, ECI Contractor of the Year in 2003, ECI ACTIVE Project of the Year Awards in 2004, 2006 and 2008 as well as another 'Royal Society for the Prevention of Accidents' (RoSPA) Gold Medal in 2009 – the eighth consecutive Gold Award the Company has received. PROJEN have also been awarded Vale Royal Business of the year 2006, the High Sheriff of Cheshire award for Enterprise in 2007 and received Carbon Trust Accreditation in 2007.

R22 PHASE OUT HAS BEGUN, But do you know what options are available to you?

What is R22?

R22 is the most common HCFC low temperature refrigerant used in process chillers, industrial refrigerant plants, commercial cold storage facilities and air-conditioning systems.

R22 - Background

R22 is a widely used refrigerant found throughout industry. A recent UK report by the Carbon Trust indicated that 70% of sites surveyed have at least one refrigerant system using R22. In addition to its use in the manufacturing of food and drink, chemical, electronics and engineering sectors, R22 is also extensively used in food retail, food storage and in commercial building air-conditioning systems.

The problem with R22

R22 is an ozone depleting substance and like many HCFC's, has been used as a refrigerant for many years, including the use as an interim replacement to CFC's which were banned in 2000. R22 damages the earth's ozone layer which filters out incoming radiation in the "cell-damaging" ultraviolet (UV) part of the spectrum. The discovery of a large ozone hole over Antarctica and its association with man-made CFCs encouraged the world to take action to protect the ozone layer through the introduction of legislation covering their manufacture, use and disposal.

Other refrigerants

In addition to R22, which has the highest profile of refrigerants being phased out, the EU Ozone regulations and the F-Gas regulations apply to many other common and not so common refrigerants used in cooling systems. The table opposite indicates commonly found refrigerants covered by these regulations.





F-GAS & OZONE DEPLETING SUBSTANCE END USE MARKETS

	END USE SUB-SECTOR	CURRENTLY USE F-GAS	CURRENTLY USE OZONE DEPLETING SUBSTANCES
Stationary refrigeration & air-conditioning (RAC) systems	Industrial refrigeration	✓	✓
	Commercial refrigeration	✓	✓
	Domestic refrigeration	✓	X
	Building air-conditioning	✓	✓
	Heat pumps	✓	✓
Mobile refrigeration & air-conditioning (MAC) systems	Mobile air-conditioning in cars	✓	X
	Mobile air-conditioning in vans	✓	X
	Other transport air-conditioning	✓	✓
	Refrigerated transport	✓	✓
Fire protection systems (FP)	Stationary fire protection systems	✓	X
	Portable fire extinguishers	✓	X
High voltage switchgear containing sulphur hexafluoride (SF ₆)	Electricity supply industry	✓	X
	Factory based switchgear	✓	X
Aerosols	Technical aerosols	✓	X
	Novelty aerosols	✓	X
	One component foam (OCF)	✓	X
	Metered dose inhalers (MDI)	✓	X
Specialised uses	Magnesium smelting	✓	X
	Electronics manufacture	✓	X
	Solvent cleaning	✓	✓
	Military applications	✓	✓
	Rigid insulating foam manufacture	✓	X
	By-product from aluminium smelting	✓	X
Less common uses	Double glazing	✓	X
	Car tyres	✓	X
	Cosmetics	✓	X
	Laboratory & scientific applications	✓	X

The following table lists the most common refrigerants used and shows which regulations are relevant to each.

REFRIGERANT	TYPE	EC F GAS REGULATION	EC OZONE REGULATION
R22	HCFC	X	✓
R408A	HCFC + HFC Blend	✓	✓
R134A	HFC	✓	X
R404A	HFC Blend	✓	X
R407C	HFC Blend	✓	X
R410A	HFC Blend	✓	X



Legislation

There are two key areas of EU legislation governing the use of refrigerants, firstly HCFC refrigerants are covered by EU Regulation 2037/2000 which includes ozone depleting substances (EU Ozone Regulation) and secondly, HFC refrigerants are affected by EU regulation 842/2006 (F-Gas Regulation) which is applicable to a number of fluorinated greenhouse gases (F-Gasses).

EU Ozone Regulation Deadlines

HCFC's (including R22) were banned in new refrigeration systems in 2000. After the **31st December 2009** it will no longer be possible to use virgin HCFC's for the maintenance of refrigeration systems and the use of recycled HCFC's will be banned from the end of 2014. After this date all R22 users will need to find acceptable alternative refrigerants or invest in new plant. There will be no other (legal) alternatives.



Summary of EU Ozone Regulation Obligations

Obligation

Check for leakage annually

Recover Ozone Depleting Substance during plant servicing & maintenance & at end of plant life

Use appropriately trained personnel to carry out installation, servicing & maintenance & leakage checking

Stop using virgin HCFC refrigerant for plant maintenance from 31st December 2009

Stop using recycled HCFC refrigerant for plant maintenance from 31st December 2014



F-Gas Regulation

The F-Gas regulation imposes new obligations on operators of refrigeration and air-conditioning equipment that use HFC refrigerants such as R410A and R407C. Most aspects of the F-Gas regulation came in force in July 2007 and predominately cover the adequate management of refrigerants. This includes the labelling of new equipment stating the type and quantity of refrigerant used, maintenance of records, regular leak testing of systems with more than 3kg of HFC refrigerant, recovery of HFC refrigerants during maintenance or plant decommissioning and the use of adequately qualified staff.

Summary of F-Gas Regulation Obligations

Obligation

Take steps to prevent F gas leakage & repair detected leakage as soon as possible

Fit automatic leak detection system

Keep detailed records about refrigeration plant

Recover F gases during plant servicing & maintenance & at end of plant life

Use appropriately qualified personnel to carry out installation, servicing, maintenance & leakage checking

Label new equipment adjacent to service point

Placing on the market of non-refillable containers used to service equipment is banned from July 2007.

Leak Testing Frequencies

Frequency	Normal Systems	Hermetically Sealed Systems
None	Less than 3kg	Less than 6kg
Annual	3kg to 30kg	6kg to 30kg
6 Monthly*	30kg to 300kg	30kg to 300kg
Quarterly*	Greater than 300kg	Greater than 300kg

*Half this frequency if fitted with automatic leak detection



The R22 phase out

Companies who still use R22 refrigerants run a very real risk of incurring high costs for the purchase of diminishing stocks of available R22. It is extremely important that users of R22 put robust plans in place to deal with the phase out of this refrigerant.

December 31st 2009 was the fixed deadline after which companies will no longer be able to use "virgin" R22 refrigerant, even if it was purchased before this date. From this date the stocks of even recycled R22 will fall in volume and prices will rise. How fast for far prices will rise will be dependent on how many organisations have planned carefully for this deadline and what demands are placed on the diminishing stocks. Current estimates suggest a 70% fall in redundant R22 stocks in 2010.

The next deadline following the "virgin" deadline, is 31st December 2014, when even recycled R22 will no longer be available for use. However companies can't even rely on this deadline as the ongoing review process may bring this deadline forward. There are also no guarantees that there will be any R22 available between 2010 and 2014 or if there is, that it will be affordable.



Operators' obligations

Plant operators have obligations under the F-Gas regulations which cover the use of HFC's and other refrigerant gases. These include the prevention of leakage of the refrigerant, regular leak testing (the frequency of which being dependent on the refrigerant or volume). Automatic leak detection has to be fitted to systems using more than 300kg of refrigerant and system records must be maintained for systems with more than 3kg. The operator must ensure that all staff are adequately qualified and that only certified personnel carry out gas recovery. In addition, all plant must be correctly labelled with the type and volume of refrigerant used

WHERE TO GO FOR ADVICE

R22, HCFC and main F-Gas advice is available from many sources. The problem facing companies is where to go for impartial advice. Replacement refrigerant manufacturers are likely to advise organisations that there is no need to change plant equipment and that they provide a replacement that can simply "drop in". How do you know if the new refrigerant is the right one and whether there will be a loss in efficiency? For example, some advice suggests that R407C is the best alternative. It is a ternary blend of hydro fluorocarbon or HFC compounds, comprising 23% of R32, 25% of R125 and 52% of R134a. It has no chlorine content, no ozone depletion potential, and only a modest direct global warming potential.

However, other "experts" state that the same R407C could lead to a performance loss of 8%. Even if you do discover the right replacement, who is going to carry out the replacement and project manage the process whilst adhering to the F-Gas regulations or other potentially relevant legislation? We then come to the situation of replacing plant equipment.

Why go to the expense of replacing and disposing of R22 if the plant is at the end of its life span? How do you know if it's more cost effective to upgrade plant or replace the refrigerant which could lead to an overall efficiency loss? Isn't it a backward step to reduce the efficiency of your refrigeration process by taking the easy option if plant is ready for renewal or replacement? If plant needs to be upgraded the refrigerant companies will not be interested in project managing the process or carrying out the upgrade. Companies then have to think about carrying out feasibility studies, plant and system design, purchasing, training and installation, again adhering to all relevant legislation.

The biggest challenge is finding an impartial company that has the full spectrum of knowledge, can offer unbiased advice across the whole process and carry out any replacement work required, whether as a simple refrigerant replacement or an upgrade to plant.

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HOW CAN PROJEN HELP?

PROJEN are experts in R22 replacement and have successfully implemented replacement systems for a number of industrial clients across many industry sectors. We will start by helping you plan the phase out of your R22 system, considering the most appropriate options at minimal cost and disruption to your business. We have an unbiased approach to the best solution for your business and are able to assess all of the alternative refrigerants on the market, analyse their effects on your current refrigeration system and determine whether an alternative refrigerant is the best solution. We can also carry out feasibility studies to determine whether greater efficiency will be gained from upgrading or replacing your current plant equipment and what the short, medium and long term benefits you would gain by any plant modifications.

PROJEN will project manage the removal of the R22 refrigerant and ensure the professional installation of a replacement system; in short, we provide a single turnkey solution to replacing R22 refrigerants or the systems containing them.

TO SUMMARISE, PROJEN WILL:

- Ensure compliance with EU legislation
- Identify the most appropriate options – cost/time effective
- Effectively manage the transition
- Safely dispose of R22 refrigerant
- Safely install new refrigerant
- As appropriate, manage the new build/modify existing in line with new system
- Ensure minimal disruption to ongoing operations
- Ensure smooth integration of the new plant

A SUMMARY OF THE FACTS

- HCFCs including R22, were banned in new refrigeration systems in 2000
- No new R22 available after 2009
- No new or recycled R22 available after 2014
- Prices set to rise at an unknown rate
- No alternative but to act
- The longer companies take to act, the higher the likelihood of incurring substantial refrigerant costs in the short term

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What should you do next?

If you understand the importance of Refrigerant Replacement but need help, or you are in any way unsure as to whether your business would benefit from it, you should obtain specialist advice.

Please contact PROJEN on:

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