



Partner today for a
Circular Economy
tomorrow



The global challenge

The UK has committed to reducing F-Gas emissions by 68% between 2015 and 2030. More reductions will be required to reduce emissions to near zero by 2050. And Daikin is committed to playing its part.

Our climate is facing its greatest ever challenge. Global average temperatures are rising. Human activity has already led to global warming of 1°C from pre-industrial levels.

If we continued with 'business as usual', temperatures were predicted to rise 4 to 5°C by the end of the century. The impact could put 80% of the world's population at risk of flooding and bring the very real risks of widespread biodiversity loss, crop failure and catastrophic rises in sea levels.

Current policies have already reduced the expected rate of warming to 3°C by the end of the century. But the aim is to reduce warming to below 1.5°C, as this will significantly reduce climate risks.

To achieve this, the UK's Committee on Climate Change has recommended a new target of Net Zero Greenhouse Gases by 2050.

The energy, construction and HVAC industries have a huge role to play in this. We must quadruple the supply of low carbon electricity. Efficiency improvements to buildings will demand higher standards to deliver crucial energy savings and emissions reductions. The transition to low carbon heating is vital. We must also move away to a greater extent from F-gases.



Tomorrow is ambitious

Daikin's environmental vision



Our vision is to provide safe and healthy air environments while striving to make our business activities carbon neutral by 2050.

We will do this by:

- › Promoting energy efficient technologies and energy management solutions.
- › Adopting refrigerants such as R32 with lower global warming potential; developing next generation refrigerants; and recovering and reclaiming refrigerants in use.
- › Reducing the environmental impact of materials throughout the entire life cycle of our products – from procurement and manufacture to recovery and reclaiming.

As a general principle, we will support the development of a Circular Economy, which aims to design out waste and pollution, keep products and materials in use and regenerate natural systems. It is about moving away from the 'take, make, dispose' approach and away from the consumption of finite resources to a future in which we minimise impact on the world around us.

Together we can be part of the climate solution.

Find out more about:

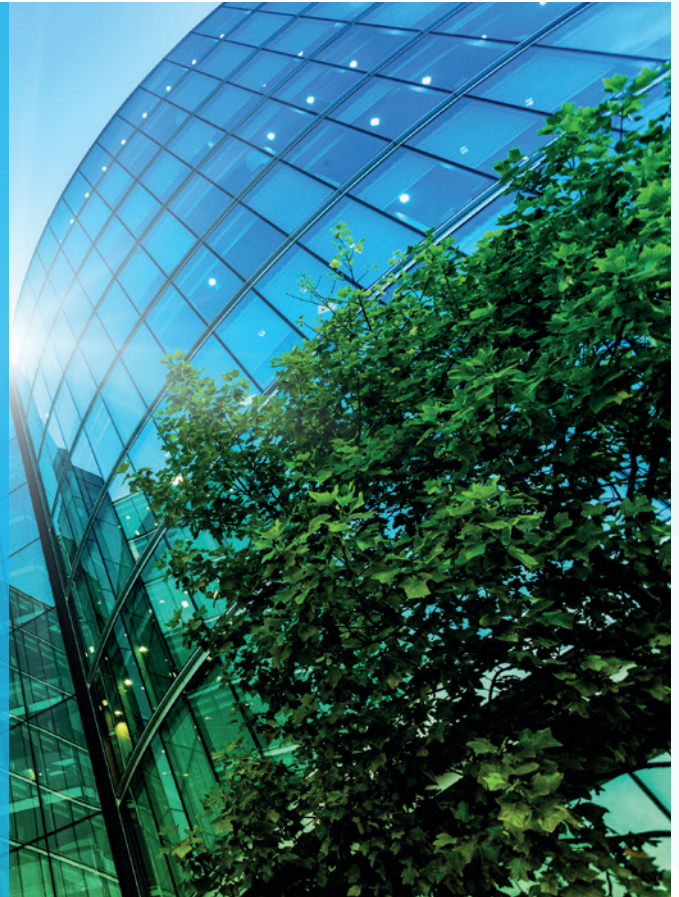
- › **The F-Gas Phase Down:** [Page 2](#)
- › **What is reclaiming refrigerant?:** [Page 3](#)
- › **Design with Confidence** – VRV IV systems with Certified Reclaimed Refrigerant Allocation: [Page 4](#)
- › **Commission with Confidence** – fixed cost commissioning assistance and trim charge: [Page 6](#)
- › **Reclaim with Confidence** – rapid refrigerant recovery service: [Page 8](#)

Tomorrow is opportunity

The F-Gas phase down

By reclaiming refrigerant, we can help to maintain security of refrigerant supply in the UK – and protect our planet.

Together we can be part of the climate solution.



F-Gas regulations define quotas for how much fluorinated gases can be produced by manufacturers, with the aim of phasing them down, step by step. In 2018, the quota reduced by 37% and in 2021 it will reduce once more by 55% against the baseline.

As restrictions increase on the production of F-Gas refrigerants, prices may rise and demand is expected to exceed supply of virgin material within the next decade.

Manufacturers must reduce the HFC's they are using and switch to gases with a lower global warming potential. And we must develop a more sustainable supply of F-gases for installation and ongoing servicing.

However, the F-Gas quota does not include refrigerant already in the market. Reclaimed refrigerant has zero impact on the F-Gas quota, so it is not restricted in the same way. That's because reclaiming refrigerant avoids the carbon emissions associated with manufacturing new F-gases. So systems that use reclaimed refrigerants have a lower environmental impact overall.

Throughout the lifetime of a system, the responsible recovery and recycling of components and refrigerants all contribute to a circular economy. Instead of seeing redundant parts and contaminated refrigerant as expensive waste to dispose of, we need to start seeing them as valuable assets for reprocessing, so they can be reclaimed for future use.

Together we can be part of the climate solution.



We are only at the start of the journey to create a circular economy of refrigerant supply, use, recovery and reclaiming. By each playing our part, we can increase the amount of reclaimed refrigerant available and reduce the environmental impact of air conditioning systems.

What does reclaiming refrigerant involve?

There is often confusion about the difference between recovery, recycling and reclaiming refrigerant. So here's a quick guide:

Recovery is when you remove the refrigerant from a system to a yellow-top cylinder. A hazardous waste consignment note must be completed and it can then be returned to the supplier for reprocessing.

Recycling is when you remove a refrigerant from a system into a receiver cylinder, so it may be used again on the same site. It cannot be transferred to another site, or stored for longer than 12 months. And remember: best practise is that recycled refrigerant shouldn't be used when a compressor has failed or is being changed.

Recovery and receiver cylinders should also be kept separate and clearly identified to avoid contamination and reduce separation costs at the processor.

Reclaiming refrigerant is a much more extensive process of cleaning and reprocessing recovered refrigerant to AHRI700 standard.

- › First the recovered gas is tested in a laboratory, then distilled to boil off the F-gases.
- › Any sludge, particulates, moisture, acid or oil are safely disposed of.
- › Next any non condensable gases such as Nitrogen and air are removed.
- › The gas is then dried and analysed to check its purity levels.
- › If other refrigerants are mixed in, these are separated in a distillation column into individual pure components for re-use or disposal.

Many people assume all recovered refrigerant is incinerated, but that's not the case. If it is separated and recovered according to best practice, as above, in dedicated reclamation facilities, it can be separated and reclaimed to AHRI700 standard – the same level of purity as new refrigerant.

That's important, because refrigerant recovered from a site can only be resold, passed on or exchanged if it meets the AHRI700 standard. This standard specifies purity requirements for fluorocarbon, hydrocarbon, and carbon dioxide based refrigerants – whatever source they come from.

Using AHRI700 standard refrigerant is vital for the performance, efficiency and long life of a system and to ensure the warranty remains valid.

See more about how you can get involved in reclaiming refrigerants on page 8.

Tomorrow is sustainable



VRV IV+ systems and VRV IV S-series units now have reclaimed refrigerant allocated to them during production. The quantity of reclaimed refrigerant allocated to these units avoids more than 300,000 tons of CO₂eq from being generated in the production of virgin refrigerant.

What does Certified Reclaimed Refrigerant Allocation mean?

When you see a Daikin product described as having a "Certified Reclaimed Refrigerant Allocation" this means both the quantity and quality of the reclaimed refrigerant is confirmed by independent auditors as being of:

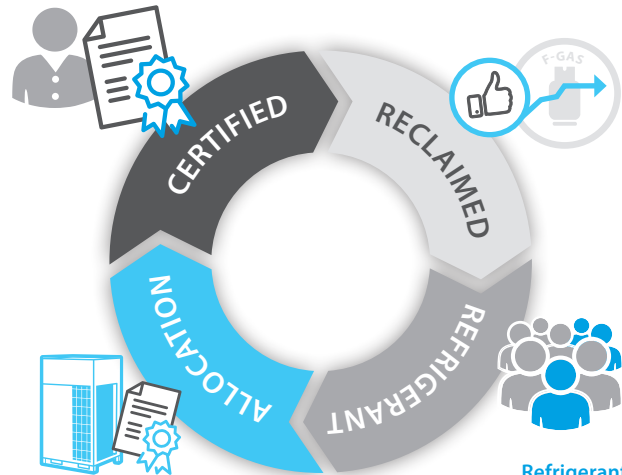
- › **Certified quantity:** the reclaimed refrigerant allocated administratively to the unit is equivalent to 100% of its factory charge, so the unit has zero F-Gas quota impact
- › **Certified quality:** the reclaimed refrigerant has been reclaimed to AHRI700 certified standards to be of the same quality as virgin R410A

External certified quality

Reclaimed refrigerant meets AHRI700 certified standards, just like virgin refrigerant.

Reclaimed within Europe

Reclaimed refrigerant reused within Europe is not part of the quota set by the F-Gas regulation.



Certified allocated quantity

Through an audit process we ensure the reclaimed refrigerant is administratively allocated to the VRV IV+ Heat Recovery and Mini VRV-S series factory charge.

Refrigerant is a valuable asset

A huge source of R-410A is available in existing installations. Together we can create a circular economy of refrigerant supply, use, recovery and reclaiming.

Make a positive choice:

Now it's easier to make a positive choice to reduce the environmental impact of your air conditioning systems by choosing VRV IV+ heat recovery and VRV IV S-series units with Certified Reclaimed Refrigerant Allocation. Exclusive to Daikin, reclaimed refrigerant is now used in our units and:

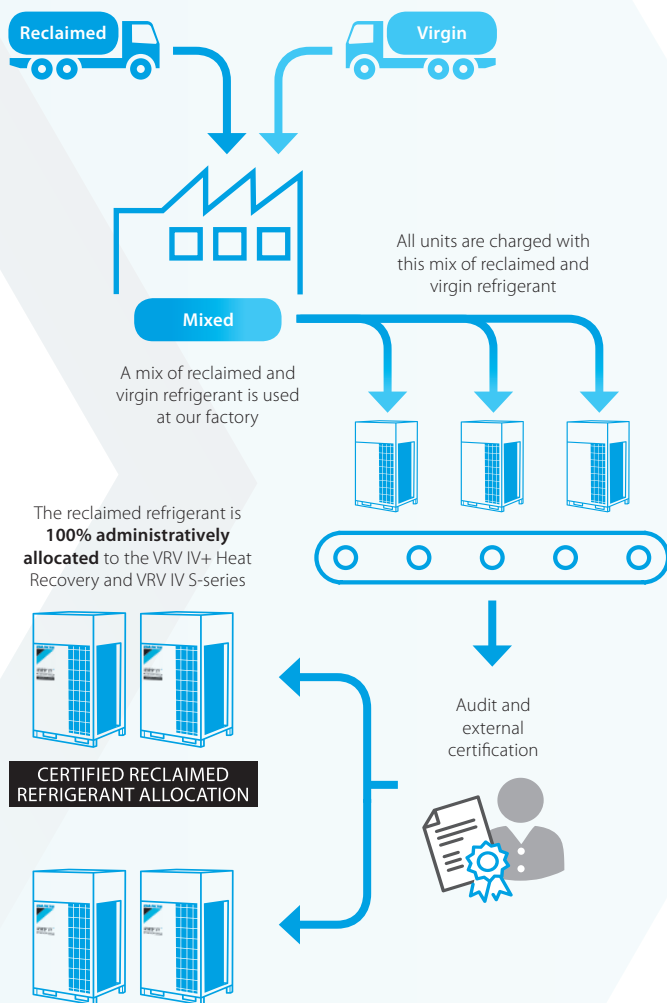
- › Is independently certified as being the same quality as virgin refrigerant
- › Is administratively allocated 100% to VRV IV+ Heat Recovery and VRV IV S-series units
- › Has zero impact on F-gas quota, as it is reclaimed and reused within Europe
- › Saves more than 300,000 tons CO₂eq of virgin gas being manufactured each year
- › Supports the development of a circular economy in our industry



Do VRV IV+ heat recovery and VRV IV S-series units have 100% reclaimed refrigerant?

It's not quite that simple. Because when refrigerant is supplied to the factory, the allocation of reclaimed refrigerant is mixed with virgin refrigerant on one production line, as they are both of identical quality.

However, an independent auditor ensures that 100% of the reclaimed gas is allocated administratively to two product ranges: the VRV IV+ Heat Recovery and the Mini VRV IV S-series units produced in Ostend.



Just like in the energy market, where customer can choose an electricity tariff using energy from renewable sources, the reality is that the electricity grid distributes electricity from all sources – renewable, fossil and nuclear energy. But the energy provider buys enough energy from renewable energy sources to match the energy demands of its renewable energy tariff customers.

In the same way, Daikin has secured sufficient reclaimed R410A to match the factory charge required for our new VRV IV+ Heat Recovery and the Mini VRV IV S-series units. And we can provide certificates of proof for your clients that the reclaimed refrigerant has been allocated to these ranges.

By choosing these products, you are making a clear choice to ease pressure on the F-Gas quota, avoid virgin gas being brought into the market and support the supply of refrigerant from a more sustainable source.

Together we can be part of the climate solution.

VRV IV⁺ is the most efficient in the market today

The new VRV IV+ range has been designed with an entirely new compressor that delivers an average 15% increase in seasonal efficiency over the previous range of Daikin VRV systems. As a result, it already exceeds the standards of the Lot 21 Ecodesign Directive, which is increasing the minimum efficiency requirements for air conditioners over 12kW once again in 1 January 2021.

At the heart of the latest system, existing VRV IV features such as variable refrigerant temperature and continuous heating during defrost are matched by a completely redesigned compressor, which is fully optimised to ensure high performance at part loads – the main operation mode throughout the year.

The new compressor addresses a key issue that can occur during low load operation, which is that refrigerant leaks can occur from the high-pressure side to the low-pressure side in the compression chamber, resulting in loss of efficiency.

In the new compressor, a back-pressure control port sends a small amount of high-pressure refrigerant from the compression chamber to the back of the scroll. This optimal separation of lower- and higher-pressure sides within the compression chamber boosts seasonal efficiency delivering a 15% increase in efficiency.

The VRV IV+ also uses a four-side heat exchanger with a new capillary design for optimised refrigerant distribution, providing the smoothest performance in any system loading.

The VRV IV+ delivers 15% higher average SEER. On an 8HP system, the SEER is as much as 38% higher with indoor ducts and 41% higher with indoor cassettes. In heating mode, the VRV IV+ delivers 13% higher SCOP on average, or 16% higher SCOP for an 8HP unit with indoor ducts.

VRV IV+ offers:

- > 15% increased cooling efficiency and 13% increased heating efficiency compared with current models
- > Compliance with the 2021 ENER Lot 21 EcoDesign Directive standards
- > Completely redesigned compressor, fully optimised to ensure high performance at part loads
- > Improved refrigerant distribution, delivering smoothest performance yet
- > Fully compatibility with all Daikin controllers
- > Heat recovery, heat pump, replacement and high ambient versions.



Tomorrow is secure



Daikin is the only air conditioning manufacturer in the industry that also produces refrigerant gas (via Daikin Chemicals) and so is in an ideal position to ensure security of refrigerant supply within the UK market.

Daikin UK's Commission With Confidence service aim to bring stability and confidence to the market, which has experienced price turbulence for refrigerants since the quota reductions in 2018 set by the European F-Gas Regulations.

Commission with Confidence

Daikin's Commission With Confidence service includes refrigerant supply, system charging and commissioning assistance, all for a flat rate. The supply of R410A refrigerant trim charge is guaranteed as part of a commissioning package for a set fee. So you can enjoy complete confidence from tender to installation of a VRV system, while ensuring your system is commissioned for maximum efficiency.

Confidence in supply

Daikin is striving to reduce the CO₂eq impact of our systems, so from 2019 the trim charge refrigerant we supply as part of our Commission With Confidence service will now be reclaimed refrigerant. This reclaimed refrigerant is certified to AHRI700 standard and therefore identical in quality to virgin refrigerant but it has much lower CO₂eq emissions generated during manufacture and has zero impact on the F-Gas quota.

Confidence in cost

This fixed-cost commissioning service includes, as standard, the cost of charging the system with refrigerant gas. With the premium option, cloud set up and one year's monitoring is also included at a reduced rate. What's more, when quoted with us as part of your VRV project, these packages are guaranteed for a set time period (stated at the point of purchase). This will protect you against fluctuating prices between the time you quote, and the date given.

Confidence in simplicity

Our options are transparent, regardless of VRV type. Choose from our Standard and Premium packages to enjoy additional security when pricing for installations and aftercare monitoring for your clients.

Together we can be part of the climate solution.

Your Commission with Confidence options

Standard

COMMISSIONING SUPPORT CHARGING THE SYSTEM WITH REFRIGERANT

Use Daikin service on site to provide refrigeration system commissioning assistance with the supply of the R410A trim charge at a set fee. We'll undertake a visible system check and ensure your VRV successfully completes its test run and is fully operational.

Premium

COMMISSIONING SUPPORT CHARGING THE SYSTEM WITH REFRIGERANT CLOUD MONITORING

Our Premium package offers commissioning assistance and trim charge just like the Standard service, plus cloud set up and monitoring for one year, all included in the price.

Service includes	Standard service	Premium service
Daikin service on site to assist with refrigerant system commissioning	Yes	Yes
All refrigerant required to cover trim charge for installation	Yes	Yes
Initial cloud set up	No	Yes
Energy and system monitoring for 1 year	No	Yes
1 annual monitoring report	No	Yes



Commission with Confidence offers:

- › Fixed-cost commissioning service including trim charge
- › Stable refrigerant prices meaning you can plan for a more prosperous tomorrow
- › A service trusted across hundreds of projects
- › Optional system monitoring by cloud services for optimal performance

Tomorrow is responsible



By each playing our part, we can increase the amount of reclaimed refrigerant going back into our units, ease pressure on the F-Gas quota and secure the supply of R410A in the years ahead. That's why Daikin is launching a new service helping you to Reclaim with Confidence.

Reclaim with Confidence is a fixed fee service that saves almost 70% of time and costs on-site, ensuring that when it's time to repair or replace systems, refrigerant is recovered for reclaiming – completely hassle free. This rapid recovery is available solely for D1 customers, via A-Gas, exclusively in partnership with Daikin.

To thank you for recovering refrigerant via Daikin, you'll gain extra Business Development Fund rewards based on the quantity of refrigerant you reclaim. For every kilo of refrigerant you reclaim, a credit will be made into your next year's Business Development Fund.

Plus you'll be able to claim the cost of the Reclaim with Confidence service from your Business Development Fund by completing a claim online at d1.daikin.co.uk in the usual way, increasing your cost savings even further.

So it really does pay to Reclaim with Confidence.

Being sustainable saves you time and money!

Reclaim with Confidence makes it quick, easy and cost effective to recover refrigerant according to best practice. There's no need to rent cylinders or produce waste consignment notes as everything is done for you.

During a recent reclaim at a Bristol Water site, the Reclaim with Confidence service recovered 50kg of refrigerant in just three hours total time on site. This compares with typically a day's labour if your team were to do the job themselves. So you can use their valuable skills on more profitable tasks.

When you add in the cost of renting cylinders for recovering refrigerant and returning it to the wholesaler directly, Reclaim with Confidence is available at about 31%* of the total cost to your business.

The service can be arranged for all refrigerants – R410A, R407C and many more. Plus when you Reclaim with Confidence, you can be sure that the refrigerant is recovered and reclaimed to AHRI700 standard for future use in the market.

It's great for your clients too because it minimises system downtime and helps to maintain business as usual, ensuring customer satisfaction at all time.

* Based on recent case studies, including Bristol Water example



Here's how it works:

- › Simply log onto the D1 portal or Etool and click on the Reclaim tab. Complete the online order form, giving the site details and an estimate of the refrigerant type/quantity. The price for the rapid recovery service will depend on the volume of refrigerant in the system
- › The form is electronically sent automatically to A-Gas Rapid Recovery who will contact you directly to agree a time and date for the site check (if required) or to go ahead directly with the recovery
- › On the day, A-Gas Rapid Recovery meets your team for induction on site, bringing with them the required cylinders for the quantity and type of gas on your site
- › The reclaim rig is wheeled into position, the recovery hose is rolled out up to 250 feet and the recovery lines are connected
- › The rapid recovery machine recovers refrigerant at around 34 kilos an hour
- › Once all the refrigerant is recovered, the system is sealed and made safe and A-Gas Rapid Recovery pack up and leave
- › On completion, you'll be able to download a certificate from the Etool recording how much refrigerant has been reclaimed, so you can present it to the site owner.

Rapid recovery cuts costs



Savings amounted to around one day on-site, as well as avoiding the need to hire cylinders, while the gas was recovered according to best practice so that it could be reclaimed to AHRI700 standard for future use, with zero impact on the refrigerant quota.

The rapid recovery service was trialled at Bristol Water's three-storey HQ in Bedminster Down, which has three Daikin VRV IV heat recovery outdoor units, with total capacity of 40hp. These serve 25 indoor units, including concealed ceiling units (medium static pressure) and under-ceiling cassettes. The system is charged with 45-50kg of R410A.

After four years' service, one of the outdoor units needed work, demanding recovery of the entire refrigerant charge so that the component could be changed. But a charge of this size would require the hire of two reclaim cylinders at around £150, plus almost a day on site to complete using a normal recovery machine.

Daikin called in A-Gas Rapid Recovery, its refrigerant reclaim partner, and international specialists in the supply and lifecycle management of refrigerants and other gases.

The A-Gas Rapid Recovery vehicle arrived on site at 08:30 and after accessing the units on the roof, positioning the vehicle and pulling 100 feet of hose up to the roof, its crew removed the Schrader valves and connected the recovery lines.

The lines were connected to the three gauge ports on one of the modules, and refrigerant recovery mode was activated on

all three linked modules. The crew started their onboard petrol-driven recovery machine at 09:20 and in the next 60 minutes they recovered 38.5kg of R410A.

At this point, the machine was switched off. The system pressure at that time was zero psi and as the accumulators had iced up because of the evaporation, they were sprayed with hot water and left for 30 minutes for the remaining refrigerant to boil off. Once the system pressure had risen, the reclaim machine was run for a further 20 minutes during which another 6.6kg of R410A was recovered and the system pressure then dropped to -10 inch Hg.

The A-Gas Rapid Recovery crew disconnected their lines, packed up and left the site at 11:40. By midday, the component could then be removed and replaced and the system recharged with fresh gas.

Savings amounted to around one day on-site, as well as avoiding the need to hire cylinders, while the gas was recovered according to best practice so that it could be reclaimed to AHRI700 standard for future use, with zero impact on the refrigerant quota.

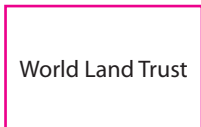
Together we can be part of the climate solution.

Daikin aims to provide safe and healthy air environments while striving to make our business activities carbon neutral by 2050.

We will do this by:

- › Promoting energy efficient technologies and energy management solutions.
- › Adopting refrigerants such as R32 with lower global warming potential; developing next generation refrigerants; and recovering and reclaiming refrigerants in use.
- › Reducing the environmental impact of materials throughout the entire life cycle of our products – from procurement and manufacture to recovery and recycling.

Together we can be part of the climate solution.



Daikin units comply with the European regulations that guarantee the safety of the product.



Daikin Europe N.V. participates in the Eurovent Certification programme for Air conditioners (AC), Liquid Chilling Packages (LCP), Air handling units (AHU) and Fan coil units (FCU). Check ongoing validity of certificate online: www.eurovent-certification.com or using: www.certiflash.com

Daikin products are distributed by:

The present document is drawn up by way of information only and does not constitute an offer binding upon Daikin UK. Daikin UK has compiled the content of this document to the best of its knowledge. No express or implied warranty is given for the completeness, accuracy, reliability or fitness for particular purpose of its content and the products and services presented therein. Specifications are subject to change without prior notice. Daikin UK explicitly rejects any liability for any direct or indirect damage, in the broadest sense, arising from or related to the use and/or interpretation of this document. All content is copyrighted by Daikin UK.

Daikin Airconditioning UK Limited The Heights Brooklands Weybridge Surrey KT13 0NY Tel 01932 879000 daikin.co.uk

London South 01932 879355	London Central 01932 879350	London North 01932 879360	Western Region 01932 879320	Midlands Region 01932 879370	Northern Region 01932 879340	Scottish Region 01932 879330
-------------------------------------	---------------------------------------	-------------------------------------	---------------------------------------	--	--	--