Refrigeration Apprentice of the Year

Commercial Boilers

REFRIGERATION

R22/HCFC Phase-out, Chillers and Heat Pumps

Office HEVAC Attenuation
Hitachi Air Conditioning
Engineering for tomorrow. And the tomorrow after that.

Powerful yet quiet in its delivery.
Why do you think we called it Samurai?

Ultra quiet
Two blade propellers reduce noise, increase airflow and reduce motor power input

Compact installation space
Meticulous design of each component means high cooling capacity in 9% less space

World-class reliability
Twin screw compressors, low starting currents and infinite capacity control for increased efficiency

Wide product range
AG2B capacities from 180 to 450HP (from 40HP in the AG2 range)

Precise control
Control outlet water temperature to 1°C of set point independent of cooling load

Continuous capacity control
Ininitely variable slide valve for 15-20% energy saving over step control systems and excellent partial load performance

Introducing Hitachi's latest Samurai AG2B chiller unit. With two blade propellers instead of four, it’s able to reduce noise and power output as well as increase airflow. It’s also smaller than previous units and boasts a touch panel LCD screen for easy servicing and maintenance. Not to mention energy savings of up to 20%. In short, it’s highly effective, powerful, yet surprisingly quiet – just as its name suggests.

To find out more call Hitachi on +353 1216 4406
Email aircon.ireland@hitachi-eu.com or visit www.hitachiaircon.com

https://www.hitachiaircon.com
Congratulations you show-offs!!!

How refreshing it was to spend a couple of days at the recent Plan Expo EcoBuild exhibition in the RDS. With so much negativity about it was encouraging to see industry players step up to the plate and showcase a positive, confident, image of the sector.

The exhibitor profile at Plan Expo EcoBuild has changed considerably in recent years, the emphasis on energy and sustainability being reflected in the increased number of building services-related companies participating.

All credit to the organisers and exhibitors at the most recent event who, despite the industry downturn, put on an excellent industry showcase. It may have been a smaller show than in previous years and the number of visitors may have been down, but that is an accurate picture of the current state of affairs.

Interestingly, exhibitors spoke to were, for the most part, very happy with the event. The quality of the visitor profile was much improved with a great deal of very senior consultants, architects and OPW personnel attending, presumably because they have more time on their hands. Additionally, those manning the stands had the time to engage in more depth with them.

While the level of business is certainly down in the context of new build, the demand for more energy-efficient and sustainable buildings is driving a resurgence of the retrofit market. This was very much in evidence at Plan Expo EcoBuild. What was also evident was that those companies who participated - be they exhibitors or visitors - are the ones who will reap the benefits of their positive, pro-active approach.
New MD for ISS Ireland

Paul Lynch has been appointed Managing Director of ISS Ireland. A graduate of UCD and a Fellow of the Institute of Chartered Accountants, Paul previously worked with Arthur Andersen, the Heiton Group plc, and One51 plc.

ISS entered the Irish market in 1995 and today employs over 3,700 people nationwide with offices in Dublin, Cork, Limerick, Galway, Drogheda, Letterkenny and Celbridge.

The company operates in a wide range of public and private industry sectors providing property maintenance, cleaning, security, catering, office support, pest control and washroom services to a broad range of private and public sector customers.

Honeywell Valves awarded Waterwise Marque

Honeywell compact pressure-reducing valves have been awarded the Waterwise Marque, awarded annually to products which reduce water wastage or raise the awareness of water efficiency.

The valves feature a balanced seat design and drop-tight seal, which hold the reduced pressure constant, day and night, even when there is wide inlet pressure fluctuation.

The Waterwise Marque applies to Honeywell D04FS, D05F and D06F valves. Models are available with built-in filters, optional pressure gauges and a range of connections from DN10 to DN50 (³/₈ to 2 inch).

Honeywell also manufactures flanged cast iron pressure-regulating valves for large water flows.

Manotherm Digital

Differential Pressure Gauge

The DigiMag Series DM-1100 digital differential pressure gauge from Manotherm monitors the pressure of air and compatible gases just as its famous predecessor, the Magnehelic differential pressure gauge.

All models are factory-calibrated to specific ranges, while the simplified four-button operation reduces set-up time and simplifies actual calibration with its digital push-button zero and span.

The four-digit LCD can display pressure readings in eight common imperial and metric units so conversions are not necessary. Accessories include surface mounting bracket; flat flush-mounting bracket; 3-way vent valve; and plastic static pressure tip.

Technical specifications include:

- Housing Materials - glass-filled plastic;
- Accuracy - ±1% FS, including linearity, hystereses and repeatability;
- Compensated temperature limits - 0°C to 50°C;
- Long-term stability - ± 0.9% FS per year;
- Power requirements - 9 to 24VDC with battery back-up or stand-alone battery;
- Enclosure rating - NEMA 4X (IP66) front face.

Contact: Bob Gilbert, Robert Gilbert or Conor Stead, Manotherm.
Tel: 01 - 452 2355; email: info@manotherm.ie; www.manotherm.ie

Alpex-plus gives installation green light

Unitherm Heating Systems Ltd recently introduced the Alpex-plus push-fit fitting for multilayer and PEX pipes. The innovative push-fit fitting is made of polyphenylsulfone (PPSU) with a stainless steel sleeve in an impressively-slim design. PPSU offers extremely good impact strength while also being non-toxic.

The new fitting - available in sizes of 16mm x 2mm and 20mm x 2mm - offers particular features such as the innovative indicator that helps to make sure that the pipe has been inserted completely. If the indicator of the Alpex-plus fitting turns green after the pipe has been pushed in, a safe connection is assured.

The Alpex-plus fittings are quick and easy to install - simply deburr, push in pipe and the job is done. This considerably reduces the amount of work required and speeds up the installation process. The fittings can be removed using a special tool without causing damage.

In addition to DVGW approval which independently verifies the excellent quality of Alpex-plus, a 10-year certificate for the entire Alpex-plus range is provided.

Contact: Unitherm Heating Systems.
Dublin - Tel: 6109153; Galway - Tel: 091 - 360038.
We'll never put a square peg in a round hole.

At TA, we believe in always using the right tool for the job. That is why we have the industry's largest range of dedicated terminal valves.

Hydronic systems are more effective when balanced correctly. Terminal valves adjust the flows to fit design condition, which, together with proper control, ensures that the hydronic system works the way it should. And because we understand that no two hydronic systems are the same, TA has developed the industry's most comprehensive range of valves for small terminal units. And that's in addition to our huge array of balancing tools such as instruments, handbooks and software programs. In short, whatever the requirements of your hydronic system, we have what you need. Think balancing, think TA.
Tour & Andersson’s service delivery ensured that valves for the waterborne system and biomass boiler at Stansted airport’s £40 million extension were delivered on time and to budget.

Tour & Andersson’s valves were specified to ensure hot and cold water is transported through the system from biomass boilers. These burn renewable forms of fuel to generate hot water for direct use and heating purposes. The latest results indicate the biomass technology is set to help reduce predicted annual airport gas consumption at the airport by nearly 40%. The success has been recognised by DEFRA which awarded the Stansted Arrivals Project with a grant under the Bio-energy capital grants Scheme.

It was Tour & Andersson’s commitment to quick delivery that won the contract, which required a valve partner that could guarantee delivery of all the valves on time.

“Delivery was a very important factor for the Stansted Airport project,” explains Nigel Huggins, Managing Director of Tour & Andersson. “By understanding these requirements, we were able to do the take-offs and ensure that all the units were supplied to site in line with the work schedule.”

The extension of Stansted sees the existing arrivals terminal increased to create an additional 5,900m sq of floor space in the building. Overall the extension to immigration, baggage and customs halls will allow Stansted to handle an extra million passengers each year.

The terminal extension provides nearly 6,000 sq m of additional space for arriving passengers, including a sixth baggage reclaim belt and extra desk space for immigration control managed by the UK Border Agency.

Contact: www.tourandersson.co.uk

Cylon BACnet Controllers

With BACnet now the preferred standard for building services integration, Cylon has extended its BACnet solution to a new range of terminal unit controllers for fan coil, chilled ceiling and VAV applications.

Two new controllers are involved – UCU10FC BACnet, a programmable unitary controller designed for use with fan coil and chilled ceiling applications; and UCU10VAV BACnet, a programmable unitary controller designed for use with single duct and fan assisted VAV applications.

Cylon native BACnet controllers offer flexibility and performance on an open platform. Importantly, they can be engineered remotely over BACnet which means that sites can be rapidly commissioned with engineering of all terminal units from a single location.

Contact: Cylon Controls.
Tel: 01 – 245 0500;
www.cylon.com
More cash, less tax...

This doesn’t have to be a dream. With the Accelerated Capital Allowance (ACA) scheme you can lower your energy costs and reduce your tax bill.

The ACA scheme can help your company invest in energy efficient equipment and provides real tax benefits.

For information visit www.sei.ie/aca or phone 01 808 2100

To find out more ways your business can save energy log onto www.sei.ie/business
Scintillating scores at Edmondstown

The CIBSE annual golf outing was held in Edmondstown Golf Club recently with 14 teams taking part. The course was in great condition, thanks to excellent work by the grounds staff the night before, but the weather on the day was a mixture of showers and sunshine.

Richard O’Hare of Edmondstown was the starter and he did an excellent job ensuring that the teams left the first tee box at the allotted time.

Results

The winner of the PJ Doyle Trophy was Fergus Weldrick, playing off a handicap of 23, who recorded a fantastic score of 46 points.

The Chairman’s Prize was retained by Colin Murphy, playing off a handicap of 7, with a great score of 38 points.

The team results were as follows:

First: CIBSE Chairman’s Team, 93pts;
Second: Control Aer, 90pts (won on the back 9);
Third: Patric Engineering, 90pts;
Front nine: Wilo, 43pts;
Back nine: Safeguard, 44pts;
Nearest the pin: Brian Sterling, 2.6m;
Longest drive: Michael O’Carroll.

The outing took the form of a Stableford competition with the Chairman’s Prize being presented to the CIBSE member with the best individual score and the PJ Doyle Trophy going to the overall individual winner.

The main event was a team event with the best two scores on each hole, and all four scores on the 18th hole, contributing to each team’s final points tally.

The outing proved an enormous success, thanks largely to the efforts of organiser Gerald O’Callaghan and the assistance provided by Gerry Fitzpatrick and Martin Keogh on the day. CIBSE is deeply indebted to the many team sponsors, in addition to the additional support provided by Mycold Engineering and GT Phelan.
Small change... huge effect

The new Honeywell advanced DT90 and DT92 thermostats lead the way in energy efficient control. The advanced technology brings precision boiler control, maximising the energy efficiency of the heating system.

With heating and hot water accounting for over 80% of total household energy usage (and lighting 3%)*, you can demonstrate to your customers how to make real energy savings – and extra business for you.

DT90 and DT92 both work with TPI** control, resulting in up to 10%*** extra energy saving over a traditional room thermostat.

Available in wired or wireless models. Look out for details of the new advanced range and energy saving information at your local merchant.

Visit www.honeywelluk.com to find out more about TPI** or call 0044 800 521 121.

Honeywell

*Figures from BEAR Domestic Energy Consumption details available from ONS (Office of National Statistics). CFL saving 10% over Tungsten light bulbs, 28 bulbs per home.

**Time Proportional Integral. ***TACMA single cycle yearly data test.
Approaching the end for virgin HCFC refrigerants

This year is an important year in the refrigeration and air conditioning world. From the end of this year, there will only be restricted use of HCFCs for the maintenance and servicing of refrigeration and air conditioning equipment. HCFCs are part of a group of chemicals known as ozone depleting substances. HCFCs were commonly used following the phase-out of CFCs in previous years, as they are far less damaging to the ozone layer. However, HCFCs still damage the ozone layer and their time is nearly up. The HCFC refrigerants we are talking about are mainly R22 but there may be other HCFC refrigerants still in use. The use of these gases will be phased out completely by 31 December 2014, starting with a ban on the use of virgin HCFC at the end of this year.

Background
The phase-out of many ozone depleting substances over the last two decades is thanks to the Montreal Protocol, which is widely accepted as one of the most successful environmental agreements to date. The Montreal Protocol is seen as effective because it has achieved its aim to halt depletion of the ozone layer and it has received the backing of every single country in the world. This success has also had the added benefit of helping to combat climate change, since some ozone depleting substances also have significant climate impacts. HCFCs are among the few remaining ozone depleting substances yet to be fully phased out.

The ban on virgin HCFC
At the end of this year, virgin HCFC cannot be used to top it up after 31 December 2009. However, between 1 January 2010 and 31 December 2014, recycled or reclaimed HCFC can be used for maintenance or servicing of such equipment. Of course equipment running on HCFCs can continue to be used but end-users and contractors should bear in mind that there may be a shortage of recycled or reclaimed HCFC in the next few years. So if you rely on equipment running on HCFCs, now is the time to develop a phase-out and replacement plan, especially if the equipment is serving a critical function. Any virgin HCFC remaining on sites after 31 December 2009 will have to be treated as hazardous waste.

Recovered HCFC
It is important that any HCFC recovered from equipment is managed properly and either recycled on site using a basic cleaning process, or sent away for full reclamation to return it to the equivalent performance of a virgin substance. Any contractor removing recovered refrigerant gas from an end-user site should have submitted a Prior Annual Notification to the EPA. More information on this is available at www.ozone.ie. The storage of waste refrigerant gases is not permitted on any site (other than temporary storage on site of generation), unless that site is specifically authorised to do so.

With the approaching ban on virgin HCFC, the question has been asked about recovering HCFC and charging with virgin HCFC...
Energy efficient R410A Super Digital Inverter – also the perfect solution for R22 and R407C replacement systems, and for the environment.

The new 4 series Super Digital Inverter from Toshiba is equipped with new Eco-driving twin-rotary compressors making the system energy class A in both heating and cooling. This results in savings of up to 70% in annual energy costs compared to fixed speed systems.

Designed as a new, energy efficient R410A single or twin split system, the Super Digital Inverter is also the perfect replacement for existing R22 and R407C systems. Able to replace both indoor and outdoor units whilst utilising the existing pipework*, the result is a quicker, cheaper, more environmentally responsible installation.

Contact us today for more information.

*Provided the existing pipework meets current high requirements regarding pressure rating of R410A.
The Montreal Protocol is seen as effective because it has achieved its aim to halt depletion of the ozone layer and it has received the backing of every single country in the world.
State-of-the-art integrated design ...

- Reduced Energy Costs
- Optimum Availability
- Maximum Flexibility
- Perfect Integration

... with a heart for the environment
HITACHI

Hitachi and Crossflow partnership delivers system excellence

With over 35 years of technical expertise Crossflow Air Conditioning installs, commissions, services and maintains all types of air conditioning equipment, from standard split air conditioning for single offices/rooms to large vrf multi room/office applications.

In addition to providing system solutions, Crossflow also offers project management, technical investigations and reports, and full facilities support – 24 hours a day, 365 days of the year.

As such, it is the perfect trading partner for Hitachi. Together, they have been responsible for some of the most prestigious air conditioning and refrigeration projects in Ireland in recent years. These include major installations at Deloitte’s Earlsfort Terrace headquarters in Dublin and at Euro Medic in Santry, Co Dublin. Project manager for Deloitte was Gary Bartley and the equipment was a Sumurai RCUE 120AG2 chiller, while Kieran Timmons of McKenna Engineering was project manager on the Euro Medic project which features a Samurai RCUE 40AG2 chiller.

Crossflow Director Padraig Hanvey says that the quality of the Hitachi equipment, and the scope of the applications catered for, perfectly complements the engineering-based solutions it strives to offer its clients.

"With the professionalism and experience of our staff and the high level of attention we pay to every detail of our customers requirements", says Padraig, "we continually strive to find innovative technical solutions for the design and installation of air conditioning systems, building control systems and close control data centre temperature management systems. We find that the Hitachi range, coupled with the support services provided from its Irish office, helps us realise this objective."

Critical to this endeavour is the constant introduction of cutting-edge products and systems such as the new Samurai AG2B chiller range which enhances the precise control of outlet water temperature across all applications.

Reduced footprint – The AG2B achieves high cooling capacity in approximately 9% smaller space than previous models thanks to air-side heat exchanger size modifications and a refrigerant distribution redesign;

Noise/energy reductions – Impressively low noise levels are delivered by inverter-driven two-blade fans. The two blades increase air-flow but lower power output, allowing for additional energy savings;

User-friendly and safety – The AG2B incorporates an easy-to-use touch LCD panel display for effective servicing and maintenance.

In conclusion, Padraig Hanvey says: “We’re delighted with this latest addition to the Hitachi Samurai range of chillers. We are also confident that it will prove critical in helping us secure further prestigious projects into the future."

Contact: Fergus Daly, Hitachi Europe (Ireland).
Tel: 01 – 216 4406; email: fergus.daly@hitachi-eu.com

Left: The Samurai RCUE 120AG2 chiller installed at Deloitte’s Earlsfort Terrace headquarters; Centre: The new AG2B Chiller from Hitachi; Right: The RCUE 40AG2 chiller installed at Euro Medic’s premises in Santry, Dublin.
Chillers, Heat Pumps and R22/HCFC Phase-out

CORE AIR CONDITIONING

New generation integrated design
Carrier AquaSnap

Design can greatly influence energy efficiency and that is why Carrier designs and develops completely integrated climate control systems and equipment for various applications. From chillers and heat pumps to air handling units, terminals, control and monitoring solutions, Carrier has infinitely-variable products and systems which can be tailored to specific needs.

Carrier has been at the forefront of climate control systems for more than 100 years and that vast experience and expertise is very much evident in the new AquaSnap range of air-cooled liquid chillers and heat pumps (40kW to 160kW).

The AquaSnap air-cooled chillers are delivered to site fully assembled, tested, charged and all set to facilitate installation. With the integrated hydronic module, there is no need to plan for additional space to install the water pump, valves and hydronic accessories. Just bolt the unit down, connect it up and it is ready to go. Maintenance is equally simple, saving time and energy.

Carrier offers the option of installing an inverter on the water pump to adapt the flow to the building’s demand. The unit measures the water temperature and pressure, enabling the end-user monitor and continuously optimise energy consumption.

Reliability was top priority in the design of the AquaSnap chiller, which passed a severe vibration test that reflects the most extreme transportation conditions. The chiller's refrigerant circuit is completely sealed, minimising the risk of leakage. Nearly all refrigerant pipes have brazed connections that are far more secure than mechanical connections.

The electronic expansion valve ensures that the unit operates with the ideal refrigerant flow and that it delivers optimum performance, even in extreme conditions.

The Pro-Dialog+ control system constantly checks and analyses all compressor operating parameters, such as pressure, temperature and number of start-ups. Moreover, AquaSnap units use puron refrigerant R-410A with zero ozone depletion that is more environmentally sound than other refrigerants.

The new air-cooled chillers require a lower refrigerant charge than their predecessors. The units are Eurovent-certified Class C, consume less energy and generate less CO2 emissions than the previous generation.

The Carrier factory where the units are manufactured is ISO 14001- certified and uses only green electricity.

The AquaSnap air-cooled chiller performs reliably within a wide operating range, regardless of season or climate and even in extreme conditions (-20°C up to +48°C). Coil defrost cycles take place only when absolutely required. The unit is suitable for floor cooling/ heating applications and, thanks to its low profile – less than 1.33 m in height – and small footprint, it can be installed virtually anywhere.

The hydronic module with single or dual pump and expansion tank is completely integrated. This makes installation faster to complete and reflects the chiller’s flexibility. The sophisticated pro-dialog+ digital control system allows precise adjustments to all chiller components in order to maximise energy savings and obtain ideal comfort conditions at all times.

With its high-efficiency scroll compressor and low-noise shrouded axial fan, AquaSnap keeps noise to a minimum. It can be easily integrated into existing Building Management Systems (BMS) while control options are compatible with the most common communication protocols such as JBUS, BACnet and LON.

Contact: Austin McDermott, Core Air Conditioning. Tel: 01 - 409 8512; email: austin@coreac.com

New generation integrated design Carrier AquaSnap.
Chillers, Heat Pumps and R22/HCFC Phase-out

GT PHELAN

Toshiba energy efficient R410A Super Digital Inverter
(also the perfect solution for R22 and R407C replacement)

Designed as a new, energy efficient R410A single or twin split system, the Toshiba Super Digital Inverter 4 from GT Phelan is also the perfect replacement for existing R22 and R407C systems. Able to replace both indoor and outdoor units while utilising the existing pipework (provided it meets current legislation regarding the pressure rating of R410A) the result is a quicker, cheaper, more environmentally-responsible installation.

The Super Digital Inverter 4 energy efficient R410A single or twin split system.

The new Super Digital Inverter Series 4 sets new standards for industry energy performance. The units are equipped with the new eco-driving twin-rotary compressors, where the magnetic action minimises the rotor friction loss. The compressors can work at very low speed, down to 10 r/s, providing excellent energy performances in both cooling and heating.

The seasonal and the rated efficiencies are the highest in the industry for capacities from 10 to 12.5 kW while the air management system has also been improved – high efficiency fan motors, larger fans and new fan grille design all contribute to the exceptional energy performance. Piping and operating limits have also been improved. The new system can work at extremely low temperatures, in cooling and heating. The extended pipe length is now up to 75m.

Key features and benefits

1. Highest EER/COP values in the industry
   All systems are “A-rated” in cooling and heating operation. Thanks to its new eco-driving compressors, the new systems provide excellent seasonal energy performance, thus saving up to 70% on annual energy costs compared to fixed speed systems.

2. Eco-driving twin-rotary compressors
   The structure and magnetic action of the new eco-driving twin-rotary compressors provide excellent energy performance at full load as well as in partial load conditions.

3. Longer pipe runs
   Longer pipe runs of up to 75m length and 30m elevation for increased installation flexibility.

4. Broader operating range
   The wide operating range goes down to -15°C in cooling mode and down to -20°C in heating mode.

5. High static fan operation
   High static fan operation is possible utilising a dip switch in the outdoor unit enabling the units to be installed in a plant room.

Contact: Derek Phelan, GT Phelan. Tel: 01 – 286 4377; email: derek@gtphelan.ie

https://arrow.dit.ie/bsn/vol48/iss7/1
The Institute of Refrigeration Ireland is calling for urgent action by end-users of refrigeration and air conditioning to make sure they are prepared for R22 phase-out deadline. With less than two months to go to the ban on both the use and sale of virgin HCFCs in Europe, it seems that a large number of refrigeration and air conditioning end-users continue to have their heads in the sand. Despite repeated warnings from the RAC sector, many end-users have yet to take any concrete steps to prepare for the ban.

In the following article, Seamus Kerr, President of the Institute of Refrigeration Ireland, outlines the options available to owners of RAC plant operating with HCFC refrigerants and urges immediate action.

**Background**

The last step in eliminating ozone-depleting substances was brought into force in October 2000 with the introduction of the EC Regulation number 2037/2000. The regulation bans the use and sale of virgin hydrochlorofluorocarbons (HCFCs) as of the 1st of January 2010.

No virgin HCFCs can be sold or used for service after the deadline date. Recycled or reclaimed product can only be used for servicing purposes up until December 2014.

The most common HCFC still in use, and the one that is causing the most concern, is R22 but the ban also includes blends containing R22 such as R401A, R402A, R408A, R409A, R412A, and R509. At the moment there are an estimated 130,000 tonnes of HCFCs in more than seven million installations across the EU.

If they haven’t done so already, RAC end-users should be working with their suppliers to identify which of their plant, if any, uses HCFCs, and to take the appropriate action immediately.

**Planning for Phase Out**

There are three steps to take when planning for phase out:

**Step 1: Identify all refrigeration and air-conditioning plant with HCFCs**

This will include refrigerant type and quantity, lubricating oil, service history (including details of top-up quantities and frequency) age of the system, cooling load details, plant design and plant performance.

**Step 2: Collect detailed information about each individual piece of plant**

Using the information collected you can begin to assess different options. Depending on their circumstances, different solutions will be appropriate for different companies.

**Step 3: Evaluate Phase-Out Options**

This option is likely to involve the greatest initial outlay and to take longest to implement so it requires careful planning. However, it affords the buyer the opportunity to avail of the...
newest technologies and improvements in system design, thus leading to higher energy efficiency and a far greater expected plant lifetime (20 to 30 years). It is also an opportunity to consider the suitability of alternative refrigerants such as CO2 and ammonia.

**Option B: Use a different refrigerant**
Where possible, some companies may elect to modify their plants to use a new refrigerant. This option should cost less and be quicker to implement than a completely new plant. An example of a low GWP retrofit refrigerant would be R407A which has been used in Ireland for over 20 years. Using R407A might require an oil change but no expansion valve change. R404A has been used as a R22 replacement in many cases but this will require an expansion valve change and possibly an oil change. R407C has been used successfully as a retrofit refrigerant in some air-conditioning plant. In this case, an oil change will be required and possibly an expansion valve change. There are also new “drop-in” refrigerants such as R422D which can be used without changing the oil or expansion valve in most cases.

Replacing the refrigerant won’t be an option in all cases and it has implications for plant performance, reliability and energy efficiency, but with the right expert advice, it can be an effective solution.

However, be very aware that there are many pitfalls and take advice regarding anything special that each plant type might require - “drop-ins” do NOT work in many cases.

**Option C: Rely exclusively on recycled HCFCs**
As it stands, recycled and reclaimed product can still be used until the December 2014 deadline. Non-virgin HCFCs can be used to top-up systems in the event of refrigerant leaks. It would appear that a large number of end-users are entirely reliant on this option, either through inaction or in the belief that it is the most cost-effective solution. However, the latter is only likely to be the case in circumstances where the equipment is very near the end of its life and is not business-critical. In any event, this option can only be temporary and one of the other solutions will still have to be implemented before the 2014 deadline. End-users should be aware that there is no guarantee that sufficient recycled HCFCs will be available after the 1st of January 2010. The price of recycled R22 is already higher than virgin R22 and is expected to continue to climb as demand outstrips supply. Also there is no guarantee that the December 2014 deadline won’t be moved forward. So there are very clear risks associated with this option.

Time is running out!
Some end-users may be tempted to defer any decisions on this until a later date. This is not a good idea. You could already be making ill-informed and expensive decisions. If you have systems operating with HCFCs, and you don’t have a HCFC Phase-Out Plan in place already, you should take action immediately. Work with your RAC contractor to put in place the appropriate solutions for your business.

Time is running out!

https://arrow.dit.ie/bsn/vol48/iss7/1
Carel Ireland was the sponsor of this year's Refrigeration & Air Conditioning Apprentice of the Year competition organised by DIT in Bolton St earlier this month as part of the National Skills Competition (NSC).

The competition is based on two sections – Phase 4 and Phase 6 – and this year the standard was particularly high. The eventual winner, Partick Egan, displayed exceptional skill levels and deserves great praise for emerging triumphant from such a high-achieving group of students.

"While I have long been associated with the refrigeration and air conditioning apprentice of the year programme in DIT", says Dave Killalea of Carel Ireland, "this is the first time that we as a company have sponsored the event.

"Over the years I have come to expect high levels of craftsmanship but I can honestly say that this year the performance of the students was quite extraordinary. Obviously, the individuals concerned deserve full credit for this but all are unanimous in acknowledging the vast input of their tutors at DIT. So, my congratulations to one and all".

Above: John Smartt DoES Chief Advising Examiner, Plumbing, pictured with Patrick, Egan DIT Refrigeration & Air-Conditioning Apprentice of the Year; Colin Brennan, holding his NSC participation plaque; Tony O’Brien, DIT Lecturer in Refrigeration; and Seamus Murrin, DIT Head of Department Construction Skills.

Below: Peter Harding, Botanic Building Supplies (sponsor), pictured with James Cox, 2009 National Skills Competition winner; and John Smartt, DoES Chief Advising Examiner, Plumbing.

Patrick Egan, DIT Refrigeration/Air-Conditioning Apprentice of the Year 2009, receiving his trophy from Dave Killalea, Managing Director, Carel Ireland, who sponsored the event.
GASCO IRELAND & MSS BUILDING SERVICES

In an age where global brands and large multi-national corporations dominate many business sectors, smaller companies have to offer something different or unique to compete. As separate entities Gasco Ireland and MSS Building Services have always done so but, now that they have formed a strategic alliance, they are set to dominate the market sectors they serve.

Combined strengths mean better customer service

Traditionally, Gasco specialised in the air conditioning/refrigeration components sector, while MSS served the mechanical, electrical and sprinkler industries. Now that they have joined forces, both will continue to trade from their existing premises but customers can order product across the combined portfolio from either branch. In addition, nationwide service has been further enhanced with the recent opening of a Belfast Branch.

Gasco Ireland was originally part of the international Gasco group but is now a wholly-owned, independent, Irish operation. Equally so, in an earlier guise MSS was once part of a major multi-national but it too is now totally independent. Both have traded with one another for many years, have the same core business philosophy, and serve many of the same customers.

More than that, the principals involved – Sean Stenson, Mark Kiely, Billy McDonald and Darren Kiely have extensive industry experience representing almost 75 years between them.

By combining their collective strengths they now provide big-company benefits but in a very direct, hands-on, personalised manner.
ExtemIII Sales Team – Ian Dennls with Des Smith and Steven McDonald.

Solutions providers

Given the complex nature of the industries served – and especially the impact of legislative directives and compliance requirements – technical advice and support is critical.

Experienced staff are constantly on hand to discuss projects and engage with customers to help them devise the most appropriate and cost-effective solution. All are highly-qualified and can provide support with everything from product selection through to system design.

‘Open all hours’

Extended opening hours, ex-stock availability and same day (Dublin) or next day (nationwide) delivery are critical strengths. MSS is open from 6.30am to 5pm, Monday through to Thursday, and 6.30am to 3pm on Fridays. Meanwhile, Gasco is open from 8am to 5pm, Monday to Friday, and 9am to 12pm on Saturdays. A 24-hour helpline also operates.

Belfast Branch – Ryan Taylor and Billy Stockton.

Brands represented

Given that quality lies at the heart of the Gasco and MSS service, a prime requirement is that the products and related accessories offered are of an equally-high standard. Hence the portfolio of world-renowned, market-leading brands. These have been carefully selected to satisfy the needs of the Irish market and comprise complementary ranges which cater for all market segments. They include:

- ACC/Electrolux Compressors
- Advanced Chemicals
- Anvil (Gruvlok)
- Armacell
- Carel Controls
- Climalife
- Danfoss
- Elico
- Erico Caddy
- Industrial Hangers Ltd
- ITW (Spit)
- Little Giant
- Metstrut
- Mupro
- Sauermann Pumps
- Univap Coolers
- Yellow Jacket

Technical advice with a cuppa!

Apart from technical support and advice, the warmth of the welcome extended at the trade counter is equally important. Tea, coffee, soup, biscuits etc are constantly on tap, not to mention the fun and banter. It is all about personal contact, understanding customers’ needs, and meeting that need in a professional, yet friendly, manner.
Businesses looking to reduce energy costs by investing in energy-efficient equipment can now doubly benefit through a new tax incentive scheme called Accelerated Capital Allowances (ACA).

### A new way to get money back from the tax man!

**Under the ACA scheme**, when money is spent on eligible energy-efficient capital equipment, the company can deduct the full cost of this equipment from its profits in the year of purchase. This contrasts with the existing Capital Allowances tax structure whereby companies can only deduct the cost of such equipment from their profits proportionally over a period of eight years.

Moreover, the saving made is on top of the energy savings that the company will make through investing in energy-efficient equipment.

If a company does not make a profit in the year of purchase, the capital allowance can be carried forward and offset against profits in following years.

The ACA benefits all companies liable for corporation tax by:

- Reducing tax liabilities;
- Increasing cash flow;
- Reducing energy costs in a sustained and ongoing basis.

### Sample Case Study 1 – ICT savings in the financial sector

A financial services company with an annual electricity spend of over €625,000 identified potential energy savings through ACA eligible server upgrades and utility efficiency improvements.

By utilising the most energy efficient blade servers and server virtualisation in conjunction with optimisation of the supply of cooling and utilities, a 19.5% reduction in site energy consumption was achieved. **Annual savings of €122,000** were achieved for an investment cost of €243,880 resulting in an average **payback of 2 years**.

As ACA eligible equipment was purchased to achieve these energy savings additional tax savings and cash flow increases were achieved in the year of purchase as detailed in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Without ACA</th>
<th>With ACA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>€30,485</td>
<td>€26,674</td>
</tr>
</tbody>
</table>

**What equipment qualifies**

The ACA scheme covers all eligible energy-efficient equipment detailed on the ACA specified list of eligible products maintained by Sustainable Energy Ireland (SEI). It now includes seven categories of equipment, and in total 29 different types of technologies.

Products which suppliers wish included on the list must meet defined product certification, testing and performance criteria. This provides assurance to users of the scheme that, as well as purchasing equipment in a tax-efficient and cost-effective manner, the equipment being purchased is among the most energy-efficient available.

SEI has recently updated the list of eligible products and it is now available to view on SEI’s ACA website, [www.sei.ie/aca](http://www.sei.ie/aca).

Manufacturers or suppliers wishing to submit their products for inclusion on the ACA specified list should visit [www.sei.ie/aca](http://www.sei.ie/aca) to register their details and find out how to submit eligible products.

### How to claim the ACA?

Claiming the ACA is simple as the standard annual company tax return procedure used to claim standard Capital Allowances is also the method used to claim the ACA.
Alpha CD50S & CD70S

Alpha Standard
Features Overview

- 3 year guarantee;
- Seasonality valve;
- Designed in filling loop;
- Stainless steel heat exchanger;
- Automatic bypass;
- Anticycling device;
- Fully modulating low NOx burner;
- Daily pump kick;
- Frost thermostat;
- Available in both LPG & natural gas.

Specifically designed for larger output requirements, the CD50S is suitable for central heating loads of between 10kW and 53.8kW and the CD70S for central heating loads of between 18.1kW and 72.8kW. Both are capable of being installed as a single unit or in simple modular formations for even bigger outputs.

Alpha Telescopic Flue Terminal

Peamount Business Centre, Newcastle, Co Dublin
City East Business Park, Ballybrit, Co Galway

Tel: 01 - 610 9275
Tel: 091 - 380 038
Fax: 01 - 621 2939
Fax: 091 - 380 039
Product Review: Commercial Boilers

ORIGEN ENERGY

Delivering engineered renewable solutions...

Origen Energy Ltd is the newest company within the Hevac Group. It was established earlier this year to provide a dedicated service to its renewable energy customers while, at the same time, utilising the vast resources of sister companies – Hevac, Polytherm and Tube Company of Ireland.

In a very short space of time Origen Energy has emerged as one of Ireland’s leading renewable energy and district heating specialists. It designs and supplies fully-engineered renewable energy solutions for the residential, commercial and industrial sectors, and can also provide additional support by way of in-house design engineers, CAD technicians and system specialists.

The focus of Origen Energy is to provide quality solutions that lower energy costs, while offering maximum efficiency and comfort. It ensures both domestic and commercial projects are as energy efficient as possible, and that they comply with all statutory energy regulations, thereby guaranteeing a reduced carbon footprint.

Mixed developments normally consist of a shell and core apartment-type building with retail units at ground level. Very often they also contain crèches and community centres. Origen Energy provides a complete design service for these types of developments, together with energy consumption analysis and commercial BER ratings.

In order to meet the requirements of Part L of the Building Regulations, the developer needs to show that renewable energy constitutes 10KW hours per sq m per year within the development. District heating is an ideal way to achieve this by providing a central energy centre with biomass heating and an energy transmission network linked to all units, both commercial and residential. These in turn can be individually-metered and monitored, and billed according to the energy they use.

There are several advantages to providing this form of centralised heat, namely the elimination of gas pipe lines and gas risers within the individual apartment blocks, and the elimination of fluing arrangements from each apartment.

When it comes to sourcing commercial heating products – such as boilers (including biomass), controls, pipework and pipe fittings, valves, pumps and other related products – Origen has no equal, irrespective of the application, fuel or specific project requirement. The composition of the renewable product portfolio is carefully structured to ensure that all needs can be satisfied with high-quality, brand-leading products from some of the world’s foremost manufacturers.

Package boiler houses, complete district heating systems, cast iron or steel boilers, solar panels, heat pumps, burners, air heaters, water heaters, pumps, boosters, radiators, gas detection, heat metering and billing, flue supply and flue installation are just a selection from the product portfolio of the commercial and industrial applications.

Capacities range from 45kW upwards and fuel types catered for include dual-fuel, natural gas, LPG, light and heavy oil, biomass and biofuel. Origen offers technical assistance with the sizing of pumps, boiler selection, the distribution pipework selection, flue sizing installation, system expansion tanks and also the controls associated with the whole installation.

In addition to specification consultation at an early stage in the project, Origen offers ongoing assistance throughout all the stages of the project, right from product identification and selection through to installation and final commission.

Contact: Peter Mulvihill, Joe Raftery or Paul Devereux, Origen Energy.
Tel: 01 – 419 1940; Fax: 01 – 419 1980; email: info@origen.ie
www.origen.ie
Working towards a cleaner future

MAXXflo
This unique range of condensing water heaters from Andrews offers a revolutionary concept in self contained, storage water heating.

Paramount two
A range of technically advanced wall hung condensing boilers. Lightweight, ultra low noise, combining the latest heat exchanger technology and state of the art control systems.

Established values.
Leading edge technology.

www.pottertoncommercial.co.uk
www.andrewswaterheaters.co.uk
Product Review: Commercial Boilers

POTTERTON MYSON

Potterton Commercial extends boiler output

Potterton Commercial, part of the Baxi Commercial Division within the Baxi Group, is one of the longest-established names in the industry. Today, these boiler specialists continue to pioneer the way in development and production of high-efficiency commercial boilers, as well as LZC (low to zero carbon) solutions, keeping ahead of new legislation.

Offering these and other group heating and hot water products to the Irish market as a “one stop shop” facility is Potterton Myson Ireland (PMI), a wholly-owned subsidiary of Baxi Group. The Group’s leading-edge role in this field is demonstrated by two new products which have just come on stream – the Eurocondense three and LogoCondense.

Eurocondense Three

The trusted Eurocondense Two range has been completely transformed and is now presented as Eurocondense Three. Aesthetically improved, it is smaller, lighter and has a reduced footprint. In addition, all connections are on the top for greater siting options and ease of installation. This cascade boiler offers a wider range of hydraulic accessories as well as a room-sealed option. The internal layout has been completely redesigned to accommodate a single burner assembly, positioned at the front, which slides out for easy servicing. The new Eurocondense Three is available in outputs from 123 to 305kW.

LogoCondense

Hailed as an exciting step forward in the oil heating sector, LogoCondense – with “carbo condense” technology – brings condensing operation to this high output, stainless steel, pressure-jet oil or dual fuel boiler range. The carbon heat exchanger, vital for oil boilers to operate in condensing mode, allows heat recovery from the boiler flue gases, achieving higher efficiencies without degradation of the heat exchanger by acidic by-products of oil.

Condensing gas-fired boilers

The Paramount Two range of wall-hung, high-efficiency, condensing boilers incorporates the proven aluminium/silicon alloy heat exchanger, which comes with an industry-leading lifetime guarantee*. This boiler delivers advanced ultra-low NOx performance of less than 20mg/kWh, exceeding Class 5, and up to 109% net energy efficiency. Controlled by the user-friendly Integrated System Regulator (ISR) control system, Paramount two is available in six outputs from 30 to 115kW.

Potterton Commercial’s Sirius FS and Sirius WH are ranges of technically sophisticated floor standing and wall-hung stainless steel condensing boilers.
Origen Energy Limited is one of Ireland's leading renewable energy and district heating specialists. We operate in offices and warehouse facilities in Dublin and Cork comprising over 10,000 square meters of space. We design and supply fully engineered renewable energy solutions to the residential, commercial and industrial sectors and can offer in-house specialists including design engineers, CAD technicians and system specialists.

The focus of Origen Energy Limited is to provide quality solutions that lower energy costs, whilst offering maximum efficiency and comfort. We ensure both domestic and commercial projects are as energy efficient as possible and comply with all necessary energy regulations, guaranteeing a reduced carbon footprint.

Origen Energy Limited are part of the "Hevac Group" which comprises Hevac Limited, Tube Company of Ireland Limited and Polytterm Heating Systems Limited. Origen represents the latest strategic move in our 35 year market experience and has the full backing and support of all group companies as it endeavors to become the market leader in its field.

Origen Services
- Expert customer service and technical support
- Comprehensive training on all our products
- Design and full CAD service

District Heating
- Consultancy and technical assistance for design and selection of plant and network.
- Completed system tailoring of your district heating scheme matching client’s specific requirement.
- Number one supplier for the complete district heating system from design, heat generation and transmission pipework to final metering and billing of the energy / heat usage of the end-user.

Origen Systems
- Solar Thermal Heating
- District Heating
- Biomass Heating
- Geothermal Heating
- Air Source Heating
- Heat Recovery Ventilation
- Underfloor Heating
- Condensing Oil / Gas
- Electricity Generation
- Solar / Gas Combi Systems

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Unit L, Furry Park Industrial Estate, Santry, Dublin 9 T +353 1 842 7037 F +353 1 842 7045
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Energy@origen.ie
www.origen.ie

Renewable Energy Solutions

Herz Biomass Boiler
Solarmax Solar Panel

Origen Energy Limited
a force from nature
**Product Review: Commercial Boilers**

**ALPHA THERM IRELAND**

**Alpha keeps carbon emissions and energy consumption to a minimum**

Alpha has been successfully supplying the heating industry for 40 years, during which time it has gained a reputation for developing innovative, high-performing, boilers which are manufactured to exacting quality-control standards.

According to Declan Kissane of Alpha Therm Ireland, “Alpha has developed a wide range of products which keep energy consumption, carbon emissions and energy bills to an absolute minimum. This has been achieved by applying innovative thinking and new and existing technologies to meet the challenge presented.”

These strengths are perfectly represented in the CD50S, CD70S, CD90S and the CD110S wall-mounted, SEDBUK Band A rated condensing, fan-assisted, system boilers. They provide heating-only for sealed central heating systems, or open systems, if required.

Specifically designed for larger output requirements, the CD50S is suitable for central heating loads of between 10kW and 53.8kW; the CD70S between 18.1kW and 72.8kW; the CD90S between 23kW and 90kW; and the CD110S between 30kW and 110kW. All models come with a three-year Alpha “no quibble” guarantee.

While these boilers are supplied with type B23 flue configuration (open chamber and forced draught) to allow for flexible siting, the configuration can be changed to type C (room sealed) with the use of a special flue adaptor kit.

All can be supplied for use with natural gas or LPG and are capable of being installed as a single unit or in simple modular formations for even bigger outputs.

Key features and benefits are as follows:
- Three-year guarantee;
- Suitable for single-unit or cascade installations;
- High-grade stainless steel heat exchanger;
- Fully modulating low NOx burner;
- Pre-wired, two-metre, flying mains lead;
- Open or concentric push-fit flue systems;
- Built-in plume management;
- Easy access for servicing;
- Built-in commissioning and fault finding.

Contact: Declan Kissane, Alpha Therm Ireland (Dublin Office).
Tel: 01 - 610 9275;
Peter Lynskey, Alpha Therm Ireland (Galway Office).
Tel: 091 - 380 038;
email: info@uni-therm.net
web: www.alpha-boilers.com
Warren Wins Golfer of Year

As befitting the intense competition throughout the year, the winner of the Hitachi Ireland-sponsored RACGS Golfer of the Year was only decided at the final outing at the European Club.

It was a closely-fought battle between the top four golfers in contention, and it was appropriate that they played together in the last four-ball of the day.

Johnny Lynagh had a one point advantage going into the last round but his competition had other ideas. The day was wild and windy, just the sort of conditions to favour a links player, and so it came to pass with Joe Warren taking the final honours by a single point from Johnny Lynagh.

Fergus Daly from sponsor Hitachi Ireland was on hand to witness the drama over the last few holes. He presented Joe with a state-of-the-art Hitachi camera, in addition to the perpetual trophy which has been awarded to the best golfer of the year since 1984.

European Club

The last RACGS outing of the year was held in the European Club and sponsored by Refrigeration Skillnet. Playing conditions were very tough and nobody came home with the same ball that they started with!

Nonetheless, it was a fitting finale to the year’s programme with Barry McCarville, representing Refrigeration Skillnet, on hand to present the prizes.

Overall winner was Billy Quelly, H16, 29pts, while the placings and scores for the remainder of the field were as follows:

Second: Ger Darcy, H11, 27pts;
Third: Mick Clancy, H12, 26pts;
Fourth: Joe Warren, H12, 26pts;
Fifth: Michael Morrissey, H7, 26pts;
Sixth: Matt Butler, H8, 25pts;
Seventh: Stephen Mahon, H6, 25pts;
Eighth: Dave Kirwan, H15, 24pts;
Ninth: Liam Hoctor, H7, 23pts;
Tenth: John Ryan, H15, 23pts.

Visitors
First: Jim Short, H10, 29pts;
Second: Richard Seaver, H18, 27pts.

Above: Joe Warren receiving his Golfer of the Year trophy from Fergus Daly of Hitachi Ireland.

Left: Barry McCarville presenting Billy Quelly with the overall winner’s prize.
Worker Appeal

Niall Mellon Trust seeks volunteers for 2010

The Niall Mellon Township Trust is looking for volunteers for 2010, following the success of its latest Building Blitz to South Africa in the second week of November.

Over 400 tradespeople from Ireland joined 600 others of various nationalities to complete 100 new houses for South Africa's poorest families in the township of Wallacedene in Cape Town. They worked on the project alongside local artisans who are currently undergoing skills training with the charity.

The Niall Mellon Township Trust operates a year-round housing building programme for impoverished families living in the townships of South Africa and has built 12,000 houses since its inception in 2002. Each year it organises a number of Building Blitzes comprised of volunteers who raise funds to travel to South Africa to build houses for families in the townships.

Volunteers on the various projects work with local people from the township who are currently training on the charity's "Skills Training Programme". Through this programme the charity helps address the issue of unemployment in South Africa by providing local artisans with both training and employment.

"Our trades people, Irish volunteers and South African workers, are crucial to our continued success", says Niall Mellon, founder of the charity. "Our volunteers not only help us to maintain the high quality of the houses being built, but also to provide the funding required for our housing projects and our Skills Training Programme. This is aimed at training local people from the townships in the art of masonry, carpentry, painting, plumbing and plastering.

"Our Skills Development Programme provides for a sustainable future for its participants through a combination of physical and life skills training that run simultaneously. Issues such as personal health (with a specific focus on HIV and AIDS), worker and employer relations, budgeting, finance and entrepreneurship are also covered.

"Ultimately, the focus is on uplifting the community and fighting poverty. Through our combined programmes the workplace becomes an active learning environment that provides employees with the opportunities to acquire new skills and gain work experience", concludes Mellon.

For the skilled Irish volunteers and the South African artisans, this partnership provides for a mutually beneficial experience for everyone involved.

Looking to 2010, the Niall Mellon Township Trust is now seeking volunteers from Ireland who, given the downturn in the industry, are willing to use the additional free time they may have to participate in next year's programme.

If you are interested in volunteering for the Niall Mellon Township Trust next Building Blitz in 2010, you can download an application form from the website at www.nmtownshiptrust.com. Alternatively, call 01 – 494 8200 for details.
Sanyo ... back to the future

Barry Hennessy has re-joined Sanyo Air Conditioners Ireland after a two-year spell out of the industry. A brief tenure with an air conditioning contractor earlier this year convinced him to return to the sector, and so he now joins former colleagues Vincent Mahony and Tony Duffy in spearheading Sanyo’s revitalised expansion strategy for Ireland.

The newly-organised operation will see Barry head up sales and marketing with a specific emphasis on new business and dealer network structure; Vincent continuing to look after technical sales and product development; and Tony maintaining responsibility for technical support, training, and quality control.

Barry has been associated with Sanyo since 1998, first as the brand representative when it was distributed in Ireland through an agent, and then as team leader when Sanyo established a direct operation in 2001.

Barry recalls: “I remember clearly the first day we went direct; we were excited and had very definite market-share ambitions. The fact that we surpassed them so spectacularly is testament to the strength of the brand and the strong team we established at Sanyo Air Conditioners Ireland.”

However, having represented the brand for almost nine years, Barry decided to try something totally different in 2007. “While it was an excellent experience and I thoroughly enjoyed the change”, says Barry, “I am genuinely thrilled to be back at Sanyo.

“That said, the air conditioning sector is a very changed market to the one I left just two years ago, and presents a whole new set of challenges. But here at Sanyo we have a great team, one of experience and total dedication, and we are all very excited at the prospect of rising to these challenges. Having just agreed a new lease extension at our premises here in Citywest, we will shortly host an open day to showcase our new CO2 and hydronic equipment products.

“Looking to the future, we are quietly confident that the market is already beginning to turn, even if ever so slowly. Our mission now is to work the length and breadth of the country to support our existing dealers, and to engage with new dealers. It’s all about being pro-active right now, about getting in front of clients and being positive.”

Contact: Barry Hennessy, Sanyo Air Conditioners Ireland. Tel: 01 – 403 9900; 086 – 775 4700; barry.hennessy@sanyo.com

Pictured above are Vincent Mahony, Tony Duffy and Barry Hennessy.

Our mission is to work the length and breadth of the country to support our existing dealers, and to engage with new dealers. It’s all about being pro-active right now, about getting in front of clients and being positive.
Designing Building Services

Eoghan Plunkett, lead building services engineer with PM group, has 21 years experience in design, installation, commissioning, testing and balancing, and hand over of building services systems in the healthcare and industrial sector, both at home and abroad.

Over the past 12 years he has worked in the Irish building services industry and has drawn on his experiences in Germany to bring several new products to the sector, often being given the tricky jobs that require someone with a good feel for fine design, coupled with a conscious commercial awareness.
Email: eoghan.plunkett@pmg.ie

Office HVAC attenuation – ‘sounds’ good!

Noise attenuation – good design practice for engineers

A pleasant office working environment is one that fulfills all statutory requirements for the environmental conditions required for the operations being carried out within the occupied space. It must be fit for purpose, complying with regulations for lighting levels, temperature requirements, humidity requirements and noise levels. This article concerns itself with the last and in many ways one of the most important environmental conditions, noise. Here the focus shall be on what is noise, where it is produced within an office environment (where it originates), what are its effects and what can be done about it.

Noise definition

Simply put, a noise is anything that can be perceived by our ear as a sensation of that organ. Noises can be unnoticeable, pleasant, annoying, unpleasant and damaging. Sound consists of energy generated by a source and transmitted by pressure fluctuations of the medium through which it travels (air, water, earth and structures). The unit of measurement of sound is the decibel (dB). Table A on the facing page demonstrates different everyday noise sources at their level of measurable value as perceived by the ear.

Sound pressure

The audible spectrum of sound pressure that the ear can hear lies between 0.00002 pascals (Lower threshold) and 20 pascals (Upper threshold). If the unit pascal (Pa)
Table A

<table>
<thead>
<tr>
<th>Level (dBA)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>Heavy weapons, 10 m behind the weapon (maximum level)</td>
</tr>
<tr>
<td>180</td>
<td>Toy pistol fired close to ear (maximum level)</td>
</tr>
<tr>
<td>170</td>
<td>Slap on the ear, fire cracker explodes on shoulder, small arms at a distance of 50 cm (maximum level)</td>
</tr>
<tr>
<td>160</td>
<td>Hammer stroke on brass tubing or steel plate at 1 m distance, airbag deployment very close at a distance of 30 cm (maximum level)</td>
</tr>
<tr>
<td>150</td>
<td>Hammer stroke in a smithy at 5 m distance (maximum level)</td>
</tr>
<tr>
<td>130</td>
<td>Loud hand clapping at 1 m distance (maximum level)</td>
</tr>
<tr>
<td>120</td>
<td>Whistle at 1 m distance, test run of a jet at 15 m distance</td>
</tr>
<tr>
<td>115</td>
<td>Take-off sound of planes at 10 m distance</td>
</tr>
<tr>
<td>110</td>
<td>Siren at 10 m distance, frequent sound level in discotheques and close to loudspeakers at rock concerts, violin close to the ear of an orchestra musician (maximum level)</td>
</tr>
<tr>
<td>105</td>
<td>Chain saw at 1 m distance, banging car door at 1 m distance (maximum level), racing car at 40 m distance, possible level with music head phones</td>
</tr>
<tr>
<td>100</td>
<td>Frequent level with music via head phones, jack hammer at 10 m distance</td>
</tr>
<tr>
<td>95</td>
<td>Loud crying, hand circular saw at 1 m distance</td>
</tr>
<tr>
<td>90</td>
<td>Angle grinder outside at 1 m distance</td>
</tr>
<tr>
<td>85</td>
<td>2-stroke chain-saw at 10 m distance, loud WC flush at 1 m distance</td>
</tr>
<tr>
<td>80</td>
<td>Very loud traffic noise of passing lorries at 7.5 m distance, high traffic on an expressway at 25 m distance</td>
</tr>
<tr>
<td>75</td>
<td>Passing car at 7.5 m distance, un-silenced wood shredder at 10 m distance</td>
</tr>
<tr>
<td>70</td>
<td>Level close to a main road by day, quiet hair dryer at 1 m distance to ear</td>
</tr>
<tr>
<td>65</td>
<td>Bad risk of heart circulation disease at constant impact is possible</td>
</tr>
<tr>
<td>60</td>
<td>Noisy lawn mower at 10 m distance</td>
</tr>
<tr>
<td>55</td>
<td>Low volume of radio or TV at 1 m distance, noisy vacuum cleaner at 10 m distance</td>
</tr>
<tr>
<td>50</td>
<td>Refrigerator at 1 m distance, bird twitter outside at 15 m distance</td>
</tr>
<tr>
<td>45</td>
<td>Noise of normal living; talking, or radio in the background</td>
</tr>
<tr>
<td>40</td>
<td>Distraction when learning or concentration is possible</td>
</tr>
<tr>
<td>35</td>
<td>Very quiet room fan at low speed at 1 m distance</td>
</tr>
<tr>
<td>25</td>
<td>Sound of breathing at 1 m distance</td>
</tr>
<tr>
<td>0</td>
<td>Auditory threshold</td>
</tr>
</tbody>
</table>

was used as a scale for sound measurement values, the scale would be too long and difficult to interpret. Using a logarithm of these Pa values, the decibel (dB) is used with the lower threshold of hearing set at 0 dB and the upper threshold set at 120 dB.

**Frequency**

The pressure fluctuations (cycles) can be described in terms of the velocity, the frequency and the wavelength. The number of cycles per second is known as the frequency and is measured in Hertz (Hz). The human ear can hear noise over a broad spectrum of octave frequencies ranging from 20 Hz to 20,000 Hz. The distance between points of equal length along a sound wave (crest to crest) is defined as the wavelength.

**A-weighted noise level**

As a complete spectrum of sound can be measured over the normal audible frequency band (from 31.5Hz to 8000Hz), a weighted unit is used to give an average value adapted to the human ear. This unit is the dB(A). However, although the dB(A) is a useful single value to quote when referring to the noise measurement (or design target value) within an office area, it does not help to identify a particular low frequency that is causing annoyance. Of interest, the following dB(A) noise levels show what activity results in what noise level:

**Noise Rating (NR)**

This is defined as a value developed by the International Organisation for Standardisation (ISO) to determine the acceptable indoor environment for hearing preservation, speech communication and annoyance. This value is widely used in...
Europe. In essence, this value uses all the readings taken across the frequency spectrum and gives different weighting values to different frequencies to simulate an average sound level representative of the human ear. This noise level value is different for rooms with different types of human activity. Three ISO values are applicable in an office building. These are as follows:

- NR 35 Executive Offices
- NR 40 Offices
- NR 45 General Offices

**Noise criterion (NC)**

This value was established in the US for rating indoor noise from air-conditioning equipment, copiers, etc. The method consists of a set of criteria curves extending from 63 to 8000 Hz, and a tangency rating procedure. The criteria curves define the limits of octave band spectra that must not be exceeded to meet occupant acceptance in certain spaces.

The NC rating can be obtained by plotting the octave band levels for a given noise spectrum – the NC curves. The noise spectrum is specified as having a NC rating same as the lowest NC curve which is not exceeded by the spectrum.

**Noise sources – HVAC plant**

In an office environment the noise sources can be from the heating system, the ventilation system, the air conditioning system, speech and office equipment. External noise infiltration is only assumed to be of annoyance or of a recordable value if the building elements (walls, windows, roofs, floors) are sub-standard for the building's geographical location and orientation. This latter does not, however, apply to open doors and windows, which are assumed closed. HVAC systems produce noise at low frequency (from 4000Hz down to 15Hz) extending only slightly into the 'Infrasound' region (below 20Hz). The noise that is of most importance is anything that interferes with speech and performance concentration within the office environment, and in particular any noise that can be classified as an annoyance. Within the office environment these noise sources specifically from the HVAC equipment can originate from the following elements of equipment:

- The ventilation terminal devices – Grills, diffusers, outlet disk valves.
- The central air handling unit and supply/exhaust fans.
- The AHU plant room/mechanical plant room. A noise from this source is often referred to as transfer noise having been caused by noise "break-in". This noise can be experienced within the office the duct serves directly through the open grill/diffuser. It can also be experienced within a space that the duct traverses (and does not directly serve) as the trapped noise within the duct can be heard in office spaces below. This is known as "break-out" noise.

- Equipment vibration.

Another noise issue often forgotten within the design of office environments is the role interconnecting ductwork between adjacent offices can have on the noise transfer from one office to another, otherwise known as "crosstalk" noise. This way it is possible for one office to hear what is being discussed in adjacent areas.

**Office noise levels – summary**

The rule of thumb is that, if you need to raise your voice to speak to someone standing two meters away from you, then the background noise level is too high. This would happen at levels above 50dB(A).

People have differing sensitivities to noise levels and character. Complaints about noise are mainly related to building noise. Ventilation/air conditioning noise can be offensive to some resulting in rising stress, fatigue and/or headaches.

Once it has been ascertained that the building services installation is the source of the noise, it
A pleasant office working environment is one that fulfills all statutory requirements for the environmental conditions required for the operations being carried out within the occupied space. It must be fit for purpose, complying with regulations for lighting levels, temperature requirements, humidity requirements and noise levels.

Immediately highlights a deficiency in the design/installation and can lead to a loss in confidence in the overall performance of the system. Disturbance and loss of concentration can cause annoyance, which could lead to stress, so it is important that the noise annoyance should not happen, and if it does, that it is fixed quickly.

*BS 8233:1999, Sound insulation and noise reduction for buildings – Code of Practice,* provides recommendations for limiting noise in various types of buildings. The recommendation for “reasonable conditions for study and work requiring concentration in a cellular office is 40-45 dB(A),” while for open plan offices the criterion is 45-50 dB(A) and is based on “reasonable acoustic privacy in shared spaces.” BS 8233 has many “watch-its” in relation to reducing and eliminating ventilation noise-related sources and is very useful for guidance on best practice.

In an office situation:
- A dB(A) value range can be taken as 40 to 45 dB(A).
- A NR rating value can be taken as maximum of 40 dB.
- A NC value range can be taken as 30 to 40 dB.
And of course there is the golden rule – if you wouldn’t like that level of noise in your office, the level is most probably too high!

**Noise identification at design stage**

All aspects of noise reduction related design are concerned with reducing the effects of the noise within the working or occupied space. There are many reasons why noise is produced and a method to aid the reduction of these noise sources during the design phase is to apply the following identification steps:

1. Outline and list all noise levels to be achieved within the occupied space;
2. Assume an acoustically “hard” office space with no or little soft furnishings that could have helped to absorb some noise. i.e. do not rely on the office fit-out to help reduce or achieve your target noise level figure;
3. Identify all potential sources of mechanical apparatus noise and list a value for these noise levels at source;
4. Identify any issues with break-in and break-out noises from the plant room down to the ceiling void above the offices and any other related spaces;
5. Identify any areas where cross-talk related noise would be an issue and would need treatment;
6. Identify any potential for noise break-in/noise break-out from plant or a noise source not connected to the HVAC equipment but where there is a risk of being transported using the duct network into the office space;
7. Identify if the building structure could pose a risk to vibration noise entering the duct through the “hard” duct support system.

This could especially be of importance in offices connected or adjacent to production areas;

8. Get an estimation of the office background ambient noise levels that will most likely be present. This only has relevance if there is a strong indication of general noise levels expected due to the work style (some offices are louder than others). However, designing for a “loud” office is not recommended as the office may change occupiers with the new tenants having a different type of office operation.

**HVAC noise producing apparatus**

The following items of mechanical HVAC plant are the principal sources of noise with which the engineer has to contend with during design development and, although not always combined together for a particular building, they should be examined and analysed individually to ascertain what measures need to be taken (if any) to ensure they do not add noise to the office space.

1. **Central AHU plant:** The fan produces noise across the audible spectrum and is the principal source of airborne noise within the duct walls. This noise, if untreated properly, can reach the office space, and can be audible to the ear across a broad spectrum of frequencies.

2. **Break-in and break-out noise:** Noise can enter the duct from other noise sources and travel down the duct to be experienced.
within the office. A loud plant room or a loud production area through which a duct travels can be the source of this break-in noise that enters the office space through the grill or diffuser. Break-out noise can enter the office through the walls of a duct that simply traverses across an office area, that itself has an internal noise source unrelated to the office supply or exhaust system. This source can often be forgotten during design.

3. **Duct turbulence noise:** High air velocities within a duct that supplies to or exhausts from an office can create turbulence noise or frictional noise as it passes rough edges, sharp bends and duct-mounted devices (fire dampers, static volume control dampers, etc.). The designer should examine all apparatus for noise-related velocity rates. Ductwork velocities should be kept low for terminal branches and duct layouts installed directly above the office space.

4. **Constant volume dampers (CVD):** These devices are often installed close to the terminal outlets to the office. They can create differing noise levels as the damper within them adjusts to compensate for a change in pressure/air flow rate upstream within the ducted system. These should always be installed with an in-line attenuator between the CVD and the office diffuser/grill.

5. **Cross-talk:** Although not an apparatus noise source, the designer must allow for attenuation within the duct as it traverses across offices and the risk of noise transfer through the duct (assuming the wall and the ceiling void division are architecturally treated) from one office to another. This must be calculated to ascertain if the duct length and contorted route is enough to attenuate or if an in-line attenuator needs to be inserted into the duct between offices. For this reason, the duct layout is very important as a bad design layout can make the designer's job difficult to acoustically treat the layout without spending a lot of money on attenuators.

6. **Room air conditioning apparatus:** Ceiling mounted fan coils and refrigerant based air conditioning units all can add to the noise within an office. Although smaller units do not pose as much of a problem to the acoustic examination, larger units can be of greater concern, particularly if these are being used in an open plan office. Ceiling concealed and ducted VRV indoor units of the same model range can have vastly contrasting noise emanance values, with differences of up to 10dB between a small unit (3kW cooling – 32dB) and a large unit (10kW cooling – 42dB). This must be examined closely and both the airborne noise and the break-out noise from the unit should be taken into consideration. With insufficient ceiling material attenuation (e.g. a perforated metal tile), the break-out noise can be identified only when it is too late. It may be advantageous to choose two smaller ceiling units over one big one from a noise reduction aspect alone.

7. **Incidental fans:** Ceiling voids are often used to house local exhaust fans that can be either directly or indirectly connected with the office operations. Break-out noise from these fans can become a problem depending on the characteristics of the fan and the make-up of the architectural ceiling. These should be examined and assessed whether additional acoustic treatment is required.

**Noise reducing apparatus**

Some noise sources are unavoidable and therefore require apparatus to be put in place to combat the noise source. Some plant room space allocations are limited and require different items of equipment to share the same plant room. The noise source, wherever it originates, has to be dealt with to ensure the occupied space does not have a problem with plant noise entering the offices and creating an annoyance. Once all noise sources and their dB values have been identified, a number of apparatus are available to the engineer to design-out the problems. These are as follows:

1. **Rectangular sound attenuators:** Sound attenuators are devices used to insert directly into the airstream path of a ventilation system to absorb the noise from the fan. They are
rated in decibel (dB) across the audible spectrum (63 Hz to 8000Hz) and in most continental countries at a standard frequency of 250Hz. Essentially, they are a specifically-built duct with splitters inserted into the air stream. The splitters are made up of a steel support frame that has a sound-absorbing infill material. The infill material and surface finish varies from manufacturer to manufacturer and in accordance with the design requirements. This noise-reducing device comes with a design price, and the pressure loss (in Pa) of the attenuator can range from 15Pa up to 100Pa, depending on the cross section dimensions, the dB rating required and in particular the length. Once these attenuators are being installed external to the air handling unit (AHU) or the fan, they now need to be included into the pressure loss calculations for the system. Having to retrofit these attenuators can mean additional uncalculated resistance (up to 100Pa) which the fan now has to overcome to maintain the same volumetric flow rate.

2. **Circular sound attenuators:**
   In principal these are as above except circular in cross-section. They are supplied with and without a core-mounted splitter. The difference in noise attenuation values between the core insertion and one without can be substantial, but cores can usually only be used on circular sizes above Ø250mm. Circular attenuators can also be flexible in form and can therefore be used to meander and bend in space-restricted ceiling voids.

3. **Attenuation matting/wrapping:**
   Closed-cell purpose-built sound absorption material can be used in several ways to attenuate noise. This generally comes in flat sheets and can be cut to shape for the inside of a duct or plenum. A self-adhesive backing is often provided to accommodate this installation method. The same material can also be used to wrap against break-out and break-in noise sources. This can also be attained using a heavy high-density acoustic wrap/blanket. This is often used as a reaction to a noise issue as opposed to an installation design from new. This installation method has more disadvantages than advantages such as the high price of the material, the high weight per unit area of the material, the “temporary” look of the material. It is also very hard to calculate the exact benefits (the value of the dB reduction) of using the material due to the nature of the application.

4. **Vibration isolation mounting devices:**
   These devices are designed to de-couple the vibration source from the structure, and to isolate the ductwork from the structure to prevent vibration noise being transferred across the structure of the building. The density of the building’s structure facilitates the transport of vibration that can manifest itself within a duct in the form of a low resonance noise. If structure transfer is identified as a potential noise source, duct vibration isolation supports should be used at all support points and flexible (fire rated) connections should be used at fire damper connections. This effectively creates a “floating” ductwork network, with no reduced risk of transfer from structure to duct. This is a standard ductwork installation practice in continental Europe and USA, but is only installed on special manufacturing installations here in Ireland.

**Building services and the office environment**

The necessity for non-naturally ventilated offices to have mechanical systems means that they can be subject to strong criticism from an environmental well-being aspect. All items associated with these systems must be designed taking full appreciation of the needs the office staff will have who will use the building. Sound level is one of the most important features of a good mechanical design. Sound levels are advised by standards institutions and regulatory authorities, but the design path to a successful noise level within an office environment is dependent upon the right questions being asked and the correct fundamental of design layout being adhered to, to ensure that all items of plant layout are of sound design (pun intended). It must not be forgotten that perceived noise at the workplace is subjective. People at different ages and different hearing conditions, can be annoyed, irritated or unaffected by the same noise level within an office. Indeed the office could be within the statutory noise level limits, and still office staff can be annoyed by the level of background noise emitting from the ventilation system. This simply demonstrates how important it is to ensure that all precautions are taken when designing for the office environment and the difference one or two decibels can make to the success of a job.
Men get hairy at Hevac
On visiting Hevac Group’s headquarters on the Naas Road in Dublin recently I was struck by the number of unshaven males. On raising the matter with Karl Carrick I learned that they were participating in Movember, an annual international month-long celebration of the moustache held every November to highlight men’s health issues, specifically prostate cancer.

Participants start clean-shaven and then grow and groom their moustache for the remainder of the month, donating a specific sum to the Irish Cancer Society for each day they go unshaven.

That said, anyone who knows Karl will realise he had a dilemma – he already has a full beard and moustache. His plan is to shave off the beard and just leave the moustache at the month’s end.

Well done to all but I do expect the photographic evidence for next month’s issue.

Calling all young and not-so-young lighters
I’m encouraged to see that the Irish branch of the Society of Light & Lighting has revamped the operational formula for its two primary lighting competitions to make them more inclusive.

Effectively, for the 2010 competitions, the Enlighten-sponsored Young Lighter Competition will feature as part of the Irish Lighter Competition and so, early in the new year, papers will be invited for both by organiser Kevin Kelly (kevin.kelly@dit.ie)

These competitions are the perfect opportunity (a) for young lighters to highlight their ideas and concepts and (b) for established practitioners to illustrate with evidence-based project information how they have applied their experience and expertise to beneficial effect.

Given the current market conditions both young and not-so-young engineers should avail of the time they now have on their hands to enter such competitions as the exposure they receive is always career-enhancing.

CIBSE taking pro-active role
Congratulations to CIBSE Republic of Ireland Region Chairman Tony McKinley and his fellow committee members who have adopted a pro-active approach to the industry’s current difficult trading conditions.

Despite the doom and gloom they have implemented a dynamic programme of technical evenings, lectures and awards which – apart from encouraging technical excellence – also act as much-needed meeting forums for engineers to gather together to discuss their concerns.

I urge all with an interest in building services engineering to log on to www.cibseireland.org to share in, and avail of, the benefits CIBSE has to offer.

Soap kitchen with a difference
The term soup kitchen summons up all sorts of depressing imagery but, in the case of MSS Building Supplies’ headquarters in Ballymount, Dublin 12, it is an oasis of sustenance and fun.

Contractors calling to the trade counter (whether they are buying or not) can partake of fresh, homemade soup every morning. The atmosphere is warm and welcoming, underlined by a sense of fun which would brighten up anyone’s day. Check it out.

Make me laugh
On the same theme a visit to Gasco Ireland in Tallaght will also cheer you up. Once again the trade counter area serves fresh tea and coffee and, more often than not, biscuits, buns and sausage rolls.

A word of warning ... leave your woes at the door before entering. Mark Kiely and his colleagues are ultra-professional when it comes to business but believe that it can be conducted with a smile. Nor would you want to be precious ... irreverent banter and slagging is the order of the day.

https://arrow.dit.ie/bsn/vol48/iss7/1
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When the trading environment is difficult, it is more important than ever to keep your name to the fore.

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