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*Designing a BMS for
Pharmaceutical
Environments*

Heating —
Renewables & DHW



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Government
Award
for Energy
Efficiency



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opinion

Government Must Make Banks Release Funds

Having travelled the length and breadth of the country over the last six weeks, it is obvious that while contraction activity is dramatically down, the industry itself has not come to a standstill.

Yes there have been considerable lay-offs within the construction sector, including building services. Moreover, many of those still working are on short-time. However, consulting engineers and contractors alike report a significant amount of work pending, and going out to tender.

The difficulty is not so much with the viability of the projects concerned but rather that the banks and other lending institutions are refusing point blank to release funds.

No one wants to see a return to irresponsible lending practices but the reality is that the majority of the everyday construction and refurbishment projects were, in the main, always well costed. There are plenty of these currently pending, the only stumbling block being the refusal of the financial institutions to release funds.

It is an absolute disgrace that, having been shored up to the tune of millions of euros so they could provide much-needed funds to the business sector, the banks are now simply holding on to the money.

It's time the Government stopped perpetuating this farcical scenario and honoured its obligation to the people of this country.

management of ground source heat pumps

Following a successful history in refrigeration and air conditioning control systems, Carel Ireland now offers an integrated electronic solution for managing residential geothermal and swimming pool heat pumps.

The system comprises an innovative microprocessor controller named GEO, and an easy-to-use indoor user interface with built-in sensor. Optionally, Carel offers its electronic expansion valve E2V, which ensures higher efficiency of the system in all operating conditions.

The main functions of the new unit are the control of the water and room temperature set point; the residential heating or swimming pool and domestic hot water; the outside temperature compensation; the enhanced efficiency due to the electronic expansion valve; and the tandem compressor management.

Contact: Leslie Mason, Carel Ireland. Tel: 01- 835 3745; email: les@carel.ie

oftec courses at athlone institute

A new training centre to deliver the full suite of OFTEC courses has been opened at the Athlone Institute. Lecture staff at the Institute have been working closely with OFTEC for the last year, upgrading the oil facility and registering staff.

The centre officially opened earlier this month and joins the existing centres of METAC and FAS (Cork) in the growing network of centres across the Republic.

Damien Keenan from OFTEC Ireland said: "This facility is well equipped and the staff are enthusiastic about delivering the single courses (101 & 105), either on an evening part-time basis or full time during the day.

"The centre is well located and now perfectly resourced to provide training for plumbers and heating engineers wishing to register with OFTEC and up-skill or learn new skills."

Contact: Kieran Heavin, Head of Department (Engineering), Athlone Institute.
Tel: 090 -6471824; email: kheavin@ait.ie



Damien Keenan, OFTEC Ireland (right) with lecture staff Pat Burke, Kenneth Beirne, Shane Kelly, Robert O'Connor, Mark Lawless, Michael Murphy and Peter Conway.

scs room control unit

Standard Control Systems has introduced a user-friendly room control unit for fan coil unit and chilled beam applications. Available in a choice of finishes, it features clear display and robust keys with unambiguous symbols.

This flexible unit is freely programmable and can be used in stand-alone mode or as part of a network of controllers. It can be applied as easily to a small office as to large building complexes.

The unit displays room temperature as well as current mode of control. Setpoints can be displayed at the touch of a button and changed. An override timer can also be programmed onto the unit, if required.

These units can be controlled and monitored from the BMS system and can also be integrated with other systems such as Access Control using the BACnet Protocol, thereby increasing the effectiveness of the EMS and increasing energy efficiency.

Contact: Sean O'Toole, Standard Control Systems. Tel: 01 - 429 1800;
email: seanotool@standardcontrol.ie.





● Revolutionary new VRF generates up to 4kW of electricity whilst heating or cooling

If you're short of electrical power and looking for an innovative green solution, the new ECO G Power, a gas driven VRF system from SANYO, could be the answer. A revolution in air conditioning design it is the first VRF system that can supply heating, cooling, hot water and now electricity!

- Generates up to 4kW of electricity - enough to power 40 indoor units or 8 computers
- Innovative technology that reduces CO₂ emissions by up to 30%
- Can provide both hot water and electricity in heating or cooling mode
- Powered by natural gas or LPG, only requires single phase power supply
- Eliminates the need for expensive upgrades to electrical power substations for new or refurbishment projects
- 100% performance in heating, at low ambient temperatures down to -20°C with no defrost cycles
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trade news + product information



Immediate past-President John Doherty pictured with current President Michael Kennedy

kennedy takes reins at mebsca

John Doherty has completed his tenure as President of MEBSCA and handed the reins over to his successor, Michael Kennedy of Mercury Engineering. In his outgoing address to members at the AGM, John reflected on issues which had affected members during his two-year term in office.

He noted that 2008 was one of the most difficult years for MEBSCA with the global economic crisis, the collapse of the banking system and the housing sector, and the lack of consumer confidence resulting in cut-throat competition in the marketplace.

He also cited the new government forms of contract, the falling number of apprenticeship registrations, apprentice rates, and the mandatory regulation of gas installers as other serious matters to be addressed.

Looking forward to 2009, he noted that members are facing even tougher times ahead and stated that the incoming President, Michael Kennedy of Mercury Engineering, would be a strong leader for MEBSCA during these difficult times. As is customary, the Association donated funds to three charities chosen by the outgoing President — Saint Vincent de Paul, St Joseph's Ward in Crumlin Children's Hospital, and the Little Way Cancer Support Unit in Clane.

CIBSE sustainable building services design award

CIBSE has devised a new awards scheme, sponsored by John Sisk & Son, to promote innovation in sustainable building services design.

The objective is to promote and encourage innovation and evidence-based research in building services design and to disseminate the findings throughout the entire sector.

It is envisaged that practicing engineers will enter the Awards, both in their own right and perhaps with the support of their employers, with a view to establishing a solid foundation for increased and continuous research in building services.

Initially, Awards Convenor Kevin Kelly of DIT is looking for 100-word extracts to be submitted from intending participants by 31 May next, after which entrants will be contacted with details of how to make a full submission.

In the meantime, those interested in entering the awards should contact Kevin Kelly directly at email: kevin.kelly@dit.ie



Back Row: John McNamara, John Sisk & Son with Kevin Kelly and Niall Bourke, CIBSE Committee. Front Row: Justin Keane and Pdraig O'Connor, John Sisk & Son with Gerard Keating, CIBSE Chairman and Tony McKinley, CIBSE Vice-Chairman.

energy show 2009 at rds

Approximately 150 Irish and international exhibitors will participate in the forthcoming Energy Show at the RDS on 29 and 30 April. The exhibition is organised by Sustainable Energy Ireland (SEI) for the purposes of encouraging trade and networking between businesses and professionals in the sector, as well as the sharing of expertise, new thinking and innovation in the areas of energy efficiency and renewable technologies. An extensive seminar programme will run in tandem with the event.

To register as a visitor or for the seminars. Log on to www.sei.ie/energyshow

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trade news + product information

new toshiba vrf 3 series

GT Phelan has just introduced the re-designed Toshiba VRF wall unit to complement the existing range of wall units available from the company.

This new "3" Series wall unit offers all of the same functions which were already available on the previous model range but now include quality air filters (2 x Zeolite + anti virus and 2 x Bioenzyme + anti allergy).



Indoor units can be group controlled (eight per controller) and are equipped with cold draught prevention and louvre swing operation. Fault diagnosis and system configuration are fully available along with sensor data and compressor run amps. All of the indoor units on the VRF range are now a uniform size (320H x 1050W x 220D)

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

refrigerant & combustible leak detection

The new Model No: RLD1 refrigerant leak detector from Manotherm incorporates a flexible, goose-neck, design and provides both audio and visual indication. It detects and pinpoints even the smallest of leaks and is suitable for existing refrigerants such as HFC, HCFC, CFC, SF6, R134a and R123.



The unit features thumb-wheel operation to increase sensitivity, the goose-neck probe making it ideal for hard-to-reach areas. An increasing tick rate sounds as a leak is pinpointed and the red indication light flashes more rapidly.

Model No: RLD1 can be used in both domestic and commercial refrigeration systems, air conditioning, and quality control testing environments.

Also new from Manotherm is the Model No: CLD20 combustible leak detector. Equally efficient and accurate, this unit provides detection of methane, butane, ammonia, ethylene oxide, alcohols, industrial solvents and other combustible or toxic gases.

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

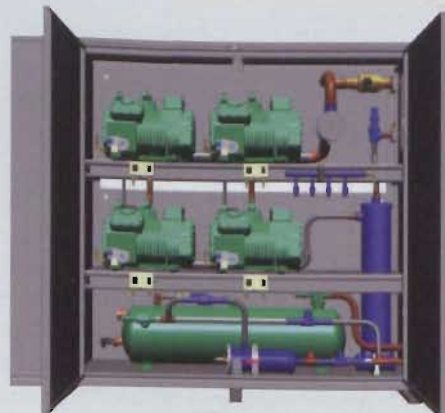
bitzer reciprocating from rsl

The new Bitzer CP4 semi-hermetic reciprocating compressor package from RSL was specially developed for the application at varying cooling loads when more than one evaporator is used.

The complete package allows quick and easy on-site installation and features:—

- Slim housing suitable for indoor and outdoor installation;
- Optimum capacity adaptation by suction shut-off capacity regulation or through an integrated frequency inverter capacity control (optional);
- High system efficiency at optimized running times of the compressors;
- Space-saving compressor arrangement;
- Integrated liquid receiver assembly (supplied as optional);
- Integrated control panel;
- Complete wiring and piping-for easy on-site installation.

Contact: Gerry McDonagh, RSL. Tel: 01 - 450 8011; gerry@rslireland.com





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Heating in Harmony Integrating Renewable Solutions

When renewables are included as part of a heating solution, the real challenge is to get all of the systems to work in harmony. Ian Dagley of Hoval outlines some of the key considerations.

These days there are plenty of opportunities to include renewable energy sources for heating and hot water in all sorts of projects but, in most cases, they will not be operating in isolation. There may be a mixture of different renewables, such as solar heating, biomass boilers, heat pumps etc, and these may be combined with conventional gas or oil fired boilers.

As a result, the challenge for the designer and installer is not so much about which renewables are most appropriate for the project but more how to get those selected to work together. So, the key is to decide which will work well together in a controllable fashion and which overall solution gives the best results for that project.

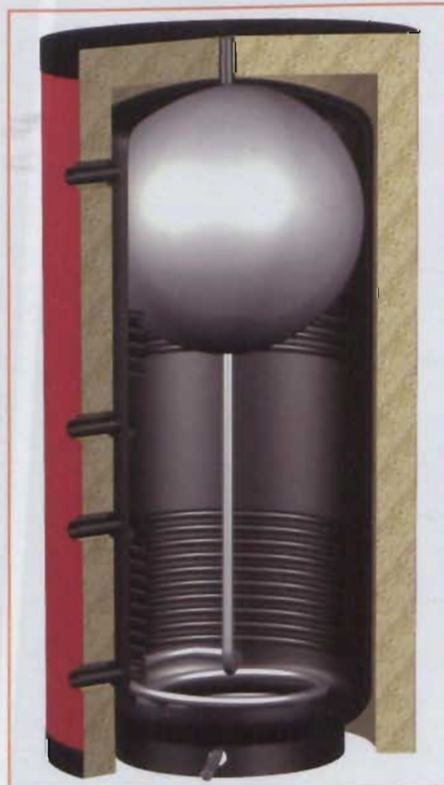
For example, solar heating is often one of the first options considered but it's important to bear in mind that solar irradiation levels in Ireland can range from less than 100Wh/m² of collection area on a cloudy day to over 1000Wh/m² on a sunny day. Consequently, any solar heating system must be backed up by 100% auxiliary heating. Of course, this auxiliary heating could be biomass boilers, which will enhance the renewable element of the project.

There's also the matter of how best to use each renewable. Solar heating, for instance, is particularly good for heating swimming pools because the

pool acts as a large heat sink (no need to buy thermal storage vessels), and the relatively low operating temperatures (typically 26-30°C) are easily achieved. These low temperatures result in high collector efficiencies and solar fractions. Additionally, most indoor pools have a large roof area, which is ideal for the solar collectors.

Solar collection and domestic hot water (DHW)

Of course, the majority of projects won't boast a swimming pool and one of the more common uses for solar heating is domestic hot water (DHW). On



CombiSol is a thermal storage vessel that allows different heat sources to be combined

sunny days, solar heating should be capable of heating all of the water to the required temperature. When less solar energy is available it may be used to pre-heat mains cold water before it is brought up to temperature by another heat source.

There are several key points to consider in this type of installation. They include:—

- In large projects with significant shifts in demand, pre-heating will usually be more cost-effective;
- Sizing for pre-heating reduces stagnation periods in the solar circuit;
- Reduced stagnation increases system efficiency and specific energy produced by the collector loop;
- Stagnation can also be reduced by increasing the angle of inclination of the collectors, reducing efficiency in summer but increasing solar fractions in winter, resulting in a load-levelling effect;
- Solar collectors built into facades are ideal for buildings with low-grade heating such as underfloor systems and can also contribute to DHW demand in the summer;
- On new-build projects well-insulated flat plate collector façades can be built into the fabric of the building, thus replacing the need to build walls behind them.

Legionella control

It is important to note that pre-

heated potable water storage volumes should be minimised, as these may require regular pasteurisation as part of the anti-legionella regime, thus increasing overall energy consumption. In these circumstances it is beneficial to store the solar energy in a thermal storage vessel and pre-heat the cold feed water through a suitable heat exchanger. This also reduces the risk of scalding.

Piping a number of non-potable thermal storage vessels in series and using diverting valves to circulate the water in the vessels will enhance stratification within the vessels. This will promote solar gain and also allow biomass boilers to be integrated within the heating/DHW scheme and support the solar powered system.

Innovative thermal storage

A recent innovation is the introduction of more versatile thermal storage vessels that enable various renewable and conventional heat sources to be easily combined – and controlled effectively – in a single system for space heating and DHW.

Within the vessel are two coils for connection to different heat sources, plus a stainless steel sphere for DHW, which is heated by the surrounding hot water in the vessel. Suitable heat sources include solar panels, heat pumps, biomass and gas or oil boilers (condensing or conventional). An immersion heater can also be installed for DHW, if required.

A 3-way valve enables heat to be directed to either or both of the coils, so the system can respond precisely to changing demands for heating and hot water, while optimising use of renewable energy sources. Integral controls ensure that each heat source is used to its full potential.



Newark Beacon shows biomass boilers and a gas-fired condensing boiler working together

Controllable biomass

Biomass boilers are an obvious choice for backing up a variable heat source but it is important to choose the right type of biomass fuel. In particular, if complex, expensive controls are to be avoided it is best to choose a fuel that provides consistent and easily-controllable combustion.

In Ireland, the most popular and feasible biomass fuel is wood – used as either wood chips or wood pellets – and wood pellets fulfil the requirement for controllability more effectively than wood chips. This is because wood chips can vary greatly in size and moisture content. In contrast, pellets are produced in line with international standards to have a consistent size and moisture content, so their combustion characteristics are more predictable.

This consistency also helps to automate key functions such as full automation of operation, function control and fuel dosage. Modern biomass boilers also feature self-cleaning heating surfaces to maintain heat exchange efficiency.

Fuel storage and delivery are also important considerations with biomass. As a rule of thumb, each kilogram of wood pellets

will provide 4.9kWh of heating and a cubic metre of storage space will accommodate 600 to 650kg of wood pellets. A major advantage of wood pellets is that they can be delivered by a "blower" lorry into a storage silo which, for instance, might occupy the same space as previously taken up by an oil storage tank.

As noted earlier, many projects may also incorporate fossil fuel boilers for either part-duty or back up. In these cases it is important to apportion the loads to give maximum benefit. For instance, a condensing boiler may be used for space heating, taking advantage of the relatively low return temperatures to achieve maximum condensing. In parallel, solar heating or heat pumps (or both) may be used to meet most of the DHW requirements, with the ability to top up from the condensing boiler.

Because there are so many variables and each project has its own particular requirements, there is no off-the-shelf solution to renewables. It really is a matter of considering each job on its merits and possibly calling on expert help from companies that have experience of all of the heating technologies discussed here.

Sanyo Sustainable & Renewable Technologies Make Their Mark

Sanyo Air Conditioners reports an exceptional response to its pioneering technology roll-outs at the recent H&V-RAC09 and Ecobuild exhibitions. The company launched three new technologies, all with a compelling sustainable theme, comprising the ECO CO₂ heat pump-based heating system; an advanced HFC-based heat pump for domestic applications; and the Power G VRF air conditioning system which generates its own electricity.

The roll-out also included a photo-voltaic option for augmenting power to air conditioning and buildings, plus a new control system to optimise efficiency when harnessing



The attractive Sanyo stand at the recent H&V-RAC09 exhibition

multiple energy sources.

Vincent Mahony, Sanyo's Irish Branch General Manager, said: "We knew that the launches would provoke interest, but even we have been surprised by people's response. Installers, specifiers and clients have seized upon the products with equal enthusiasm. They tell us that the technologies

offer exactly what the market needs – sustainable solutions that are both good for the environment and make commercial sense.

"The ECO CO₂ heat pump-based heating system has proved to be the star. Together with its new HFC-based stable-mate, it forms the spearhead for a new heating business launched by Sanyo to serve the growing market for heat pumps in Ireland."

A significant number of carbon dioxide-based systems were sold before the official launch, based mainly on word of mouth, but sales are now taking off following exposure at the recent shows.

Vincent Mahony continued: "We have genuine new technology which everyone is naturally interested in. However, it is technology that delivers – significantly cutting carbon emissions, improving efficiency and reducing power costs. For end-users and clients for whom rising energy bills are a major issue, these technologies can make a huge impact on ongoing running costs.

"Expensive energy is here to stay, and costs are likely to rise significantly again long-term. Sanyo's solution is innovative technology that harnesses a range of free and renewable energy sources – waste heat, ambient energy, solar power – but does not compromise on comfort or lifestyle. In fact, the abilities of the new systems eclipse those of conventional technologies."

Contact: Vincent Mahony, Sanyo Air Conditioners.
Tel: 01 - 403 9900;
email: vincentmahony@sanyoaircon.com



The Sanyo technical presentations at H&V-RAC09 attracted a capacity attendance for every session.

Promax HE



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Please contact the sales office as during April we will introduce new offers on the Potterton range to coincide with the SEI home installation grant scheme.

Heating, DHW & Renewables

Copper Rises To Meet Renewables Challenge

It is difficult to imagine today's world without the use of copper — electrical energy, heating, air conditioning, plumbing, transport and communications are all important aspects of our everyday lives which could not exist in the way that we know it without the substantial use of copper components.

Copper is especially significant in respect of building services, particularly with the emergence of renewables and the sustainable industry sectors. To that end Irish Metal Industries (IMI) is Ireland's leading copper supplier, offering a complete range of copper tube for hot and cold water installation services, sanitation, central heating, air conditioning, medical gas and numerous other building and engineering applications.

IMI offers copper tube to IS EN1057 carrying the Irish Standard Mark, BSI Kitemarked tube to BS EN1057, and an extensive range of plastic-coated tube. The portfolio includes high-performance copper tubes, both bare and covered, which are

ideal for any plumbing and heating application, as well as for the distribution of medical gases in the healthcare industry.

Copper tubes offer long life, strength and maximum corrosion-resistance and thus meet all the requirements for trusted and sure plumbing and heating systems. Copper tubes have long been considered ideal for all domestic applications such as hot water, cold water, drinking water, heating, gas, distribution of combustible fuels and drainage systems. This continues to be the case but copper is now also emerging as the product of choice for quality renewable/sustainable systems such as geothermal energy installations.

Copper is a natural and completely recyclable element which has excellent properties in the search for alternative energies, such as those sources of energy that encourage sustainable growth without damaging the environment.

"Because of the physical-mechanical properties of copper", says Conor Lennon, General Manager, IMI,



"we are very observant of renewable energies and aware of the role that copper products can play in the development of new products in this sector. Particularly in the area of solar heating systems, IMI offers a range of specific products that are used as components in solar collectors."

The same applies to air conditioning. The main elements that make up an ac system require copper tubes to more effectively perform their function. Copper tubes are indispensable for the distribution of liquids used in condensers and evaporators, which represent the main part of an ACR system. They are also used for connecting the various elements in order to ensure a correct installation of the system.

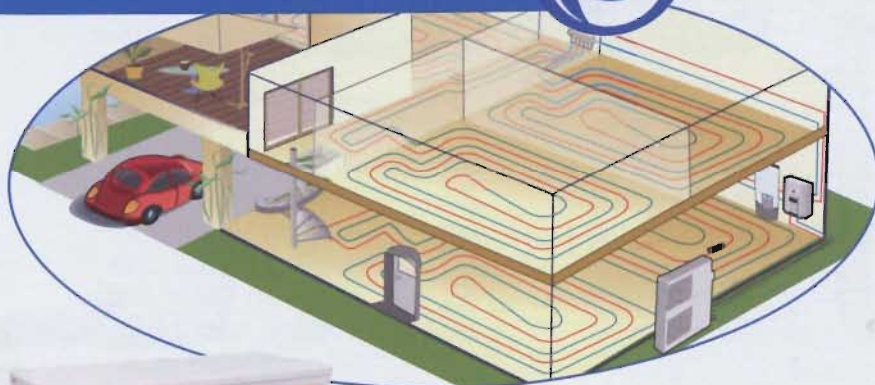


"The core inherent properties, strengths and health benefits of copper for use in what is now referred to as building services have made it the product of choice for centuries", says Conor Lennon. "As the sector has matured and developed, so too has the use and application of copper. Now, with renewables and sustainability emerging as the dominant force in building services, copper is once again proving itself the ideal solution."

Contact: Conor Lennon, IMI.
Tel: 01 - 640 - 4769;
email: conor.lennon@irishmetalindustries.com



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web: www.coreac.com

nexa



Mitsubishi Electric Launches Ecodan

Due to the growing demand for efficient, low energy heating, Mitsubishi Electric has introduced the Ecodan, offering Ireland's households a viable and sustainable low-carbon heating system.

Explaining the significance of the new Ecodan system, Mitsubishi Electric's Paul Sexton Said: "We in Ireland are heavily reliant on fossil fuels. There are a limited resource, cause emissions that are harmful to the environment and, as we have seen recently, can be subject to volatility of price and availability.

"The Irish Government wishes to reduce this reliance and move towards making greater use of our renewable energy resources. This diversification can be good for the economy because of the longer-term availability and sustainability of supply, and good for the environment through the reduced emissions of Carbon Dioxide (CO₂)."

Ecodan is an advanced heating system for the home which it is claimed will supply heating and hot water cheaper than a conventional boiler system. Ecodan works by extracting energy from the ambient air and upgrading this into useful, high-temperature energy which is then transferred to the



The Mitsubishi Electric Ecodan, offers Ireland's households a viable and sustainable low-carbon heating system.

building's heating and hot water system through a heat exchanger.

"Ecodan offers savings in running costs of up to 30% and cuts CO₂ emissions by up to 50% against even the most modern gas condensing boiler", according to Sexton. "Even greater savings can be achieved over older gas boilers and oil or direct

electric systems.

Moreover, the Ecodan air source heat pump system is affordable, reliable and now offers a range of models to suit the majority of homes in Ireland."

Ecodan is easy to install, uses single-phase electricity and works with both radiators and underfloor heating. Technology tried and

tested, it has been widely used in other European countries very successfully and can be installed in one or two days, according to Mitsubishi Electric.

Concludes Sexton: "The Irish Government, through SEI, wishes to encourage people over the next five years to green their homes by contributing to the initial investment cost of installing a renewable energy heating system.

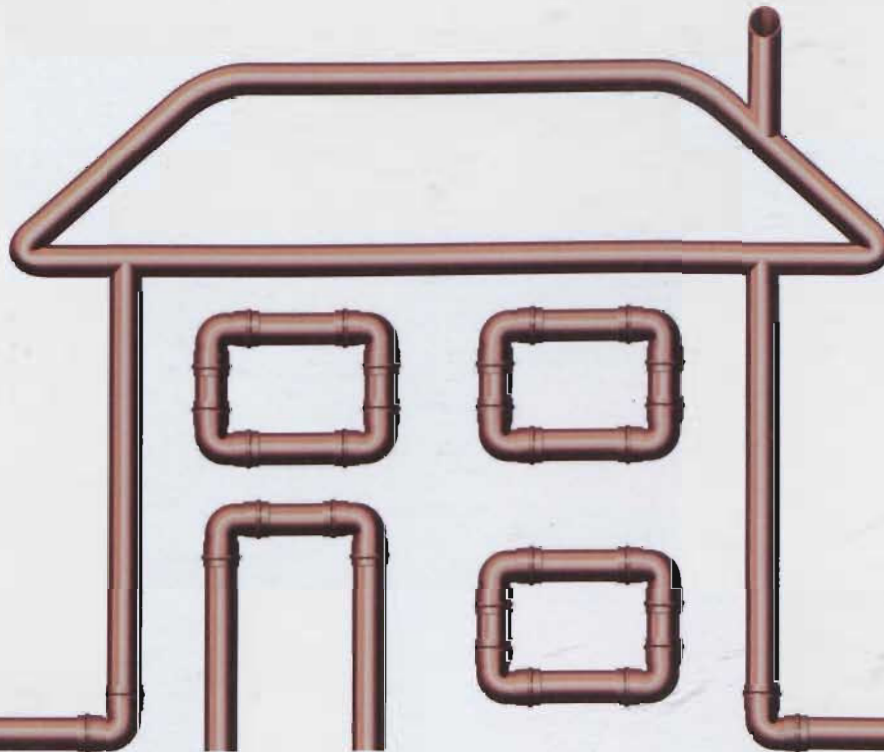
"The Greener Homes Scheme provides assistance to homeowners who intend to purchase a renewable energy heating system for existing homes and Mitsubishi Electric's Ecodan heat pump is an SEI-approved and registered product for the scheme. It is eligible for funding of a €2,000 grant, once complying with the terms and conditions of the Scheme.

"Ecodan represents a significant breakthrough for Mitsubishi Electric in the renewable and sustainable sector and is the beginning of a major initiative which will see us introduce more and more such products and systems in this area."

Contact: Mitsubishi Electric Europe.
Tel: 1800 600 400;
email: sales.info@meir.mee.com



Schematic showing a typical Ecodan domestic application

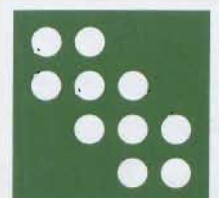


➔ IRISH METAL INDUSTRIES: TUBE WITH BUILT IN QUALITY

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**Irish Metal
Industries**

Heating, DHW & Renewables

Choosing a Heat Pump? ... Talk to Core

The recent changes in building regulations and a rise in the awareness of green or renewable energy, combined with government initiatives on sustainability, have led to an increased acceptance of alternative methods of home heating.

"As often happens when a market opportunity like this occurs, there is a concomitant explosion of suppliers" says Paul Schweppe of Core AC. "This is case with the Irish heat pump market where, at the last count, there were 50+ brands listed on the SEI Greener homes website.

"However, at times like this it is best to go with someone who has proven track record in this area of expertise, and thus avoid mistakes which can prove costly and damaging, both in terms of finance and reputation.

"Carrier is the number one selling brand of chillers, not only in Ireland but also worldwide. This position has been achieved by providing an appropriately costed product that meets the needs of specifiers and end-users, is both reliable and energy efficient, and is backed by a world class service and after sales organisation.

"So what makes a Carrier heat pump

different? Firstly, from the specifier's point of view these heat pumps represent very little risk. As with our chillers, our heat pumps can be provided as complete packaged systems — all pumps, UFH controls, interconnecting cables, safety devices, etc are included.

"Secondly, Carrier heat pumps are designed to be installed by competent tradesmen ... requiring no specialist training or understanding in heat pump technology. The best comparison we can make is that fitting one of these systems is no more complicated than fitting a wall hung boiler.

"Finally, our Carrier systems offer the highest level of comfort available on the market. From it's inception 25 years ago, the Nexa brand was always seen as delivering the highest level of residential comfort to the end-user.

"Nexa by Carrier uses state-of-the-art technology in all its control systems. Rather than opt for the more common and cheaper on/off thermostatic type controls, Nexa chose to employ resistive-type room sensors which have a high degree of accuracy and have combined these with proportionally-activated motorised valves.

"This type of system has

more in common with the high-end building management systems used in industry than the conventional heating system found in many contemporary residences. This fully automated weather-compensated control is the key to the tight control that carrier can offer end users of our systems"

Air Source or Ground Source?

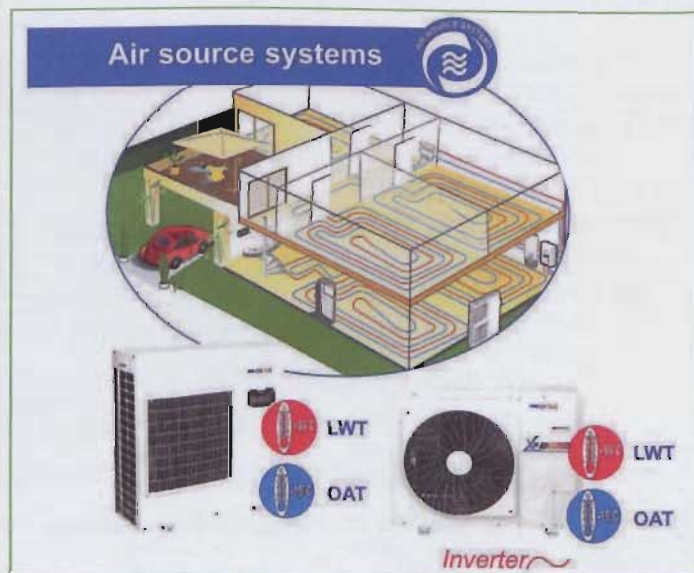
As a provider of both ground source and air source Carrier heat pumps, Core Engineers are well qualified to consult and advise on each particular application, and to then recommend the most appropriate solution for that project. Generally speaking, only if the ambient temperature drops below -10°C for 10 consecutive days would Core recommend that a ground source system.

"Carrier air to water

heat pumps is particularly suited to our climate", says Austin McDermott, Managing Director of Core AC.

"Unlike units designed for use in areas such as Scandinavia or Central Europe, they can handle high humidity conditions with ease. The defrost cycle, often seen as a limiting factor with air to water heat pumps, is handled with ease. A combination of smart controls that measure and compare ambient and evaporating temperatures and compressor running pressures allows Carrier to optimise energy usage on the defrost cycle while the 'tall and thin' profile of the outdoor coil reduces the potential for ice to form in the first place."

Contact: Paul Schweppe, Technical Sales Engineer, Core Renewables.
Tel: 01 - 409 8912;
email: paul@coreac.com



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Hoval SolKit®

Key benefits:

- Can supply up to 81% of annual hot water energy requirements
- High efficiency
- Compact design
- Low installation costs
- Suitable for use with Hoval BioLyt

Hoval BioLyt®

Key benefits:

- Compact design
- High-efficiency
- Sustainable fuel source
- Environmentally friendly
- Carbon neutral central heating

Hoval Belaria®

Key benefits:

- High-efficiency
- Certified quality
- Space saving design
- Low operating noise
- Kind to the environment

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Conservation of Energy - Protection of the Environment

Published by ARROW@TU Dublin, 2009

Hoval

Heating, DHW & Renewables

Integrate Renewable Energy Sources with a Smile

Honeywell and its Centraline brand for building controls have introduced a reliable, easy-to-use controller which manages energy-efficient integration of renewable energy sources with heating systems using gas or oil, and with district heating. The new Smile 3 controller can be used with systems using radiators, convectors and low-temperature heating circuits such as underfloor heating.

With new, refined control algorithms, Smile 3 ensures energy efficient integration of sources such as solar

power, heat pumps and wood burners. It equalises heat sources to make maximum use of renewable energy sources in the mix, while providing optimum energy management between heat producers and consumers.

Smile 3 can also manage complex heating systems requiring boiler sequencing. Its OpenTherm interface can exchange data easily with certified devices such as condensing boilers, enabling Smile 3 to be applied with even more



versatility. Up to five Smile controllers can be wired together via a two-wire bus to form a control system.

Smile 3 controllers are easy and fast to install, commission and operate, thanks to an ingenious user-panel with a large back-lit LED

display and a single rotary control that is also a push-button.

This makes it easy to select, change and confirm set values and times – and difficult to make mistakes.

Contact: www.smile-control.com

Honeywell — Phoenix Natural Gas 'Manufacturer of the Year'

Honeywell has been named Manufacturer of the Year for its comprehensive range of heating controls by Phoenix Natural Gas, the leading supplier of mains gas to homes and

businesses in the Greater Belfast area.

"Honeywell products such as the ST9000 range of timers and programmers, and both the CM900 and CM700

programmable thermostats, are designed to make it easy for users to control their heating systems for maximum comfort while minimising fuel bills," explained Ken Quigley, the Honeywell Account Manager covering Northern Ireland. "These product families have been exceptionally well received in the region."

Quigley attends monthly meetings of the Northern Ireland Natural Gas Association, which aims to promote energy efficient heating. "The combination of natural gas fuel and Honeywell energy efficient heating

controls can greatly improve the comfort of Northern Ireland residents, while keeping their heating bills low."

In addition to providing its comfort controls, Honeywell supports independent heating installers and Phoenix Natural Gas through "hands-on" training. This includes the principles of heating control, their practical and energy efficiency benefits, and which controls are best for particular types of installation.

Contact:
Web: www.honeywelluk.com



Ken Quigley, Account Manager for Honeywell home comfort controls in Northern Ireland (right), receives Phoenix Natural Gas' award for Product Manufacturer of the Year from Brendan Farnam, Managing Director, Glenhill Merchants.

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As an Approved Ecodan Installer, you can offer your customers a revolutionary, **low carbon alternative** to traditional domestic hot water systems.

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Heating, DHW & Renewables

Potterton Solar Spearheads Renewables Initiative

For over 150 years the Potterton name has been synonymous with top-quality, high-specification products. All benefit from world-class manufacturing skills, are easy to install, reliable in service, and comply with all existing and pending regulations. They are also renowned for their innovative features and pioneering design concepts. The new Potterton Solar water heating system is a typical example.

With Potterton Solar water is heated in an indirect way via a ready-mixed water and glycol solution which circulates inside a pipe network between the solar panel and the cylinder coil.

As the solar energy is absorbed by the panel, the fluid heats up and is transferred to the cylinder, heating the water via the dedicated solar cylinder coil. On leaving the coil, the cooler fluid makes its way back up to the solar panel where the process starts again.

Guaranteed for 10 years, the Potterton Solar system incorporates a contractor-friendly design. In addition, Potterton Myson Ireland runs a dedicated training programme for contractors to ensure simple, trouble-free, installation.

To further help installers win new business there will be additional new product introductions in April to coincide with

the SEI Home Installation Grant Scheme.

These will complement other products in the range which include the Performa SL heat-only boiler. This model is for installation on older systems where cast iron heat exchangers have traditionally proved more tolerant to system debris.

Meanwhile, established market-leading models continue to be available. These include:—

Promax System HE Plus
Fully modulating high-efficiency heating and hot water boilers with outputs ranging from 6.8kW to 32kW.

Incorporating a separate hot water cylinder, the units have built-in frost protection and flues that can be fitted almost anywhere in suitable applications.
Promax Combi HE Plus
Compact, wall-mounted boiler available in two models with fully modulating outputs from

8.7kW to 33kW. Includes built-in frost protection, wireless thermostats and automatic pump.

Promax HE Plus
Deceptively small but very powerful, there are three wall-mounted models in this range of heating-only boilers with modulating outputs from 9.1kW to 30kW.

Promax FSB 30 HE
High-efficiency, floor-standing range of modulating boilers designed to fit under standard worktop. Outputs go from 9.3kW to 30.2kW and the units are suitable for fully-pumped, open or sealed systems.

Potterton Suprima HE
The Suprima HE range low-lift-weight, compact boiler is available in six outputs — from 30,000 Btu/h to 80,000 Btu/h.

Potterton System SE
This range comprises four gas fired, wall-mounted standard efficiency natural gas and LPG system boilers combining elegant design with sophisticated electronic

monitoring and controls.

Potterton Suprima SE
A limited range of cast iron, standard efficiency, boilers will continue to be available from stock.

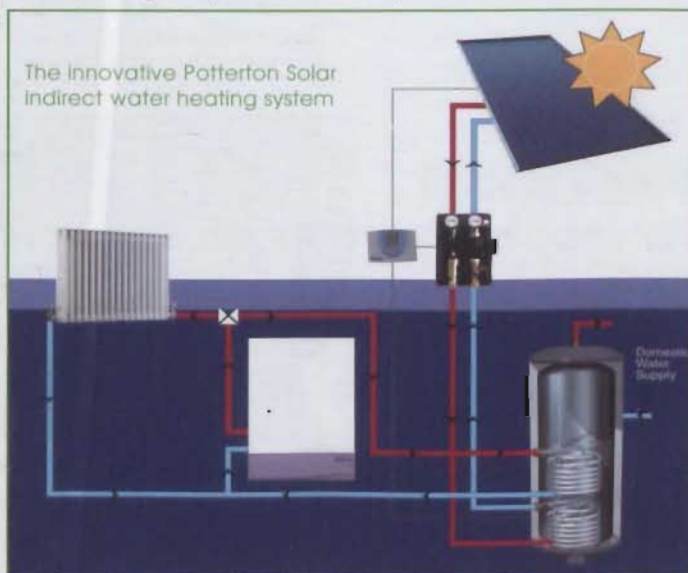
Potterton Commercial
The Potterton Commercial range (outputs from 40kW to 2500kW) includes high-efficiency floor and wall mounted models, including the new Sirius wall-hung unit (outputs from 50kW to 110kW).

Vincent Broderick, Potterton Myson Ireland says: "As we move to the era of high-efficiency boilers, installers need to be aware of the requirements in order to maximise the efficiency which customers will expect."

"Potterton Myson once again offer the installers an opportunity to participate in product training on all ranges. This programme begins shortly so, applications are welcome."

"In addition the recent announcement on home insulation, and boiler and controls upgrades, under the SEI scheme will be complimented by a Potterton promotion on the A rated boilers. Expect details of this promotion in coming weeks."

Contact: Potterton Myson.
Tel: 01 - 459 0870;
email: post@pottertonmyson.ie



CIBSE Programme Round-Up

Over the last six weeks there have been a considerable number of CIBSE CPD events, all of which were very well attended with the level of questions and discussion after each confirming their significance for, and interest to, members and non-members alike. Brief details of each are as follows:—

New ESB/Customer Interface and Safety

This presentation by Jim Keogh, Chairman ETCI Technical Committee No: 2 (Electrical Installations), examined the implications for those involved in the electrical services sector of the recent changes in the ESB/Customer interface and the electrical safety requirements with respect to ET101: 2008.

The most recent requirements in relation to operational and safety aspects at the customer interface were identified and their relevance to and impact on practitioners addressed. The evolution of international and Irish electrical safety rules was also considered. An investigation into current levels of awareness of requirements within the sector was explored and guidance towards achieving compliance was provided.

As Chairman of ETCI's TC2, Jim's primary task is the preparation and publication of the

National Rules for Electrical Installations. He has extensive experience of electrical installations, and his current position within ESB is the management of standards at the ESB/Customer interface.

Passiv Haus

Michael McNerney, Energy Manager, Tesco Ireland discussed Europe's first *Passiv Haus* supermarket (Tesco's flagship store in Waterford), from its inception to final delivery. He presented notable features of the recently-opened building and detailed many of the new technologies used on the building services.

Developments in Building Services Prefabrication

Denis O'Keeffe of Pak Plant Ltd provided a brief overview of the developments in Ireland in the area of building services prefabrication and discussed the requirements for specifying and the cost argument.

The presentation also focussed

on the concept of pre-packaged plantrooms, design considerations and the benefits of using pre-packaged units.

Geothermal Heating & Cooling Systems

David Roome, CEng MIEI FCIBSE MIRI, addressed the proposed design and mechanisms for understanding geothermal heating and cooling systems for commercial buildings. He covered a variety of collectors and delivery systems and explained their role in ensuring compliance with the new Energy Performance of Buildings Directive for commercial buildings.

David Roome is Managing Director of DC Compute Air for 30 years and a director of Refrigeration Technology Skillnet for nine years.

Design Solutions for Campus Integrated Systems

This CPD lecture was presented by Donal Colfer of ADT/Tyco International. Donal has over 25 years experience in the security industry and has been involved in the progression of design criteria for ADT and Tyco for some time now.

Donal's current role involves him in the development and implementation of new products and systems and he discussed these in relation to security design guide changes and compliance.



Gerry Eastwood, IET with Chris McLoughlin, IET; Gerard Keating, Chairman, CIBSE Republic of Ireland Branch; and Jim Keogh, Chairman, ETCI Technical Committee No: 2 (Electrical Installations).

Inaugural RECI Awards Prove Major Success

Leading environmentalist and broadcaster Duncan Stewart presented the inaugural RECI Contractor of the Year Awards at a celebratory dinner in the Burlington Hotel, Dublin 4, earlier this month. The occasion proved an enormous success with a capacity attendance paying tribute to both the regional and national awards' winners.

The Awards are a new initiative devised by RECI to promote and encourage standards of excellence in electrical contracting, and to acknowledge and reward RECI contractors who achieve that standard. They are supported as primary sponsors by Hibernian Aviva and Arachas Corporate Brokers, both of whom are actively engaged in promoting best practice in the sector.

The Panel of Assessors comprised industry experts with Kevin T Kelly, Technical Consultant to RECI, acting as Chairman. The other panel members were Michael Brennan, Risk Manager, Hibernian Aviva; Jim Rice, RECI and ETCI Director; and Kevin Kelly, RECI, Chief Inspector. There was also a significant contribution from the RECI Regional Inspectors.

While based on information contained in the submissions made by entrants, and subsequent Inspection Reports, the assessors looked in particular at: —

— Compliance with the ETCI

Wiring Rules

- Technical Competence
- Record Keeping & Data Logging
- Participation in RECI Training Schemes
- Testing Capability

Awards were presented in two primary categories — Domestic and Industrial/Commercial — with a total of 32 companies, representing each of RECI's eight designated regions shortlisted as finalists.

On the night Conefrey Electrical Services Ltd, from Longford, emerged as National Winner — Domestic, while the accolade of National Winner — Industrial/Commercial, went to Kirby Group Engineering of Limerick.

Speaking at the ceremony John Desmond, RECI, Chairman, paid tribute to all those who had entered the Awards and commended them on the very high standards presented. This in turn made it extremely difficult for the judges to choose the shortlisted finalists and ultimate winners.

In that regard he said: "The invaluable contribution of the panel of assessors, under the Chairmanship of RECI's Technical Consultant, Kevin T Kelly, cannot be overstated. We are all indebted to Kevin and his fellow panel members — Michael Brennan from Hibernian Aviva; Jim Rice, RECI & ETCI Director; and Kevin Kelly, RECI Chief Inspector.

"I must also say a special thank you to our sponsors, Hibernian

Aviva and Arachas Corporate Brokers. This venture would not have been possible without their involvement and it is also heartening to see them here tonight as we celebrate the occasion with the winning contractors."

In presenting the Awards Duncan Stewart congratulated all the winners. He referred to the current market downturn affecting electrical contractors but said that they were ideally placed to capitalise on the new market opportunities related to Ireland's energy efficiency and CO₂ emissions objectives.

As the leading experts in their field he said all those present should upskill further and take full advantage of the need for specialist contractors in the field of renewables. He stated there was a shortage of suitably-qualified and knowledgeable contractors who knew and understood the advanced electronics of modern-day controls and their vital role in the integration of emerging sustainable technologies. He urged all those present to develop their knowledge and skills in the area so that they could help Ireland achieve its objectives while, at the same time, benefiting commercially.

Further commenting on the Awards and the winners, Michael Garvey of Hibernian Aviva said: "There were so many excellent entries for the RECI Awards and it was great to see electrical contracting firms working hard to improve electrical safety standards in the industry. At Hibernian Aviva we recognise the

National Winner — Domestic Category



Michael Garvey, Hibernian-Aviva with Duncan Stewart, environmentalist and broadcaster; James Conefrey, Conefrey Electrical Services, National Winner in the Domestic category; Guy Percival, Director, Arachas Corporate Brokers; and John Desmond, Chairman, RECI

National Winner — Industrial/Commercial Category



Michael Garvey, Hibernian-Aviva with Duncan Stewart, environmentalist and broadcaster; John Browne, Kirby Group Engineering, National Winner in the Industrial/Commercial category; Guy Percival, Director, Arachas Corporate Brokers; and John Desmond, Chairman, RECI

efforts made by all the entrants in the RECI Awards and congratulate the winners. The awards have truly showcased their expertise and commitment to electrical safety".

Also commenting on the Awards, Guy Percival, Director, Arachas Corporate Brokers said: "Arachas is delighted to be involved in the RECI awards and we congratulate the RECI winners on their success. These electrical contracting firms exemplify dedication to excellence and high standards and is a great reward for all their hard work".

In conclusion, David McGloughlin, RECI General Manager, said: "These inaugural RECI Awards have proven to be a great success. Electrical contractors from all over the country entered the awards scheme, revealing a healthy electrical contracting industry in Ireland. In encouraging and rewarding standards of excellence among our members, we aim to raise awareness among consumers across the country of the importance of using only fully-registered, competent and certified electrical contractors to carry out all electrical installations".

RECI Award Winners 2009			
<u>Dublin Region</u>		<u>West Region</u>	
Domestic		Domestic	
Pedreschi Electrical & Alarms		Patrick Naughton Electrical	
Industrial/Commercial		Industrial/Commercial	
Eakins Electrical Contractors		James P Cunningham Electrical	
<u>South East Region</u>		<u>Midlands Region</u>	
Domestic		Domestic	
Dale Kirwan T/A NEAT Electrical		Conefrey Electrical Services	
Industrial/Commercial		Industrial/Commercial	
CJP Electrical T/A Smith's of Wicklow		Lima Electrical	
<u>South West Region</u>		<u>North East Region</u>	
Domestic		Domestic	
Stephen Slynne Electrical		PB Electrics	
Industrial/Commercial		Industrial/Commercial	
O'Keeffe Electrical		Brian King Engineering	
<u>South Region</u>		<u>North West Region</u>	
Domestic		Domestic	
John Fitzpatrick		Chris Doherty Electrical	
Industrial/Commercial		Industrial/Commercial	
Kirby Group Engineering		Blackburn Electrical	

Hitachi S Series — Powerful, Efficient & Ultra-Clean

Hitachi's air conditioning range is one of the most extensive on market with unit capacities ranging from 2.0kW high wall split systems to the Hitachi screw compressor chillers of over 1000kW. With products and equipment suitable for a variety of applications — from the domestic conservatory to the modern multi-storey office environment — the versatility of the range is second to none.

It is against that background that the new Hitachi S Series range of wall mounted units has been added to the portfolio. S Series units have a stylish design incorporating a sleek flat front panel with a metallic finish. They incorporate six different cleaning functions, including a stainless filter to keep the inside of the unit clean. Generating ionised mist from the air in the room, the units help eliminate odours and destroy 99.9% of airborne viruses and bacteria.

Available in cooling and heating capacities from 1.8kW to 4.2kW, these units have a market-leading COP of 6.36, EER of 6, and running costs as low as €33 a

year. These efficiencies are possible thanks to innovative Hitachi Inverter technology developments which allow a room to reach the required temperature more rapidly, and also eliminate the stop-start operation associated with constant-speed systems.

Efficiency is further improved by the use of a large-capacity cylinder and by reducing the loss in the process of refrigerant compression. It is equipped with a highly-efficient motor which runs even at low voltage after reaching a pre-set temperature.

Hitachi's DC compressor features a "permanent magnet" motor, unlike conventional motors which cannot magnetise without electricity. As a result, Hitachi's DC compressors deliver over 10% greater efficiency than conventional AC compressors. Also, the irritating "hum" caused by electromagnetic waves in AC motors is totally eliminated.

Features & Benefits

Efficiencies — Market leading COP of 6.36 and EER of 6;

Running costs — Running costs of as low as €33 per year;

Stylish design — Sleek flat front panel with a metallic finish;

Low noise — Levels as low as 20dB(A);

DC PAM Inverter technology — Hitachi pioneered 'DC' Inverter PAM-driven room air conditioners and uses this technology to drive its compressors and fans;

Anti-bacterial stainless clean — Six different cleaning functions, including a stainless filter to keep the inside of the unit clean;

Ionised mist — Generates ionised mist from the air in the room so there is no need for a water supply. This eliminates odours and destroys 99.9% of airborne viruses and bacteria;

Jet blades — Provides efficient air distribution for both cooling and heating operation.

Contact: Fergus Daly, Hitachi Europe (Dublin).
Tel: 01 - 216 4406;
email: aircon.ireland@hitachi-eu.com

Hitachi S Series range of wall mounted units have a stylish design incorporating a sleek flat front panel with a metallic finish.



HITACHI

Energy Master installs Daikin Demo Unit at DIT Bolton St



A sophisticated demo unit with full working Altherma air-to-water heat pump from Daikin has been installed by Energy Master at the Institute of Technology in Bolton Street, Dublin.

The unit is located in the heating lab of the Engineering Department to allow apprentices, engineers, plumbers and consultants to get a clear

understanding of how the Altherma air-to-water heat pump system works, how efficient the Altherma system is compared to regular heating systems, and to demonstrate proper plumbing standards.

Apart from the Altherma heat pump, the demo unit also features the following fully working components:—

- Hewalex flat-plate solar panel and control unit;
- Water pressurisation system;
- Underfloor heating;
- Conventional radiator/towel rail heater;
- Fan coil heater;
- Hand wash basin.

To mark the official handing over of the installation Frans Hoorelbeke, Chairman, Daikin Europe NV, recently visited DIT Kevin St in the company of his Irish Branch Office colleagues, Peter Grunewald, Branch Manager and Liam Kirwan, Technical Services. Also present was Tom Somers, Managing Director of Energy Master.

The visiting party was welcomed to, and shown around, the facility by DIT's John Smartt before Frans Hoorelbeke delivered a highly-informative address to the main body of students on the course.



Liam Kirwan, Technical Services, Daikin Europe NV, Ireland Office with Tom Somers, Managing Director, Energy Master; Peter Grunewald, Branch Manager, Daikin Europe NV, Ireland Office; Frans Hoorelbeke, Chairman, Daikin Europe NV; and John Smartt, DIT.

DIT Bolton St Student Strikes Gold

Jonathan Cussen, a student from the Dublin Institute of Technology's DT 151 Plumbing/Building Services Advanced Course, has won the prestigious Lilli Sara Barber Student Gold Award from the Master of the Worshipful Company of Plumbers.

The Lilli Sara Barber Gold Award is presented annually by the Plumbers Company to the highest-achieving student in plumbing in the UK and Ireland and the selection is based on examination results and an interview. Jonathan was awarded

a Distinction Grade in his Higher Professional Diploma by the City and Guilds of London and it is the

first time that the Lilli Sara Barber Award has been made to a plumbing student from Ireland.



Jonathan Cussen receiving the Lilli Sara Barber Student Gold Award from the Master of the Worshipful Company of Plumbers, Professor Rodney Cartwright. Also included is Liveryman John Smartt, Course Co-ordinator at DIT Bolton St.

CIAT Ozonair ground source heat pumps and dry air coolers — which are distributed in Ireland by Crystal Air — form an essential part of Europe's largest ground source system that has been installed at the Churchill Hospital in Oxford, England.

Haden Young Midlands and Southern worked in a joint venture with Alfred McAlpine and Impreglio to build the complex which comprises a state-of-the-art cancer centre, surgery and diagnostics building, and private patients' unit.

The core of the solution provided is an ambitious ground source heat pump system. Heat is transformed through CIAT Ozonair's heat pumps to provide the energy needed to heat or cool the buildings.

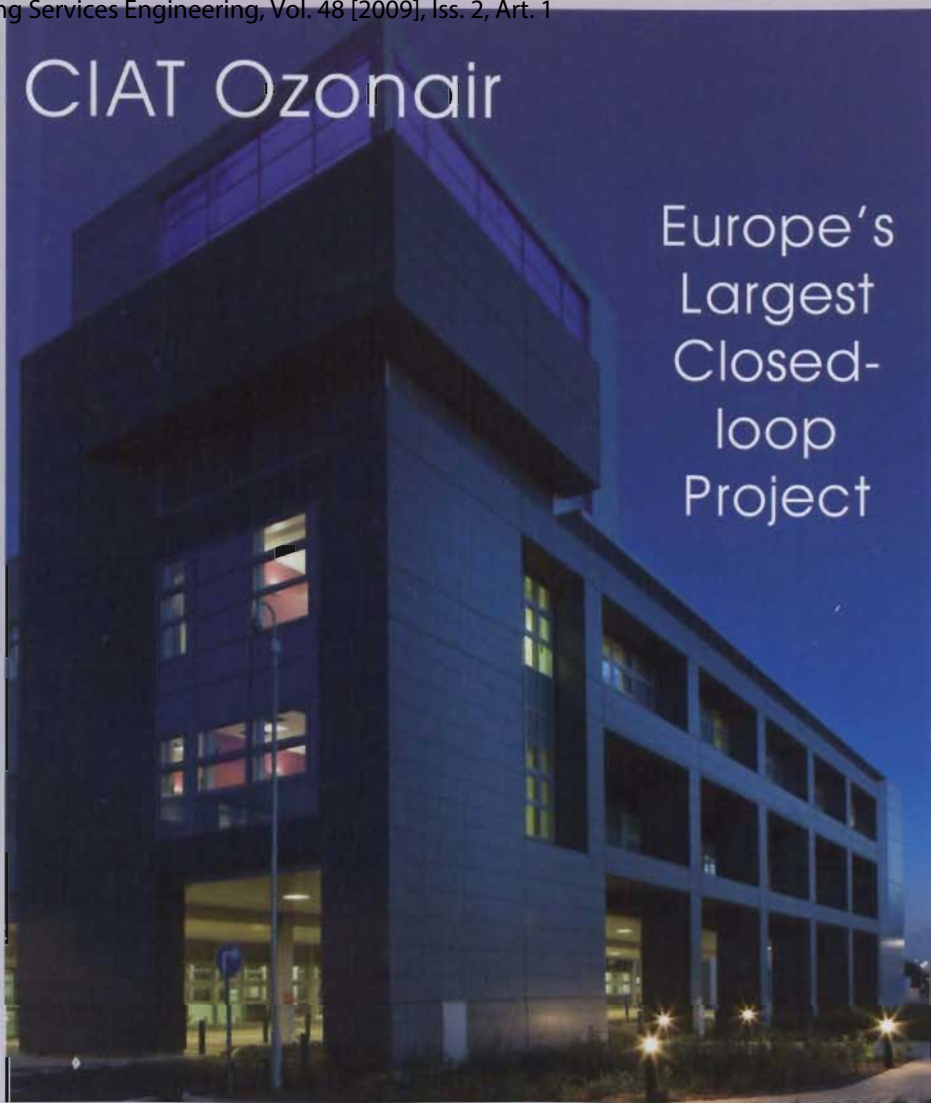
The system uses 240 bore holes, each 100 metres deep, through which water is pumped in a closed loop of around 35 miles of pipe. The eight CIAT Ozonair LWP 2150 heat pumps are installed in two plant rooms (five in one and three in the other), one heat pump in each plant room being in standby mode. They provide more than 2.5 megawatts of heating and cooling with scope for a ninth unit to bring the system capacity to over three megawatts.

Each heat pump has a heating capacity of 522kW and a cooling capacity of 373kW in heating mode, and 505kW cooling capacity and 613kW heating capacity when in cooling mode. The installation is completed by two CIAT sequence control panels, three CIAT Vextra dry coolers and 14 heat exchangers.

In heating mode, the heat pumps draw cold water from the sealed

CIAT Ozonair

Europe's Largest Closed- loop Project



geothermal ground loop. In cooling mode, the hot condenser water is pumped into the ground loop, which provides condenser water cooling.

The central BMS constantly monitors the hospital environment and determines whether to operate in either heating or cooling-dominant mode. It sends a signal to the sequence control which, in turn, operates the heat pumps in the required mode. It also varies the system water temperature via a 0 - 20 mA signal to the sequence control system.

The sequence control panels measure flow and return water temperatures and ensure the heat pumps are used in the most economical mode. In doing so, they open and close both chiller and heating water valves, the

design flow rates being maintained by inverter-driven pumps. The sequence panels also provide fault-monitoring as well as duty rotation and standby selection.

Controlled by the BMS, the dry coolers are used to maintain the well field by either injecting or rejecting heat at times of high load. The heating and cooling water is distributed around the hospital in secondary systems via CIAT PWA plate heat exchangers.

Haden Young estimate that for every kilowatt used to power the ground source system, up to six kilowatts are generated for heating and cooling.

Contact: Barry Hennessy, Sales & Marketing Director, Crystal Air.
Tel: 045 - 893 228;
email: barry@crystalair.ie

RGII

Registration of Installers Now Underway

Further to its CER appointment as the Gas Safety Supervisory Body (GSSB), the Register of Electrical Contractors of Ireland (RECI) has formed a company limited by guarantee called the Register of Gas Installers of Ireland (RGII) with the sole purpose of operating as the GSSB.

RGII will be responsible for registering gas installers and regulating their activities with respect to safety. It will initially be responsible for regulating those domestic gas works as set down in the Commission's Criteria Document CER/08/130.

This new statutory-backed regulatory system replaces the voluntary registration scheme operated by Bord Gáis Networks (BGN) since 2006 in compliance with its Natural Gas License Obligations.

Transitional Arrangements

The new RGII-regulated system is now in place and has been taking applications for registration from 5 January 2009 last. Contact is being made with all installers on the current BGN voluntary register regarding their transfer to the new RGII regulatory register. Such transfers will be facilitated between January and April 2009. The April 2009 deadline is also applicable to those installers who wish to be considered for inclusion in the Provisional Membership category. The Provisional Membership category

is a temporary measure and the category will cease to exist on 18 December 2009. Gas installers seeking inclusion in this membership category should pay close attention to the requirements for Provisional Membership as set out in the Criteria Document.

Gas installers who are registered under the Provisional Membership category must obtain the Gas Installer Domestic (GID) qualification. Failure to acquire the GID qualification prior to 18 December will result in the removal of a gas installer from the register. Such gas installers would therefore be unable to undertake domestic gas works thereafter.

Appropriate non-domestic membership categories will be enshrined in regulations in due course after the CER's Gas Works consultation process.

Formal Commencement Date

Friday 26 June 2009 will be the official commencement date for the new regulatory regime. After this date it will be an offence for any person to carry out domestic gas works unless he/she is a registered gas installer. A person convicted of this offence may be fined up to €15,000 or imprisoned for up to three years, or both.



RGII registration administrators — Sinead Kearns and Samantha Somers

The current BGN voluntary register will remain in place during the transitional period until commencement of the new regime to ensure that current safety standards are maintained.

Information Evenings

Further information in relation to the new regulatory regime will be made available to gas installers and the industry in general over the coming months. As part of that process a nationwide series of information evenings (all from 7pm to 9pm) will be held throughout April. Dates and venues are as follows:—

Wednesday, 1 April, Green Isle Hotel, Dublin;
Monday, 6 April, Kilkenny Hotel;
Tuesday, 7 April, Silver Springs Hotel, Cork;
Wednesday, 8 April, Carlton Castletroy Park Hotel, Limerick;
Thursday, 9 April, Radisson SAS Hotel, Galway.

Contact: Samantha Somers, RGII.
Tel: 01 - 492 9966;
email: samantha@rgii.ie

Guardian™ Sets Industry-Standard Benchmark

IDH, one of the last remaining electric cable manufacturers in Ireland, celebrates its 75th anniversary this year. It prides itself on its customer focus, providing excellent quality, service and flexibility to its worldwide customer base. Over the years it has continued to diversify its product portfolio, introducing innovative fire — and mechanically-protected cable designs. It has also applied its unique combination of flexible manufacturing and product application knowledge to match customer needs.

Guardian™, one of IDH's newest and most innovative products, is a low-smoke, halogen-free cable that has a unique construction incorporating an earthed metallic shield. It is a lightweight, easy-to-use cable that is resistant to expanded polystyrene, has inherent shielding against electromagnetic interference, and does not need an expensive steel conduit to protect it against becoming dangerous if damaged within partition walls.

Guardian™ is rated at 600/1000volt and can be used to replace steel-wired armoured (SWA) cable in many indoor applications.

Guardian™ was developed to meet ever-changing building regulations and is the only cable of its type which has full industry regulatory approval. It was designed to meet the toughest standards in Ireland and the UK and was tested at ERA and BSI before being awarded the only BASEC approval for cables which meet IS273 and BS8436.

Guardian™ is the only approved screened cable that complies with the new requirement for cables concealed in walls and ceilings in both Ireland and the UK.

These features make IDH's innovative Guardian™ the

perfect choice for use in prestigious projects. These include the state-of-the-art private Galway Clinic which was designed to bring the best possible medical cancer care to the west of Ireland. Architects on this important project were the Dublin-based firm, CCH

Kentz specified IDH's Guardian™ for application in the highly-sensitive radiology department because it offered a tough, low-smoke, halogen-free cable which was easy to use and has a unique EMC screening incorporated into the cable design.

In addition, Kyne & Clyne, the electrical consultants, specified IDH's Guardian™ cable on this prestigious site, which was developed by Jimmy Sheehan.

Kentz's Projects Manager, Ray Murphy, decided that IDH's Guardian™ cable offered an ideal EMC screening for the data-sensitive areas of the radiotherapy department, while its mechanically-protected design and light weight made it robust as well as easy to install.

Kentz has been in the construction business for almost 90 years and operates in over 20 countries worldwide. It provides the full range of technical and project management skills, from

design through to procurement, construction, commissioning and start up.

Guardian™ has proven to be the cable of choice for many other important building projects. John Egan of John Egan & Associates has specified Guardian™ cables on many different sites, including the Virginia Health Centre in County Cavan.

John Egan & Associates also were the mechanical and electrical consultants on the new Navan Court House designed by architects Freyer and Taylor. Again they used Guardian™ as a safe method for concealing electrical cables behind baseboards.

Guardian™ has also been used in many retrofit applications where its robust design allows for use either directly clipped to walls or concealed behind studded partitions. One of the latest examples is the National Heritage Building, Terenure House where leading consultant engineers, White, Young and Green, specified Guardian™ because it is the only BASEC-approved product which complies to the new wiring regulations for use in concealed walls.

Durrow Church was the site of another significant electrical

refurbishment where Sean Duggan of Duggan Electrical found that the unique pliability of the cable was an invaluable feature of Guardian™ as this allowed the installer to shape or form the cable to suit various difficult configurations. Duggan Electrical has also used Guardian™ cable in many different Dublin City street lighting projects.

The Office Of Public Works was an early advocate of this new cable and collaborated with Kirwin Electrical to complete work on Lansdowne House, where again the speed of installation was a winning attribute of the Guardian™ cable.

Marks & Spencer, one of the UK's largest department stores, now uses Guardian™ in several of its newest stores. Electrical contractors there decided on Guardian™ because it was lightweight, easy-to-use and could be placed in direct contact with thermal insulation.

The EMC shielding meant that Guardian™ could be used as drop down power points running alongside data-sensitive cabling leading to cash registers. Significant saving were made by reducing installation times, replacing heavy cable trays with lighter and cheaper cable baskets, and generating far less scrap for disposal when compared with SWA cables in similar applications.

The foregoing project examples clearly demonstrate that, in IDH, Ireland has one of the most pioneering cable developers and manufacturers not just in Europe, but throughout the whole world.



Galway Clinic



Custom House, Dublin



Marks & Spencer

MHI Ecolution KX6 Series Heralds AC Revolution

M

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Heavy
Industries'

new Ecolution VRF KX6 inverter drive, multi-indoor, air-conditioning system represents the pinnacle of MHI research in commercial air-conditioning system development. With over 80 years of refrigeration engineering heritage, MHI's KX6 achieves the highest levels of efficiency and reliability in the marketplace through intelligent design.

Advances in technology have significantly improved both the EER and COP of the new generation KX6 series. Running with 100% Inverter compressor on R410a refrigerant, the units achieve very high co-efficient of performance (COP) across the entire KX6 range, thereby reducing running costs and environmental impact.



Mitsubishi Heavy Industries Ecolution KX6 combination outdoor unit

Utilisation of new twin-rotary and 3D scroll compressors, compact heat exchangers, and DC motors, all allow the new new KX6 units achieve Class A energy-saving ratings. With an extensive choice of outdoor units (27 models), and indoor units (14 types/69 models), virtually every conceivable application is catered for.

Significant reductions in both the size and weight of all the heat pump outdoor units, from 4hp to 12hp, allows the KX6 system to be installed in various space-restricted applications. Additionally, the side-blow fan configuration enables wall-mounting of the outdoor units with a capacity of up to 33.5kW nominal cooling.

Being lightweight and compact, the KX6 units are easy to transport and handle, making delivery and installation that much easier and quicker. The outdoor units (up to 12hp) can be moved without difficulty in a typical 6-person lift, reducing the need for expensive crane costs and labour.

The new KX6 series also has improved indoor unit connection capacity. The capacity ratio has been increased up to 200% (14hp to



Mitsubishi Heavy Industries Ecolution KX6 compact outdoor units

16hp), allowing design flexibility for both the consultant and installer. It is now claimed to be the number one connectable indoor unit in the industry, with up to 48 units per system above 30Hp of system capacity.

The KX6 series also offers industry-leading pipe lengths of up to 160m (actual). This is achieved by the use of improved compressor design, the use of thinner pipework, and reduced refrigerant volume. KX6 models (14hp and up) now achieve an incredible 1000m total pipe length.

Meanwhile, the height difference between indoor units has been extended to 18m, enabling installation in taller buildings.

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designing BUILDING SERVICES

the design of a BMS for a pharmaceutical environment

There are three main phases to any BMS project — A&E Design; BMS Contractor Design/Build; and BMS Contractor Commissioning. Phase one will be discussed in this issue of *bs news* while the remaining two phases will be dealt with in the April edition.

The objective of this article is to provide an overview of the issues to be addressed by the architectural and engineering (A&E) firm throughout the design life-cycle of a building management system (BMS) in a regulated pharmaceutical environment. There is a significant difference between the level of design input required for a BMS system controlling a HVAC system in a pharmaceutical cleanroom environment, and a BMS system in, say, a commercial building.

This article does not seek to explain how a decision is arrived at, to subject the BMS system to a rigorous "qualification" process. However, a brief outline of the process which leads to that decision is useful.

The primary issue is system functionality — will the BMS

system control a HVAC system that will be responsible for delivering a quality-critical parameter? To put it another way, could any of the environmental functions of particulate level, temperature, humidity or pressure control be described as "critical" in terms of maintaining product quality. If

not, then they are "non-critical".

In the regulated pharmaceutical industry, delivery of "critical functionality" must be proven. In terms of proving environmental functionality, there are a number of technically-acceptable arrangements. These will be discussed later. At a minimum,

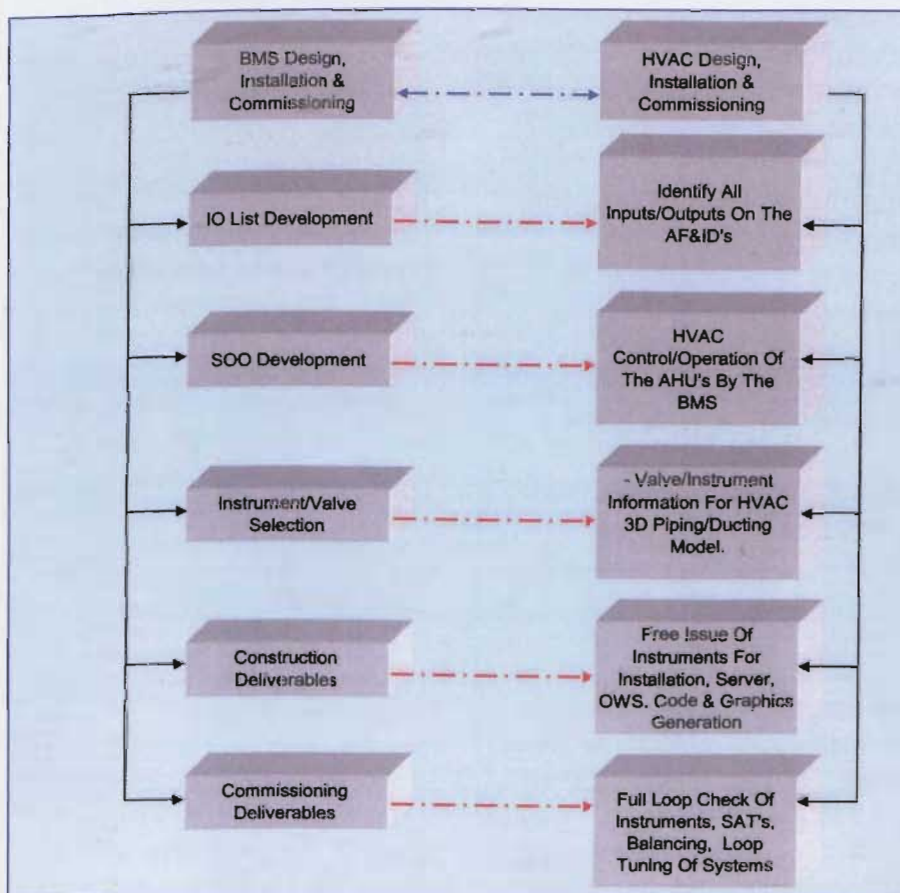


Figure 1: This shows some typical crossovers between HVAC and BMS design

the design of a BMS for a pharmaceutical environment

whichever arrangement is chosen, it will have to comply both with the electronic data storage requirements of the US 21CFR 11 and the documentation lifecycle requirements of GAMP 5.

Multi-Disciplinary Aspect Of BMS Design

There are many stakeholders in the design phase of the BMS system. For a project to be a success, both the HVAC and BMS engineer should work hand-in-hand, interfacing with other disciplines to ensure the end-product meets the client's specification. **Figure 1** shows some typical crossovers between HVAC and BMS design. The airflow and instrumentation diagrams (AF&ID) detail how the HVAC system will maintain the required environmental conditions. It also shows all instrumentation required to operate and control the HVAC plant, to maintain the required environmental parameters.

By both engineers working in unison, the correct type/quantities of instruments are selected to control the plant. In many A&E design offices, valve/instrument information is inputted into 3D piping/duct modelling to evaluate whether there are any design clashes, and to ensure future maintainability (eg, instrument access for in-situ calibration or maintenance).

In addition, the other disciplines for interaction are:—

- User Group – URS development;
- Electrical – HVAC equipment interlocks and VFD/MCC interfaces;
- IT/Automation: IT site network infrastructure;
- Instrumentation: Industrial quality instrumentation;
- Commissioning & Qualification (C&Q): qualification strategy & protocols;
- Procurement – who buys instruments? Project benefit from early involvement of the BMS contractor?

All of this equips the BMS contractor to interpret the design and deliver a successful project.

User Requirement Specification/ Scope Of Works Document

One of the most important stages of the BMS design is to understand and document the client's requirements for the BMS. For a BMS installation to be GAMP compliant, these requirements must be captured in a User Requirement Specification (URS)/Scope Of Works (SOW) document.

This document provides a description of system requirements and a basic outline for the development of the BMS. The following sections explain some of the key points which should be contained within the URS.

BMS Overview

In the pharmaceutical industry there may be a regulatory requirement (ie, FDA, IMB) to monitor and report on environmental conditions in designated cGMP areas. Some or all of the environmental parameters in these areas may be regarded as critical to product quality. These quality critical parameters must be recorded to support cGMP manufacturing batch records.

The monitoring system is generally referred to as the EMS (Environmental Monitoring System) and the records (trends, alarms) from this system are cGMP data that must be protected/maintained. The client should conduct an impact analysis and risk assessment to determine the areas that require environmental monitoring and reporting.

There are various means of providing an EMS for the cGMP areas. Some of the options are as follows:—

Qualified BMS (QBMS)

In simplistic form, identify the HVAC plant which controls the qualified (cGMP) areas. For example, if there were 10 AHU's controlling a production building, the client may identify that only eight need to be qualified. These eight AHUs would reside on a separate Qualified BMS (QBMS) system.

the design of a BMS for a pharmaceutical environment

The remaining two AHUs (non-cGMP) would reside on a Non-Qualified BMS (NQBMS) system which typically would also include control and/or monitoring of all black utility equipment such as chillers, boilers etc.

Even though the regulatory requirements do not apply to the NQBMS, the design and test documentation may be produced to the same standard as that for cGMP areas. The QBMS and the NQBMS should be two distinct systems with dedicated servers, Operator Work Stations (OWS) and BMS

panels. It should be noted here that the same BMS platform/hardware can be used for both systems.

Non-Qualified BMS With Additional Transmitter To A Dedicated EMS

A second option is to install an additional transmitter in the cGMP areas (ie, space temperature, humidity and pressure). The NQBMS controls the operation of the HVAC plant, with only the duplicate temperature, humidity and pressure transmitters connected directly to the EMS (PLC, DCS or QBMS).

Figure 2 shows a sketch of how the system would look. One of the drawbacks of selecting this option is the initial capital cost for the additional transmitters required, and also the ongoing calibration of both sets of instruments throughout the lifetime of the installation. Another drawback is that both instruments will never provide an identical reading so people are tempted to ask which one is correct? Generally, the instruments will read within the permissible margin of error so, strictly speaking, this is not an issue.

Transmitter Signal Repeated To A Dedicated EMS

A third option is to wire the environmental instruments in the cGMP areas back to the NQBMS panel as normal. The NQBMS panel consists of two distinct physical areas — the cGMP section and the non-cGMP section. The splitter resides in the cGMP section, together with the remote base of the EMS.

The signal from the instrument is split within the cGMP section, one output going to the NQBMS controller in the non-cGMP section and the other output going to the EMS remote base located within the cGMP section. The cGMP instrument loops are fully qualified back to the EMS.

The combined NQBMS panel comes to site pre-wired and FAT

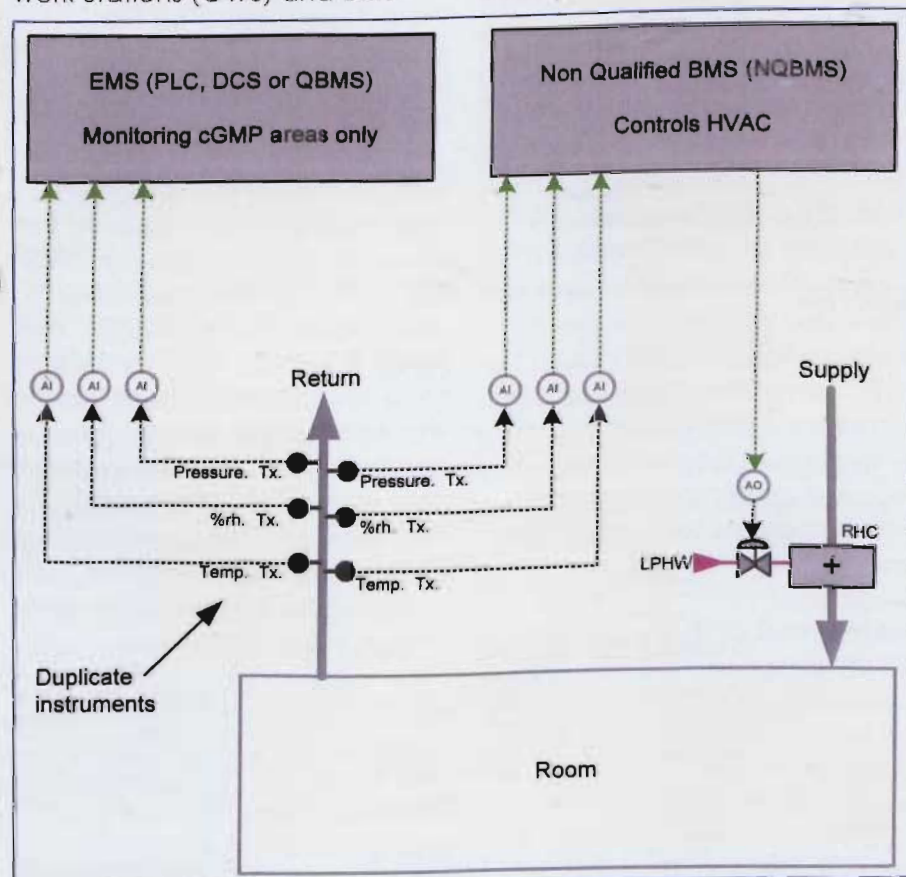


Figure 2: Non-qualified BMS with additional transmitter to a dedicated EMS

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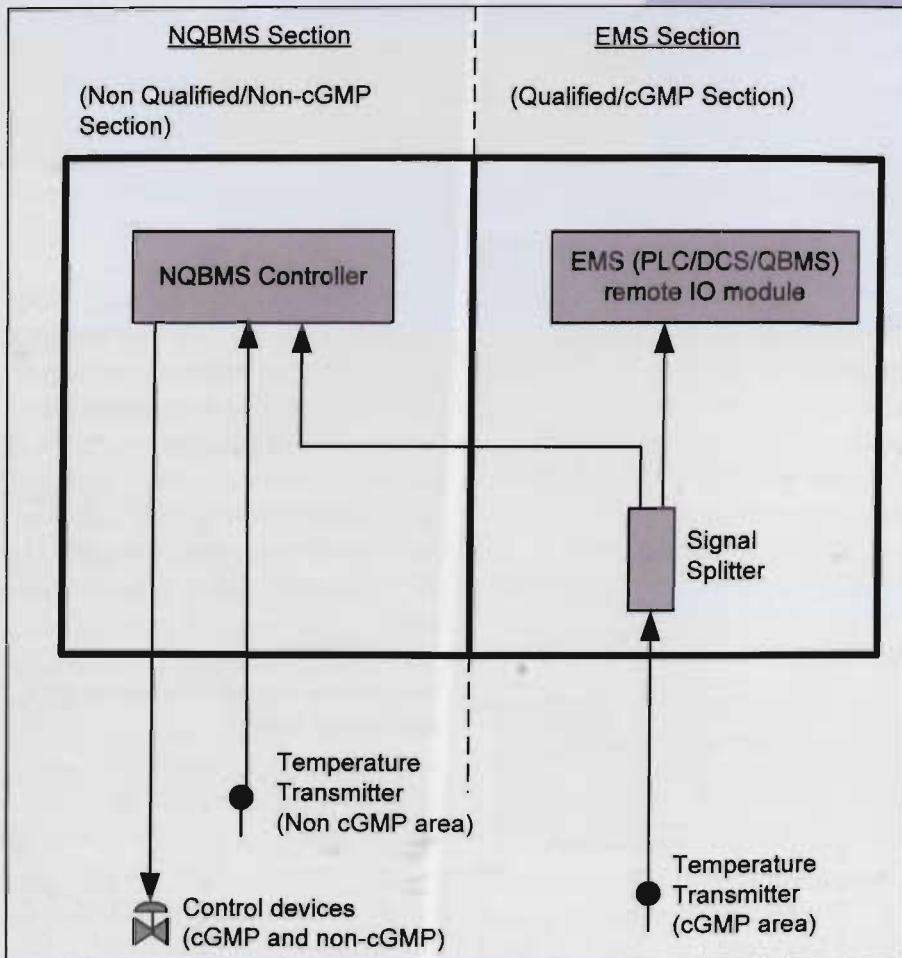


Figure 3: Transmitter signal repeated to a dedicated EMS

tested as normal with a bus cable connecting the EMS remote base back to its respective validated system CPU. All the environmental instruments in the cGMP areas can now be viewed on the validated EMS system. **Figure 3** shows a sketch of the how the system would look.

The three foregoing examples give the client some options for monitoring of HVAC environmental conditions in cGMP areas. Again it can be seen that the identification of

which option of monitoring of HVAC environmental conditions is important from an early stage of design (i.e. if option 2 was required, duplicate transmitters with associated tags need to be added to the AF&ID's).

For the most part, our experience is that wherever the EMS model is adopted, the NQBMS system will be subjected to the same scope of design documentation as if it were a qualified system. However, the level of control on this documentation would be less rigorous. This approach

provides companies with a documentation level that ensures the BMS system is properly designed and commissioned but avoids the ongoing costs of maintaining qualification for a BMS.

Redundancy

The requirement, if any, for redundancy should be driven by the client's quality/project team. It is essential that the correct requirements are identified initially so that the correct BMS platform can be selected to meet the requirements. Through the client's own impact analysis and risk assessment procedures, the outcome could be that redundancy at the file server level or instrument level is required.

Redundancy at the file server level means an additional file server (i.e. if the primary file server fails the hot standby file server should automatically start).

Figure 4 shows a typical cluster server arrangement. There are various means of setting up this arrangement, some more costly than others. This will require discussion with the client and selected BMS contractor on what options are available and what the likely risks are.

Another option would be to look at the buffering capacity at the BMS panel CPU. By agreeing the trending requirements for each type of cGMP area environmental instrument (i.e. Temp/RH - 15 minutes, Pressure -

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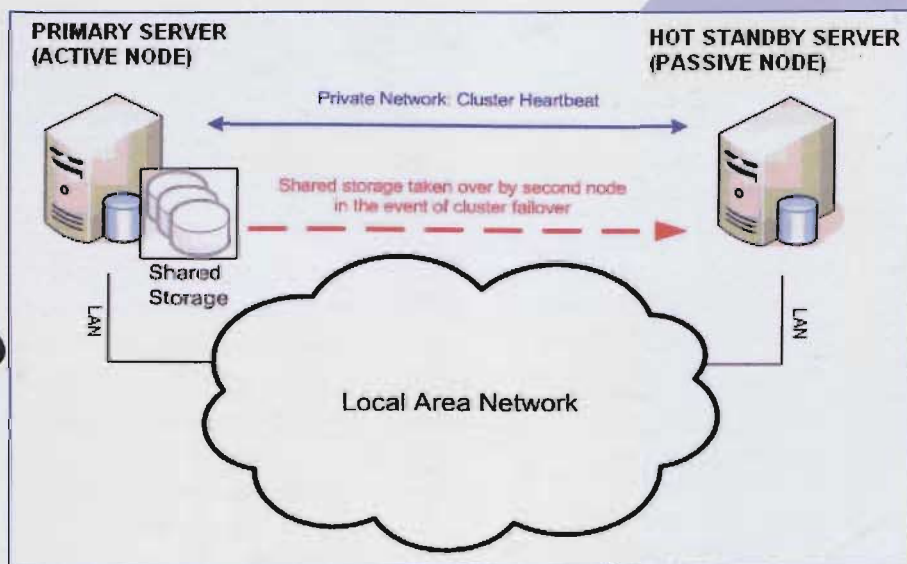


Figure 4: Typical cluster server arrangement

1 minute), the BMS CPU could store up to 3-4 days worth of information. When the server failure issue is resolved, the information can be uploaded from the BMS panel CPU's to the server for archiving.

Tagging

Although tagging of instruments may look quite simple at a glance, it is imperative that the correct tagging standard is agreed with the client at the very beginning of AF&ID and design documentation development. If the tagging standard is not agreed, the re-work of AF&ID's due to tagging errors can be costly and time-consuming. Where possible, the Instrumentation Systems and Automation society (ISA) standard should be used.

Hardwired Interlocks

The interlocks between the BMS

and the electrical drives for HVAC equipment also require detailed attention during the design phase (ie, frost stats, fire alarm, damper open endswitch interlocks). Other interlocks are low/high pressure switches (PSL or PSH) which should be installed if installations of smoke dampers are present, or if it is a VAV-type of system. All interlocks between the HVAC equipment and the fan VFD/DOL electrical schematics need to be co-ordinated so that the required hardwired signals and voltages between VFD/MCC/BMS panels are maintained.

BMS Panels & Servers

It is good practice to have a dedicated panel per AHU system. This ensures that all code and graphics generated are specific for this AHU only. It also helps during commissioning to be able to test specific AHUs in

isolation, so that all necessary paperwork (IQ, OQ, PQ) can be reviewed and signed-off on a system per system basis.

All BMS panels, file servers and OWS should be on UPS power so that the BMS can keep trending of environmental parameters in the event of power failure. Server and OWS specifications should be reviewed and approved by the client's IT department. Spare capacity in the form of space for the installation of extra I/O should be provided per each BMS panel (ie, 20% is an average limit). This means additional installed rack space, bus rails, cable gland holes, power distribution etc.

High Level Interfaces With Client Site Historian & Vendor Equipment

Any high-level interfaces to other control systems should be reviewed at a very early stage of the design to ensure that the selected interface protocol will function efficiently and reliably. Commonly-available, multiple-sourced, networking components and protocols should be used to allow the BMS to co-exist with other networking applications, eg, interface between VFD and BMS via the commonly-used modbus protocol.

It is common for the BMS to send information to the client's site historian for long-term storage of data. Any testing of interfaces

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off-site is recommended to avoid delays in the commissioning program on site and for the overall reliability of the interface.

Philosophy Of Alarm Management

The principle of alarm notification to operator/maintenance personnel should be reviewed. A site philosophy should be agreed on how critical plant alarms are dealt with on a daily basis. Most BMS systems have various ways of sending alarms to operator/maintenance personnel, ie, paging and email. Level of alarming — Level 0; Critical; Level 1; Urgent — should also be reviewed and agreed by the client so that the alarm most critical to the process gets acted upon first. Again most BMS systems have various alarming levels which can be configured to suit the client's requirements.

Instrumentation

All cGMP instruments should be factory-calibrated and able to be calibrated on site by an instrument technician without reference to the manufacturer. Signal operation should be 4-20mA. All cGMP instruments should be supplied with a factory-calibration certificate. The only exception to this requirement should be non-cGMP areas. However, non-cGMP sensors should be good quality commercial grade type and signal operation can be 0-10V.

All calibration equipment must be traceable to a National Metrology Institute such as NIST, NML or NPL. All instruments should come to site pre-tagged. A sample tag should be submitted by the BMS contractor for approval prior to proceeding with tagging of instruments. The BMS contractor should also identify the correct location for each instrument in their supply.

Delivery of the instruments to site should be on a Just-In-Time (JIT) basis to avoid misplacement by the installation contractors. The BMS contractor should also be responsible to ensure that all instruments under their supply are installed correctly during their own walk-down procedures.

Training

All training courses should be customised to meet the client's requirement. Programs should include lecture, demonstration, hands-on practice and training manual. Trainee testing and certification must also be available. All systems must be covered, especially in relation to system back-up procedures and data recovery.

Conclusion

From the outset of the design, the BMS engineer needs to understand the client's requirements for the BMS system. By identifying the design criteria for the BMS, the URS/SOW document can be generated to

capture the client's BMS requirements. Covering the above topics with the client will help to ensure that the correct BMS system is selected to satisfy the URS.

In addition, understanding the client's requirements will also feed back into the development of the HVAC AF&ID, electrical design, instrumentation selection, C&Q protocols and BMS contract procurement.

References

- (1) Project Management Group;
- (2) GAMP Guide for Validation of Automated Systems;
- (3) The Instrumentation Systems and Automation society (ISA).

Next month

The development of the BMS SOO, network architecture drawings and IO list by the A&E firm will be discussed in the next issue of *bs news*, along with all the BMS contractors' deliverables during their "Design/Build" and "Commissioning" phases.

Bibliography

Oliver O'Reilly is a lead BMS Project Engineer with Project Management Group (PMG). A graduate of Dundalk IT, Oliver has worked on a wide variety of projects from design, construction and commissioning in pharmaceutical and commercial industries in Ireland and the UK.

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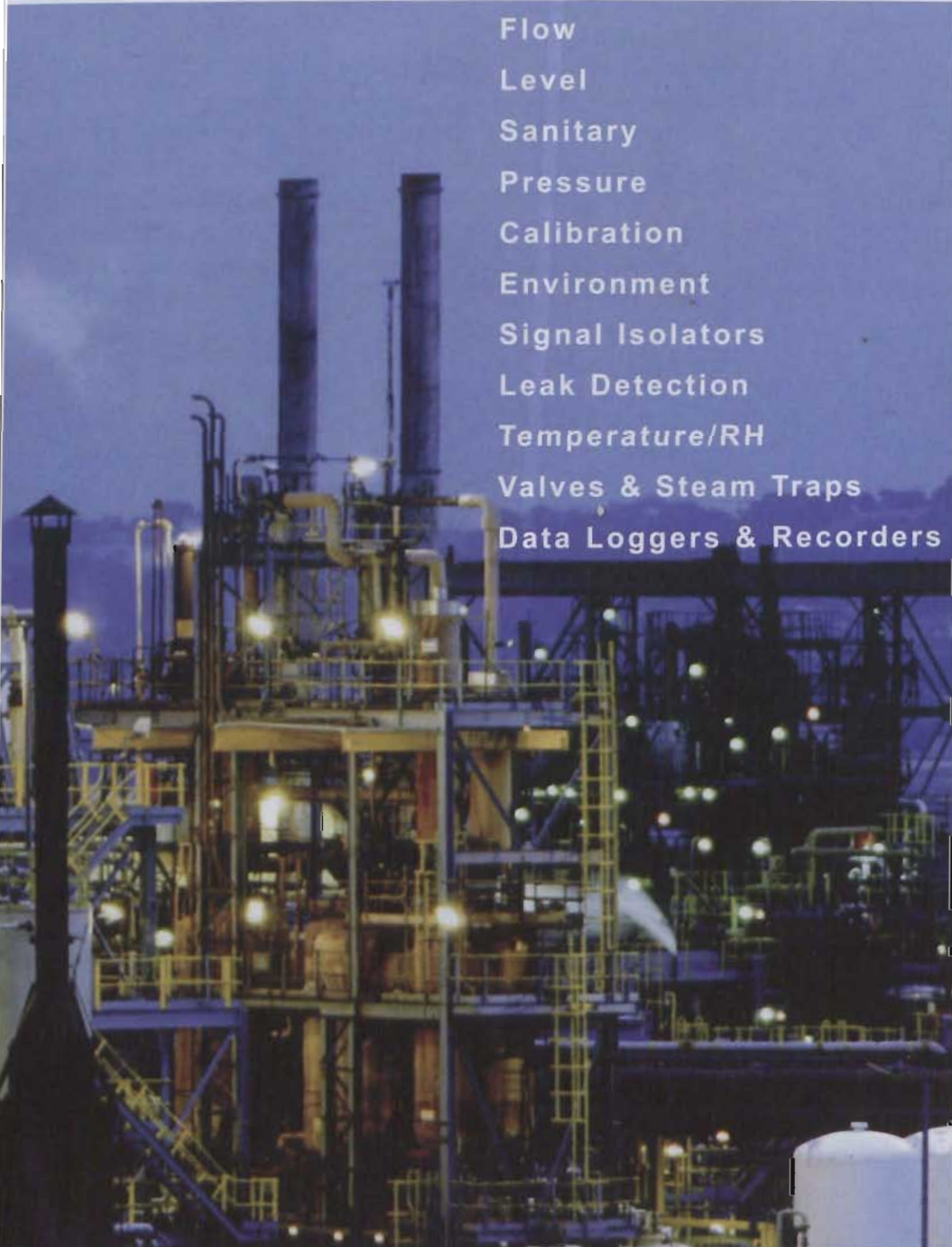


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