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## Irish Building Services News

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# IRISH **building SERVICES** NEWS

INCORPORATING IRISH H&V NEWS

NOVEMBER 1988

DUNDALK WATER PIPE CONTRACT ...

## Implications of Judgement

"THERE WAS much interest in the standards bodies of other Member States in the judgement given in the European Court of Justice on 22 September 1988 in the case brought by the Commission supported by Spain against Ireland related to the Dundalk Water Supply Augmentation contract.

"The contract, which was issued for tender specified pipe certified with the Irish Standard Mark to comply with the requirements of IS 188 and was considered by the Commission to impede the import of pipes from Spain for use in the contract, and to have led to a refusal to accept their pipes made to ISO 160.

"The interest of the standards bodies centered on this latter aspect of the Commission's case and during the proceeding of the case it seemed at one point that a legal interpretation would indicate that the supplier could insist that a product met a public procurement contract by reference to an international standard used to replace the standard in the contract, even when technically different.

"The Court — composed of Lord Mackenzie Stuart (President) and eight judges — accepted the Commission's initial part of their application in that by not stating the pipes must be certified as complying with IS 188 "or equivalent", the contract was restrictive in causing suppliers to refrain from tendering.

However, the Court stated this finding did not relate to compliance with technical

requirements. This is an important ruling for Ireland and other Member States' public authorities to follow in future contracts, and underlines the role of mutual recognition of national standards and harmonisation.

"The fact that the Court ruling considered the complaint did not relate to compliance with the technical requirements and the differences between IS 188 and ISO 160 were irrelevant to the breach of the Treaty of Rome in the contract, has given some relief to NSAI and other CEN standards bodies.

"We interpret this part of the ruling to uphold the right of the purchaser to specify precise requirements in technical terms, such as a national standard, provided equivalent technical

conditions are imposed uniformly throughout the EC.

"NSAI therefore recommends that public procurement contracts in future should be carefully drawn up with reference to national standards, always accompanied by the words "or equivalent". This should lead to an improved definition of the technical requirements, and NSAI is available to advise public authorities on the published standards and their equivalents available.

"The most important point to emerge from the case is that Irish standards along with other national standards still have an important role as reference specifications in public procurement."

E Paterson, NSAI.



• Barlo - Meeting the 1992 Challenge Head On .... Page 14.

## 'Veha' On Stream Shortly

FOLLOWING THE acquisition of Veha plant from the liquidator by the Kingspan Group, plans for a full scale launch of the new company are now at an advanced stage.

Recruitment advertisements for senior managerial positions have already appeared in the newspapers and *Building Services News* understands that discussions are presently taking place with a view to the imminent appointment of a Managing Director and Sales Director.

A major announcement is anticipated early in December. See our radiator feature on page xx.

## Walker/Holland Adjust Agreement

WALKER AIR Conditioning have negotiated with Holland Heating termination of that part of their distributorship agreement which relates to England only, while continuing as sole distributors of their air handling products in Scotland and Ireland.

When the original agreement was reached, there was no conflict of interest with the Carrier range of Air Conditioning equipment for which Walker are sole distributors in Scotland and Ireland.

Now it has become necessary for Walker to adjust their arrangement with Holland Heating in order to honour their long-standing commitment to Carrier, not to compete against them in England's air handling market.


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• IDHE group pictured during the recent visit to Barlo's Clonmel plant.



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## READERSHIP DATA

*Irish Building Services News* (formerly *Irish H&V News*) is Ireland's only *Building Services* magazine providing coverage of the heating, ventilating, air conditioning, refrigeration, sanitary ware, plumbing, maintenance and environmental industries. It is the only publication catering exclusively for these industries and its circulation includes members of the following:

The Institute of Consulting Engineers; The Chartered Institute of Building Services Engineers; The Institute of Domestic Heating Engineers; The Energy Managers' Association; The Institute of Energy; The Institute of Plumbing; The Energy Conservation & District Heating Association; The Mechanical Engineering & Building Services Contracting Association; The Irish Builders' Providers Association; The Association of Consulting Engineers of Ireland; Small Housebuilders' Association; Maintenance Managers' Association. In addition, *Irish Building Services News* circulates to independent building services contractors and key executives in industry, Government, Semi-State and local authority bodies. Essentially, our circulation is virtually saturation coverage of all those with an interest and/or involvement in the industry.

# IRISH BUILDING SERVICES NEWS



• Ray Burke, TD, Minister for Energy, officially opened the new C&F Gas Warm Home Centre at Chapelizod Industrial Estate, Dublin 20 recently. Pictured are John Lynch, Chairman, FAS; Ray Burke, TD, Minister for Energy; John Duignan, Managing Director, C&F Ltd; and Colm McCabe, Dublin Gas.



• John Walsh, Associated Hardware Ltd., Mr. Gerrard McMahon, Calor Teo., Mr. Pat Kennedy, Calor Kosengas and Mr. Bernard Delaney, Associated Hardware Ltd.

## Minister Opens C&F's Centre

THE MINISTER for Energy and Communications, Mr Ray Burke, TD, officially opened the new C&F Gas Warm Home Centre in the Chapelizod Industrial Estate, Dublin, last month.

The Centre will provide an opportunity for the public to inspect a variety of gas appliances, cookers, enclosed fires, open fires and central heating units. It will be open Monday to Friday, 9.30 am to 6 pm and on Saturday from 10 am to 1 pm.

Manufacturers represented in Ireland by C & F include Glow-

producers of central heating boilers in Europe; the Glynwed company, Flavel/Leisure, suppliers of top quality gas cookers and fires; Honeywell, renowned for heating control products; and Rite-Vent Ltd, the pioneer of twin-walled chimneys.

Featured in the new C & F Gas Warm Home Centre are decorative coal effect fires in modern and period surroundings, 'slip-in' cookers and boilers in kitchen units, together with a wide choice of cookers, heating units and gas fires to suit every requirement.

## Areo Feu Launched

AREO FEU of Murcia, Spain introduced their extensive range of fire extinguishers to the Irish market on the Apex Fire stand, during the 2-day Fire Safety & Security exhibition recently.

Areo Feu manufacture a large selection of extinguishers including dry powder, multi-purpose, light water, CO2 and Halon. Apex Fire have already had considerable success with their marketing efforts for the Areo Feu Portable and Mobile Extinguishers. The Dry Powder Stored Pressure and the Halon 1200 models, in addition to Areo Feu's Water and Foam Stored Pressure, the All Purpose and the CO2 are all supplied from Areo Feu's newly appointed Irish Distributor — Apex Fire through their country wide Sales and Service Engineers network.

Apex Fire also showed Cerberus Ltd's fire alarm detector systems and safety equipment. The Irish company has had considerable interest and enquiries for the Cerberus

addressable/conventional fire alarm systems, which they have installed in many commercial premises.

IAS Electronics Ltd are another company represented by Apex Fire who are promoting their fire alarm control panels from single to multi-zone to BS 5839 Part 1 1988. The IAS control panels were also featured on Apex Fire's Stand at the annual Fire Exhibition.

A new product to Apex Fire is the Gas Guard — a self-contained gas detector which, in the event of a gas leak, will sound a loud alarm. The Gas Guard features volt-free contacts for external use.

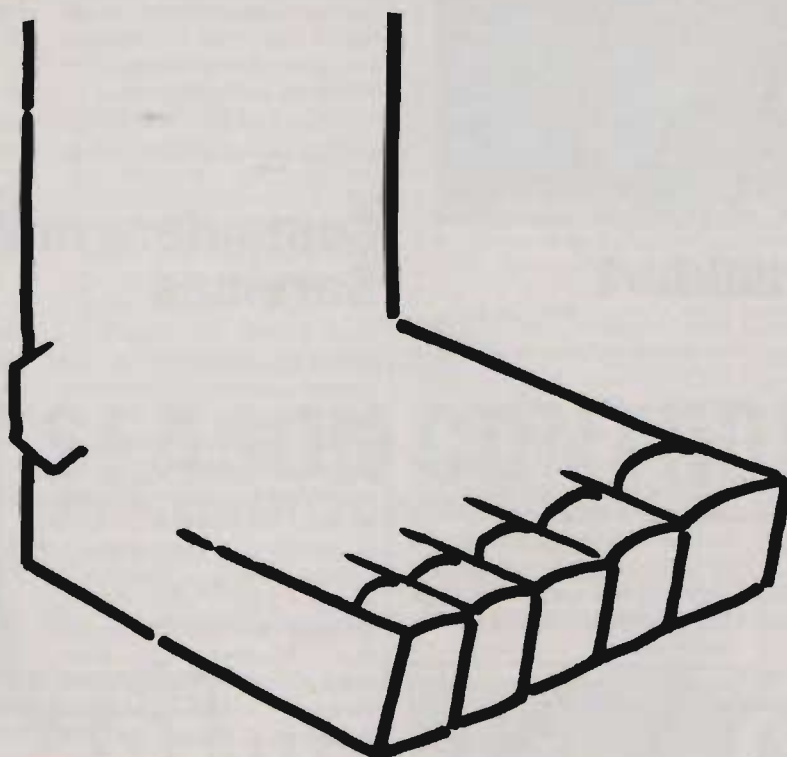
Allied Safety Ltd showed their wide selection of fire extinguishers which are suitable for many domestic, commercial and industrial installations.

Other companies featured included Beadle Protective Clothing; Bristol Uniforms; and Clifford and Snell and Macron Fire.



• Linear actuator range extended — Satchwell's new AL-S linear spring return actuator is the latest addition to an already extensive range of linear actuators designed to fulfil most heating and ventilating applications. It is used, typically, to close a hot water or steam valve.

# WALKER HAS AIR CONDITIONED — MORE — SQUARE FEET...



Remember this ad? Certainly those who have been in business as long as we have will! But it's as valid today as it was back in the Sixties – the market has developed and changed, but Walker Air Conditioning remains Ireland's largest air conditioning supplier and Carrier is still the world's biggest selling brand of air conditioning and refrigeration equipment.

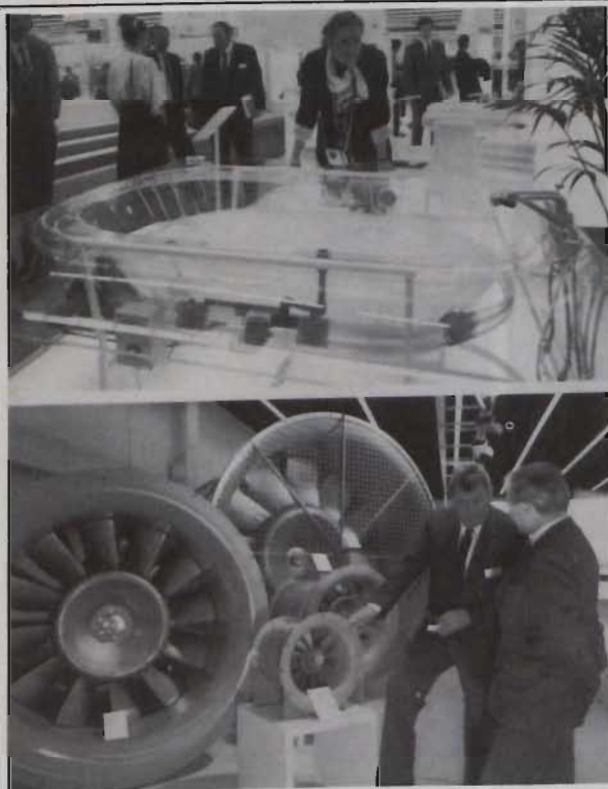
**Carrier**

*Carrier from Walker – Ireland's No. 1 choice – yesterday, today and tomorrow.*



Walker Air Conditioning Ltd Finglas Road Dublin Industrial Estate Dublin 11 Tel: 0001 300844 Tlx: 0500 31359 Fax: 0001 308578  
Walker Air Conditioning Ltd 9A Cherryhill Road Dundonald Belfast BT16 0JH Tel: 02318 5234 Tlx: 747681 Fax: 02318 4852

# IRISH BUILDING SERVICES NEWS



• ISH - International trade fair sanitation, heating, air conditioning.

## ISH '89 in Frankfurt

WITH OVER 1,500 exhibitors on an indoor exhibition area of approximately 200,000 square metres, the 15th ISH — International Trade Fair Sanitation, Heating, Air-conditioning, to be held in Frankfurt from 14 to 18 March — will once again be the biggest specialist event of its kind.

Registrations have already been received from exhibitors in 24 countries; a third of all companies will be coming from outside the Federal Republic of Germany. Leading the way is Italy with 170 direct exhibitors and another 36 additionally represented firms. In second place is Austria with 46 exhibitors, closely followed by Switzerland with 45.

Other major contingents of exhibitors will be coming from Belgium (24 companies); Denmark (36); Finland (17); Great Britain (29); Holland (25) and Spain (11).

A new product group in 1989 will be tiled stoves and air heating with a total area of 2,000 sq m in Hall 6.2. For the first time, manufacturers from the apparatus and tile industries will have the opportunity to present the latest engineering and design advances.

Successfully introduced in

Representatives and Licence Exchange will also be offered to exhibitors and visitors in 1989. Almost 340 exhibitors — approximately every fifth — registered roughly 3,400 items of information in "Compass" — Messe Frankfurt's electronic information system with the aim of finding business partners for production licences and trade representations in other countries.



• Robert Macleod-Smith has been appointed Managing Director of Baltimore Aircoil Ltd based in Corby. He has been with BAC for 14 years and his previous positions include General Manager of European Marketing of Baltimore Aircoil International in Belgium and Managing Director of Baltimore Aircoil Company, South Africa.

## Opportunity Knocks

THE SURVEY conducted by the European trade associations among their national affiliates recently has thrown up a number of interesting findings.

The high response rate (over 120 companies) reveals that the great majority of firms take an optimistic view of Europe, with 78% considering that business should grasp the opportunity offered.

In the order of priorities, harmonisation of standards and rules at European level ranks second (at 88%) behind harmonisation of tax systems. Ninety six per cent think European associations should have a major role in preparing for the harmonisation of standards and rules.

Nearly half the firms (45%),

however, do not consider themselves yet equal to the challenge of a vast common market. The solutions contemplated are: agreements with European associates (66%); and expanding sales capacity (52%).

West Germany, France and Italy were the countries most often cited (58%, 42% and 36% respectively) as likely to draw most benefit from the completion of the Europe-wide market.

The wide-open European market is thought likely to favour co-operation agreements between American and Japanese firms with European businesses, but might also place a brake on imports from those countries.

## Computers in Building Services

THE CIBSE has organised a one-day conference on computers and their application in buildings services.

The conference will deal in particular with the use of computers for drafting, design, project management, word processing and spread sheets.

Contributors are: A.J. Baxter, BSc., MSc., PhD., MCIBSE, Director, Hevacomp; B.A. Sheehan, BE(Chem), MBA, C.Eng., FIEI, MICHEM, Director, VMRA Consulting Engineers; A. Dooley, MCIOB,

MAMM, BSc. Hons., Managing Director, Project Planning Services (UK); P. Condron, BE CEng, MIEI, Partner, Intech Associates; and J. Cuthbert, MCIBSE, Partner, John Cuthbert and Associates.

Venue: Irish Management Institute, Clonard, Sandyford Road, Dublin 14.

Date: Thursday 24 November 1988. (9 am to 5.30 pm. Registration 9 am - 9.30 am).

Fee: £95.00 to include morning coffee, afternoon tea and self-service lunch.

## IDHE Forthcoming Events

DATE	SUBJECT	VENUE
Jan. '89	NE Pipeline New Dublin Gas	Engineers' Club Clyde Road
17th Feb.	Condensing Gas Fire Unit C. & F. Ltd.	Engineers' Club 22 Clyde Road
30th March	CONFERENCE	Burlington Hotel
Apr.	Golf Outing	Assembly details later
25th May	ANNUAL GENERAL MEETING	Engineers' Club 22 Clyde Road



• Pat Byrne, Walker Air Conditioning's new Sales Engineer.



• Anne O'Hanlon, Walker Air Conditioning's new Internal Sales Engineer, who joins the company in their Dublin office to provide additional sales support.

## A New Power in Ventilation

AS PART of a major development programme Vent-Axia has introduced a new range of industrial fans.

The range consists of slim-cased and plate-mounted axial models in seven sizes, with a choice of motor speeds. The unique design of the motor and impeller gives maximum performance in minimum installation space.

Important features such as

standard thermal overload protection (STOP) plus IP55 water and dust protection mean trouble-free running in tough conditions.

Behind every Vent-Axia fan lies a commitment to the most advanced ventilation technology — a tradition of quality and innovation with experience of more than half a century.

These competitively priced fans are now available ex-stock.

## Walker Appointments

TWO NEW sales engineers have joined the Dublin office of Walker Air Conditioning.

Pat Byrne, will strengthen the field sales operation with his wide experience of general building services applications and specialist knowledge of raised access flooring for air conditioning. During his career, Pat has worked with McArdle McSweeney O'Malley as a draughtsman in System Design and as a Projects Engineer with

Enviro for five years. Before that he was with Coolair for eight years.

Anne O'Hanlon will provide additional internal sales support, having gained considerable administrative experience in telephone sales, customer liaison and as Sales Office Manageress for Action Seals Ltd in the UK. Anne joins the Walker sales team from Abbey Seals of Dublin.



• Pictured at the Energy Saving Seminar held recently at the Silver Springs Hotel, Cork were Jim Nolan, R N Murphy & Associates; Patrick J. Mercer, Director & General Manager, Flogas plc; Gerard O'Callaghan, County Architect, Cork County Council; and Pat Hegarty, Flogas Representative, Cork.



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They also have the design expertise to create an efficient radiant heating system, tailor-made for you. That's how Ambi-Rad can achieve savings in excess of 60% on fuel costs. That's why Ambi-Rad are No. 1 to British Industry. If you want radiant tube, look to the leaders, write for the full facts today.

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PLAQUE HEATERS**

An ultra-efficient range of gas fired, ceramic plaque heaters incorporating a host of innovative features, which make Solar Glow perfect for spot heating, high bay and high air change situations. Ambi-Rad Solar Glow is available in four sizes for horizontal or angled mounting with a range output from 6kW (20,000 Btu/hr) to 24kW (80,000 Btu/hr or 40,000 Btu/hr with high/low fire option).

Get the full facts from the No. 1 to British Industry.

Our energy is your power

**AMBI-RAD**  
radiant heating systems



# IRISH BUILDING SERVICES NEWS



• Dermot Murphy, Manager, Chesterton Industries, BV, with Minister for Labour, Bertie Ahearn, TD, and Mary Melia, Quality Control Manager, Chesterton, pictured at the Berkeley Court recently where Chesterton were presented with the prestigious Quality Mark by the Minister on behalf of the Irish Quality Association. The Mark was awarded to the company in recognition of the very high standard of technical achievement at the Dublin 17-based production plant.



• Martin Kearney, newly-appointed Sales Engineer, Turbo Dynamics.

## Turbo Dynamics Appointment

TURBO DYNAMICS Ltd have appointed Martin Kearney as Sales Engineer for the Turbo-Air range of air handling units as manufactured in their Clondalkin works.

These Irish-made air handling units, manufactured in plastic-coated, double-skin, galvanised construction as standard, come in a range of sizes with duties ranging from 0.8m<sup>3</sup>/sec to 18.8m<sup>3</sup>/sec. Special requirements can also be catered for.

Turbo Air hope to continue to provide aesthetically-pleasing, high-quality, reliable units backed up by prompt efficient service, thus satisfying their clients needs completely.

For further details contact 01-571029/571096.

## Cathal Industries Open Plant

A NEW Irish Company, Cathal Industries, has commenced building and assembling a range of Road Suction Sweepers, Refuse Collection Vehicles and Ancillary Equipment at their factory in Ballyfermot, Dublin 10.

Cathal Industries began building these vehicles for the

municipal services market earlier this year and have just completed an exhibition in Dublin, Cork and Galway, where these were demonstrated to Councils and Corporations by a team of trained operators.

This company also looks after the Irish interests of Whale Tankers Ltd who manufacture

Jetters and gully emptying tankers.

David P McConnell is General Manager of Cathal Industries where presently 10 are employed. However, this is scheduled to increase to 40 over a planned 3-year expansion.

Cathal Industries is part of the Colin Draycott Group which is backing the newly-formed Irish firm. Fully trained operators, in addition to service engineers, professional maintenance service and spare parts back up are all supplied by the Dublin-based company.

## World Plumbing Event

THE 2ND World Plumbing Conference and Exhibition will be held in the City of London's Barbican Centre between 28 May and 2 June 1990.

With the disappearance of national trading barriers occurring on a world-wide basis and the commercial implications of these developments due to manifest themselves in Europe in 1992, the value and importance of this World Plumbing Conference and exhibition will be of great significance to delegates and visitors from the plumbing

trades and industries throughout the world.

The six-day Conference will include a variety of technical workshops and social events culminating in a Gala Dinner Dance and firework display near Tower Bridge.

An exhibition of plumbing products to be arranged by Exhibitions and Presentations Ltd will run in parallel with the Conference. Worldwide travel and ground arrangements will be handled by Quo Vadis Travel Group.

## John Houghton

Because of a typographical error in the Building Services Buyer Guide, John Houghton Engineering were listed incorrectly.

As agents for Alpha-Laval Riedel GmbH water and liquid chillers, John Houghton Engineering, Killinane, Kilcullen, Co. Kildare. (Tel: 045-85242; Fax: 045-85242), should have appeared under the Refrigeration & Air Conditioning Sections.



Over the past ten years, Grant Engineering have built themselves a solid reputation for building superbly efficient solid fuel back boilers.

What's more, for the past four years Grant's have earned an equally dependable reputation for producing a range of highly efficient oil-fired boilers to help you weather the winter in more comfort for less cost.

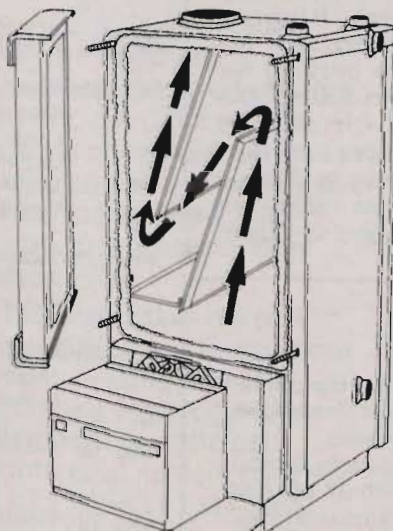
Based on a patented design principle featuring the unique Triple Pass system, Grant oil-fired boilers actually boast an increased boiler surface area to help you get more heat from your boiler.

And more heat for your money.

And Grant oil-fired boilers are so versatile they can

be installed anywhere: indoors, outdoors or in a boiler house with extreme ease of servicing by removability of front doors.

With a new all time high in efficiency and economy, no wonder more and more homes are warming to Grant oil-fired boilers.



Cleaning Door removed to show how efficiency is achieved from Triple Pass System.

**GRANT**  
OIL-FIRED BOILERS

EFFICIENCY AND ECONOMY  
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# NEWS

## Presidential Address

A repeat performance of his London Presidential Address was given by Mr Derek Thornley in the Institute of Engineers of Ireland, Dublin.

Titled "Family Album", the paper addressed itself to what he termed the various families which co-exist in CIBSE affairs. Firstly, he spoke of the involvement of his own family — his grandfather was proprietor of a small firm of heating contractors in Lancashire and his father was an associate of the I.H.V.E.

He then devoted time to the family of his working life. The firm of consulting engineers of which he is now a partner has played a significant role in the affairs of CIBSE. Five presidents have been fielded by the practice, so he took the opportunity of outlining the role his predecessors had played in the development of the Institution since 1928.

Finally, he dealt with the family of disciplines catered for by the CIBSE and the new emerging disciplines which are assuming increasing importance.

The paper was presented in a very interesting fashion

with the aid of a dual slide presentation, ably handled by Michael Buckley and Oliver Reddy. Mr Thornley's presidential address was the first given to the Branch for many years. It was thoroughly enjoyed by those attending.

## Bolton Street Visit

CIBSE President, Deryck Thornley, payed the traditional Annual Presidential Visit to the College of Science and Technology during his stay in Dublin. He addressed the biggest gathering of Building Services Students ever recorded for such a visit and told them how impressed he was with their College and the facilities available to them.

He also presented the Walker Air Conditioning Students Prizes. Raymond Quinn was awarded the degree course prize for his first place in graduating. The Technician Diploma in Building Services Engineering Award went to Padraic McGinn and the Technician Certificate Award to Ciaran O'Connor.

## Golf News

One hundred and eighty five were seated for the dinner following the Annual Golf Outing and Ladies Evening at Hermitage. This was considerably up on last year.

The weather smiled on the golfers, particularly Eamon O'Brien who won the H.A. O'Neill Cup with 37 pts and Eamon McGrattan (37 pts), winner of the Chairman's Prize.

Eddie Egan and Gerry Baker assisted event organiser Michael Curley. Unfortunately, we got no photographs as our resident photographer was indisposed.



• President Mr Deryck Thornley being greeted on the steps of the Institution of Engineers of Ireland by Republic of Ireland Branch Chairman, P.J. Doyle and his welcoming party — Eoin Kenny; Larry Kane; Bob Jacob; Michael Buckley; and Oliver Reddy.



• Michael Buckley and President Deryck Thornley with Walker Award Winners — Padraic McGinn and Ciaran O'Connor.



• Group Bolton St Visit: George O'Neill with Michael Murphy, Vice-President, Bolton St.; Ray Clinton; Michael Buckley; Oliver McNulty, Principal Environmental Engineering; President, Deryck Thornley; P J Doyle, Chairman; Oliver Reddy; and Eoin Kenny.

## Forthcoming CIBSE Events

DATE	EVENT	VENUE
Nov. 4th	Republic of Ireland Branch Annual Dance — Guest of Honour Dr Sean McCarthy, Minister for Science and Technology	Riverside Centre, Sir John Rogerson Quay, Dublin.
Nov. 17th	Technical Evening "Professional Computer Aided Lighting Design"	I.E.I., Clyde Road, Dublin 4
Nov. 24th	Full Day Seminar "Application of Computers to Building Services"	I.M.I., Sandymount, Co Dublin.
Dec. 1st	Technical Evening	Murphy's Brewery, Cork.
Dec. 9th	Celebrity Lunch — Guest of Honour Prof. Jack Torrance	Deerpark, Clonskeagh, Dublin 14.

<https://arrow.tudublin.ie/bsn/vol27/iss8/1>  
DOI: 10.21427/D7913G

# Electricity. Top of the list when you're talking shop.



In more and more ways, in large shops and small shops alike, electricity is proving invaluable. It's safe, clean, convenient, controllable. It's the power behind the latest refrigerated cabinets, waterheaters, cheerful lighting and a warm inviting atmosphere - all important for sales.

And while the ways in which electricity can help shopkeepers increases, its cost is actually reducing. Take electric heating for

instance. A typical system using the night-rate (providing electricity at less than one-third the normal price) is cheap and easy to install - and very cost effective to run. In fact night-rate electricity is cheaper now than in 1982.

And that makes it a real bargain! Find out more about electric heating now, by contacting your local ESB Office or phone the ESB Commercial Advisory Service at (01) 765831 Ext. 7265.

Or fill in the coupon.  
Electricity. The power to do it all.

Please send me information on:

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- Heat Pumps  Over Door Heaters

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E L E C T R I C I T Y B R I N G S L I V I N G T O L I F E

## Home Comfort Controls

LANDIS & GYR, one of the leading and longest established manufacturers of heating, ventilating and air conditioning controls, now produce an extensive range of domestic heating controls.

Chosen as the "best buy" by a leading consumer magazine recently, the Microgyr RWB20 electronic, microprocessor-based weekly controller can be programmed to switch heating and hot water systems on and off for up to three times a day and at different times for each day of the week.

The battery powered Microgyr overcomes the problems of power cuts and blown fuses and, in the event of power surges, will not lose its pre-set programme as would a conventional unit.

RWB2, like the Microgyr, is suitable for any domestic programming situation and has a facility for up to 16 different programmes to be selected, depending on the type of heating

system. It is easy to set with sliding switches for different operating periods and has the option of manual over-ride.

Landis & Gyr's RWB30 timeswitch is designed to operate a single circuit once or twice a day. Operating periods are set on a 24-hour dial with easily adjusted tappets. An over-ride selector switch allows manual control.

The company's two motorised valves are the SK2L, two-port and the SK3L, three port. Sk2L valves are designed for radiator zone control and HWS schemes while SK3L valves are designed for mid-position applications and are used to control heating and hot water systems simultaneously without the need for a separate relay.

The motor can be fitted to, or removed from, the valve body without disconnecting the valve from the pipework. Both types are spring return and fitted with a lever to allow for manual over-

ride. An auxiliary switch is also fitted as standard for control of a pump, if required.

Brochure and further details available from ABB, Asea

Brown Boveri Ltd, Whitestown Industrial Estate, Tallaght, Dublin 24. Tel: 01-522622; Telex: 93681; Fax: 01-522985.



• Landis & Gyr's Microgyr RWB20 .... from ABB ASEA Brown Boveri.

## Servo Motors

PRINTED MOTORS Ltd has issued a new eight-page colour brochure providing specifications for their full range of servo motors, including pancake types. PML is a Pilgrim House

Group Company.

Details from Printed Motors Ltd, Bardon Trading Estate, Oathanger Road, Bardon, Hants, GW3S 9HY. Tel: 04203 3033; Fax: 04203 7640.



## THE IDEAL STELRAD RANGE OF GAS BOILERS

**Ideal Mexico**  
Floor Standing  
R/S or C/F for  
Natural Gas or  
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**Ideal W2000**  
Wall Hung Cast  
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**Ideal Elan 2**  
Light-weight Wall  
Hung R/S & C/F  
Fanned.



6-8 Richmond Avenue, Fairview, Dublin 3. Tel: (01) 376076. Telex: 33587.



## ● Noise Control

*NOISE CONTROL in Building Services* is the latest publication in a series of books on acoustics from Sound Research Laboratories Ltd.

This single volume provides a reference source for architects, building services consultants and contractors, product manufacturers and students of applied acoustics.

The book has been written by senior SRL staff, all of whom are directly involved in noise and vibration consultancy projects, including design and remedial work in the building services sector. Collectively, they have

over 150 years of practical experience.

*Noise Control in Building Services* comprises 500 pages with the 14 chapters ranging from fundamental acoustic theory to complex practical applications. The comprehensive text is supported by tables, graphs, line drawings and photographs.

Further details from Mrs D.A. Pearce, Sound Research Laboratories Ltd, The Coach House, 49 East Street, Colchester, Essex, CO1 2TG, England. Tel: (0206) 870025; Fax: (0206) 866393.

## ● Brassware From Shires

THE introduction of three additional brands of brassware is a major move by Shires towards becoming a significant supplier of taps and mixers for both bathrooms and kitchens. The new products and the established Da Vinci brand are each aimed at separate sectors of the market. Together, they provide a comprehensive range to suit every application.

**Discus** — This is an advanced range of taps and mixers. They incorporate ceramic discs for minimum maintenance and non-drip characteristics. Discus will be available in Diamond White as well as Chrome and Venetian Gold.

**Medici** — A range that is very competitively priced; incorporating traditional valves and manufactured to BS 5412. An ideal choice of fittings for

merchants, retailers and private developers, Medici combines attractive appearance with a high-quality finish.

**Choice of heads** — Discus and Medici fittings are supplied without heads. These come cartoned in pairs in a variety of finishes — chrome, venetian gold and diamond white — and there are more to follow.

**Cross head range** — Also launched is a range of cross head pillar taps for basins, bath and kitchen called Excel. Attractively styled, competitively priced and manufactured to BS5412, Excel will have maximum appeal in the contract market.

For further information contact Kevin Sullivan or Adrienne Mulloy, Shires Ireland Ltd. Tel: 01-515877; Telex: 31337; Fax: 515534.

## Heating Controls

THE OMNITROL heating system controller and mini-management system, designed for LPHW and steam duties up to 32 bar at 220°C, is just one of the units featured in the new BSS Honeywell HVAC Controls catalogue.

The Omnitrol series of microprocessor controllers are designed to control LPHW heating systems combining an outside temperature compensated flow control system with optimised start/stop and HWS control.

Able to act as a stand-alone controller, the Omnitrol W7032 series can also be expanded into a mini management system by the addition of modular

accessories.

The W7032A provides outside temperature compensated boiler and mixing valve control. Compensation can be available as well as automatic BST/GMT hour changes, 3-stage frost protection, DHWS control linked to boiler operation, programmable pump overrun and 7-day battery back up.

Extra features including two-boiler sequence control, second auxiliary output and separate DHWS control can also be obtained.

Available from BSS Ireland Ltd, White Heather Industrial Estate, 301 South Circular Road, Dublin 8. Tel: 541966.



● New range of Fernox cleaners from Hevac.

## Fernox Cleaners

AN UPGRADED range of central heating cleansers has now become available from Fernox.

Called Fernox DS-40, the new cleanser and descaler completely dissolves iron oxide sludge and lime scale in a system. It is a powder product manufacturer with foodgrade acids.

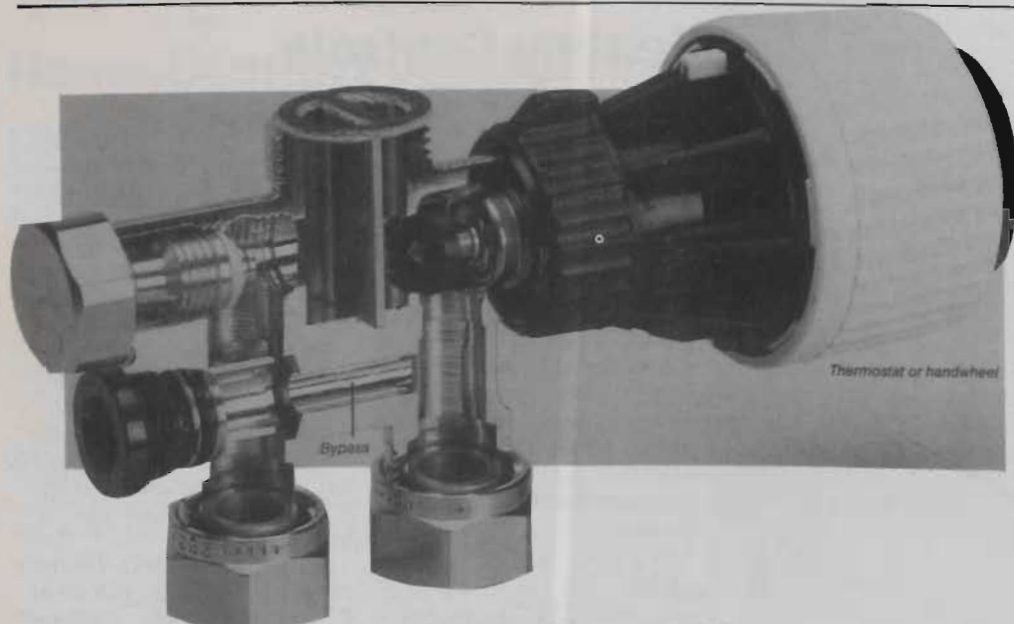
Fernox DS-40 provides considerable flexibility in use, as cleansing can be undertaken over any period between 2 and 10 days on the normal heating

cycle to suit both the heating engineer and the customer.

The whole operation can be achieved with one cleanse, although with a very badly sludged system a short 2-hour preliminary cleanse can be undertaken to clear the worst of the debris. It is fully corrosion inhibited and so will not attack the solid metal.

Details from Hevac Ltd, 70/72 Lower Dorset Street, Dublin 1. Tel: 301211; Telex: 32104; Fax: 301990.

## NEW PRODUCTS & LITERATURE



• The TKM valve is a vital component in the TKM Heating System from HeatOvent.

### TKM Heating System

THE SWEDISH-manufactured TKM System is a hot water (hydronic) heating system which is suitable for use with all sources of energy — oil, gas, solid fuel, solar energy, hot water systems, indirect electric heating, heat pumps and district heating.

It is claimed to reduce installation and building costs while also providing a balanced

hot water heating system with lower use of energy.

The TKM System can be used and is perfectly suitable for all types of buildings, including the small family home, for flats, offices, hospitals and commercial buildings.

A vital component is the TKM valve. It has very low noise and pressure drop values. A valve can be shut off to isolate a

radiator and the flow and return are interchangeable, regardless of the direction of flow in the pipe. Hence a valve can never be mounted incorrectly. Furthermore, the TKM valves do not require any service or maintenance.

Full details from HeatOvent Ltd, HeatOvent House, Mount Argus Road, Harolds Cross, Dublin 6, (Tel: 975562).

### Boulter's Optional Extra

SALES LITERATURE providing a full technical specification for the new Deluxe control panel offered as an optional extra on Camray 2 domestic oil-fired boilers is now available from Boulter Boilers Ltd. The panel provides a complete integral programmer, which is pre-wired for simple on-site installation.

In A4, four-colour format, the leaflet gives a general description of the panel and details each component function. This includes timeswitch, rocker switches, neon illumination and boiler control thermostat.

Also included is a brief outline on installation method, wiring to the panel and supply details.

Full-colour photographs are used throughout the leaflet to illustrate the panel in-situ on the boiler; a close-up view of the panel; wiring to the panel.

Supplies of the new literature are freely available from Boulter Boilers Ltd, Meteor Close, Norwich Airport Ind. Est., Norwich NR6 6HG.

### Determining Flow Capacity

A NEW edition of the Clay Pipe Development Association's well-known flow design tables booklet has been produced.

It takes into account the most recently-published information on design values for the roughness of pipelines from a range of code of practice and specification sources. An increased number of tables is now available to the designer, which will enable fuller use of proportional velocity and discharge values for pipes running part full.

Copies are available free of charge from C.E.G. Bland, Director of Engineering Services, Clay Pipe Development Association Ltd, Drayton House, 30 Gordon Street, London, W1H 0AN.

### Kiloheat Extract Units

KILOHEAT HAS published a new A4 sized full colour brochure detailing its range of Genovent roof extract units.

Fully illustrated in colour and black and white, the 10-page publication describes the new technical and design features incorporated throughout the range and includes a full technical specification for each model.

The modular nature of Genovent, which allows easy installation and maintenance, is depicted on the centre pages together with photographs highlighting important features such as weatherproof discharge shutters, safety guards, sealed base frame corners and anti-vibration mountings.

The new brochure also includes a full page of technical data, including the dimensions of each unit, a performance curve, a list of accessories and a



• A new brochure on the range of Genovent roof extract units is now available from Kiloheat Ltd.

brief description of the other models available in Kiloheat's range of fans and roof units.

Copies of the new brochure, headed "Genovent Roof

Extract Units" are available from: Kiloheat Ltd, Enterprise Way, Edenbridge, Kent TN8 6HF. Tel: 0732 866000. Fax: 0732 866370. Telex 95406.

# NEW PRODUCTS & LITERATURE

## Valve Literature

TWO LEAFLETS on quarter-turn valves are the latest additions to Bestobell Valve & Steam Products' range of literature. The first leaflet describes the Bestobell JHP butterfly valve.

The JHP is lighter, more compact and less expensive than equivalent globe and gate valves and is particularly recommended for zone control of steam systems.

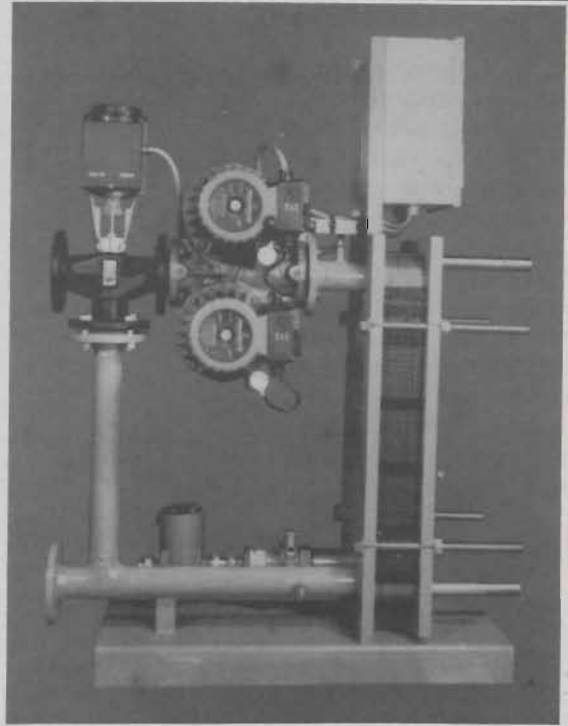
Design features, performance data, installation and maintenance instructions, dimensions and actuator

options are all described and illustrated.

Subject of the second leaflet is Bestobell's three-piece ball valve, available with a carbon steel or stainless steel body, or all-stainless for corrosive atmospheres.

The leaflet provides full technical data, including pressure/temperature ratings and a full, illustrated listing of components.

Copies from Bestobell Valve & Steam Products, Greasbrough Road, Rotherham S60 1RE, England. Tel: 0709 828180.



• The new alphaserm instantaneous hot water generator from AEL Ltd.

## Hot Toaster

WHEN REPLACING coal fires with a gas-fired unit, the Hot Toaster from Taney offers distinct advantages. The three main points to consider are: (A) The Hot Toaster has a unique one-piece fibre back which produces a warm red glow at the back and sides of the fire. It also

has a unique patented twin burner which produces a most realistic glowing coal effect fire; (B) The Hot Toaster delivers 3 Kilowatt of heat;

(C) Because of the Hot Toaster's design, it is claimed to be twice as efficient as a coal fire or any other decorative flame effect fire. Furthermore, it is the first living flame gas fire with guaranteed running costs to be

approved by the British Standards Institute.

The Hot Toaster also has Piezo ignition, flame failure device fitted as standard and comes complete with black fire

front and brass trim.

Full details from Taney Distributors Ltd, Unit 4, Riverside Industrial Estate, Bluebell Avenue, Dublin 12, (Tel: 508120/520436).

# Park Heating Appliances Ltd.



SUPPLIERS OF CENTRAL HEATING EQUIPMENT

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Glow  worm

**MYSON**

**e.l.m. leblanc**

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Oil and Solid Fuel Boilers

**Grant**

Oil and Solid Fuel Boilers

# Park Heating Appliances Ltd.



Chapelizod, Dublin 20. Telephone 265711. Fax 267863. Telex 93709.





• Charles J Wheeler, Managing Director, Barlo Heating Ltd.

## Barlo — Meeting the 1992 Challenge Head On

While Government Ministries, industry representative bodies and economic advisors are fully engaged at present in exhorting Irish industry to prepare itself for 1992, one company — Barlo Heating Ltd — is already halfway through a planned action programme which will see it emerge as a major European manufacturing force in the coming years.

Since the initial success of its first manufacturing venture in Clonmel in 1965, Barlo has always been an outward-looking, progressive company. Originally production was intended for the Irish market but, encouraged by the completion of a number of contracts for British Local Authorities, it was decided in 1972 to establish a UK distribution subsidiary called Barlo Radiators Ltd which was subsequently renamed Barlo Products.

At the same time Barlo Sales was established in Ireland to co-ordinate all export sales to the UK with Barlo Group Ltd being incorporated on 30th March, 1973.

For a time Barlo included a Division which soled farm machinery but, in 1981, the Group decided to concentrate solely on heating products and therefore took the decision to

dispose of this Division which it did in the same year.

But overall growth continued unabated. In July 1985 a Bristol-based designer and distributor of industrial and domestic control equipment called Coppas was acquired with a company called Halstead, which had been a supplier of domestic gas-fired boilers to the Group, being acquired in 1987. Between the two, purchase price expenditure was nearly **£1,700,000**.

In February of this year Barlo raised an additional **£2.63** million by way of a private placing with the Group Directors indicating at the time that a full Stock Exchange listing would be sought in the Autumn. As readers are aware, this has subsequently come about with the Barlo Group Ltd being re-registered as a public company on 22 August last.

Essentially, the Group represents a holding company incorporating six wholly-owned subsidiaries — Barlo Heating, Barlo Sales, Barlo Industrial Products, Barlo Products, Coppas and Halstead. Between them they manufacture and market a diverse range of central heating radiators, domestic gas-fired boilers, heating accessories and controls.



● P Murray with Charles J Wheeler, M.D., Barlo Heating Ltd; Paul Fox and Jimmy Farrell.



● Leo McCooe, Sales Manager, Barlo Heating Ltd, with Bill Penrice, Gerry Griffin and Raph Connery, Marketing Manager, Barlo Heating Ltd.

Actual production centres on two principal plants, the facility in Clonmel which has been substantially upgraded to meet increasing demands and the newly-developed facility at Leigh in Manchester which is presently undergoing minor production runs with a view to full output commencing in the New Year.

Both the upgrading in Clonmel and the coming on steam of the Leigh plant led to a degree of controversy recently but now all problems have been laid to rest with the contentious issues being resolved. Over 90% of the Clonmel output is exported to the UK with the remainder being distributed throughout Ireland. Overall, UK sales account for 91% of Group sales.

The upgrading of the Clonmel facility involved a major capital investment programme with the factory been totally re-organised, a new paint plant being installed and additional warehouse space being constructed. The cost involved was a little over £3 million. Furthermore, other plant improvements costing £0.5 million have been approved.

However, the rate of market expansion in the UK is so great that the Group, having conducted a comprehensive review of its manufacturing strategy, concluded that the long-term interests of Barlo would be best served by the establishment of a radiator manufacturing facility in the UK. Hence the plant at Leigh.

Total investment in the Leigh complex will be in the region of St£7 million with over 170,000 sq ft of covered factory and warehouse space being provided on the 7.6 acre site.

Leigh will act as the Group's northern distribution centre in the UK with finished products also being despatched to the other central distribution warehouses in Dublin, Crawley and Susses and Dunstable in Bedfordshire.

The boilers as manufactured by Halstead in Braintree in Essex are similarly distributed. Halstead has already designed and developed the Barlo Balmoral and Blenheim range of gas-fired domestic boilers with a new range of balanced flue gas boilers scheduled to come on stream shortly. The new Barlo Duo gas-fired combination boiler is also about to be launched.

Coppas has offices and a warehouse at Bristol and a manufacturing facility at Willenhall near Birmingham. It provides a comprehensive design and supply

service for heating, lighting, ventilation and air conditioning control systems for commercial and industrial customers. It designs and builds complete control systems including panels, plant switchgear and associated equipment.

Coppas also provides installation, commissioning and maintenance services and acts as a distributor for leading equipment manufacturers.

As for the Barlo Products' product portfolio — in addition to radiators and boilers — included are thermostatic and motorised valves; brass compression fittings and accessories; pipe insulation; room thermostats; electronic programmers and cylinder thermostats.

For the future, Barlo is committed to continuous improvement in the design and quality of its products and production techniques. Additionally, the quality control of finished products and the manufacturing standards will be maintained to meet the stringent Kitemark requirements.

All in all, the newly-revamped and reorganised package from Barlo not only strengthens its standing in Ireland and the UK, but provides a secure base point from which to make its assault on mainland Europe.



• Part of the extensive warehousing facilities at Clonmel.

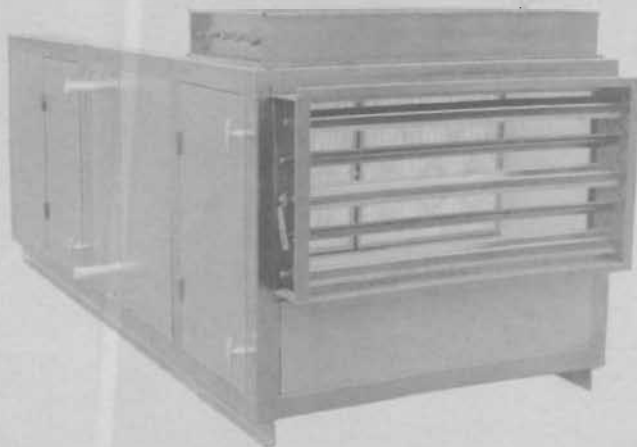
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from

# TURBO-AIR

### Construction Features

- Heavy duty pentapost mainframe
- All double skin construction with high density polyurethane insulation
- Standard sizes of enclosure panels specially constructed to give increased rigidity
- Doors are fitted with lockable T handle with heavy duty cam lock device.
- Easy access to all internal parts.



### Advantages of TURBO-AIR

- Attractively finished quality units
- Competitive pricing structure
- Plastic coated panels inside and outside gives a tough scratch resistant surface which is easily cleaned
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- High efficiency fan selection yields low noise and vibration levels
- Alternative dimensions can be supplied to suit awkward plantrooms
- Off-the-shelf standard renewable parts
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For further information or catalogue contact:

**TURBO DYNAMICS LTD.,**  
Unit 2, Clondalkin Industrial Estate, Dublin 22.  
Telephone 571029/571096 Telex 32875 Fax 574255

# BTU GOLF

## Westport Winners Results — ABB

1st Tom Scott (H19) 37 pts, back nine; 2nd Aubrey Moriarity (H6) 36 pts, last three; 3rd John Lavelle (H12) 36 pts; 4th Jerry Baker (H10) 36 pts, 5th George Carlton (H17) 35 pts, last three. Back Nine — Tony Gillen (H12) 19 pts. Front Nine Eddie Egan (H16) 19 pts.

### LADIES

1st Bridget Delaney (H19) 31 pts; 2nd Nora McDonagh (H27) 27 pts; 3rd Ursula Carlton (H36) 26 pts.

## Westport Sunday — Mixed Foursome

Aubrey Moriarity, M. McDonagh, Marie Lavelle, Ursula Carlton — 24 $\frac{3}{4}$  strokes; D. Prendergast, Tony O'Leary, G. Evans, Lillian Baker — 28 $\frac{1}{8}$  strokes; E. Egan, T. Delaney, Bridget Delaney, S. Scott — 27 $\frac{1}{4}$  strokes.

## Lister Tubes Hermitage

Winner — Dave Meaney 39 pts (H11).  
Class I — Des Prendergast 35 pts (H11); Michael Wise 34 pts (H9); Michael Matthews 33 pts (H7).  
Class II — John Lawlor S/H 36 pts (H14); Brendan Sheehan 34 pts (H12); Tony Gillen S/H 33 pts (H12).  
Class III — Leo Lynch 37 pts (H24); David Sampson 33 pts (H20); John White S/H 33 pts (H18).  
Back Nine — Liam Stenson 19 pts; Shay Keamey 18 pts.  
Front Nine — George Carlton 19 pts; Sean Farrell 18 pts.

### Visitors

1st Michael McLoughlin 39 pts (H9); 2nd Gerry Branriogan 37 pts (H16).



• BTU Westport: Tom Scott, overall winner being congratulated by Michael Murphy, ASEA Brown Boveri, the sponsors.



• BTU Westport: John Lavelle, BTU Captain with Michael Murphy, ASEA Brown Boveri and Gerry Baker.



• BTU Westport: John Lavelle, BTU Captain, with Michael Murphy, ASEA Brown Boveri, and Tony Gillen.

Radiators ... Radiators ... Radiators ... Radiators ... Radiators

# The Commercial Industrial Scenario



• Customised radiators means that no pipework or fittings need be visible.

The radiator heating system whether fuelled by gas, oil or solid fuel is still by far the most popular form of heating on the market today. It's only real competitor, particularly in the commercial sector, is air conditioning which, while it is necessary for certain buildings because of their location and function, is more expensive to install and to run, writes Pat Keane of Runtalrad.

Despite, or maybe because of, its popularity in the marketplace and the inevitable competition between manufacturers, the radiator as most people know it has developed very slowly over the years, except in areas of production technology, particularly in relation to mass production.

As buildings become streamlined and more emphasis is placed on the working environment, the requirement now is for the integration of the central heating system into the overall design of the building.

A radiator is one of the only visible parts of a heating system and should be designed and updated as would an item of furniture. It should also be flexible enough to take account of special architectural details.

designs to acknowledge this concept had led to a generally negative attitude towards radiators as "a necessary evil" or "something to be kept out of sight".

The main considerations of the designer when selecting radiators for an area should be: (1) Output — ability to do the required job, (2) Can it be integrated into the room design? (3) Can it satisfy special requirements related to use or design of the building, and (4) Cost and value for money.

It is clear that no standard "off the shelf" radiator can satisfy all requirements and hence the development and increasing popularity of "Custom Built" radiators over recent years.

Radiators can be custom

built to satisfy almost any requirement.

A few examples of what can be achieved are:

— There is a growing tendency among architects to conceal all pipework and fittings and radiators have been customised to accommodate this trend. However, to meet this requirement, architects, consulting engineers and manufacturers must work hand in hand.

— The pipework must be concealed behind wall panels or under flooring and must only reappear through the wall behind the radiator, where it is linked up to the radiator using flexible connections.

The radiator has an integrated control valve at hand level. Result: Very cleanline

system — no pipework or fittings visible. Radiators are also available with integrated floor mounting feet which conceal valves and pipework behind the feet.

— The low surface temperature panel was designed to meet the UK Department of Health and Social Services guidelines on safe temperature for heated surfaces in Health Care Buildings.

The guidelines recommend a maximum average temperature of 43°C in geriatric, mentally ill, mentally handicapped and paediatric areas.

This means that either flow temperatures must be reduced, the consequences of which would be a significant increase in the size of equipment used, i.e. larger radiators, pipework, etc; or, that the hot surfaces must be protected.

Low surface temperature panels are available which, when used in conjunction with convectors, result in no reduction in efficiency and permit use of normal flow and return temperatures while generating maximum touch temperature of 40°C.

These LST panels can also conceal pipework and fittings, eliminating the need for heavy protective lagging of pipes.

The LST panel's wall to wall facility and its ability to conceal pipework has made it very suitable for use in Cill-line heating applications. It is also much more robust than the traditional Cill-line heating system.

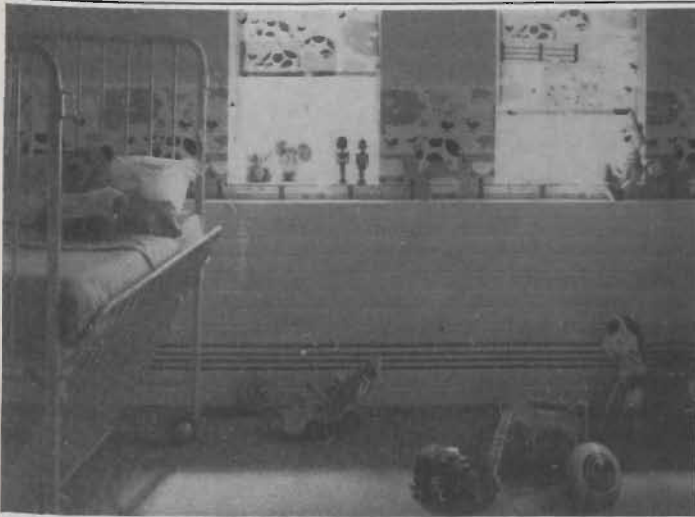
— It is possible to put special "see through" column radiators in front of full height glazing without diminishing the original architectural concept. In fact, the column radiator actually adds to the impact of architectural features.

— The column radiator can also be used as a room divider creating a feature in itself.

— If horizontal space is severely limited, radiators can run vertically, thereby providing the required heat and eliminating

Some examples of special requirements mentioned in (3) above would be:

Use of Building/Room	Special Requirement
Operating Theatre	Hygiene — radiator must be easily cleaned.
Geriatric/Paediatric ward	Conceal hot surfaces from patients.
Psychiatric ward/prison	Robustness, security of fixing.
Modern office building	Integration with modern furniture systems.



• With pipework and fittings concealed, the need for heavy protective lagging is often eliminated.

the need to use bulky double or treble panel radiators and provides the designer with another opportunity to make a feature of the radiator if desired.

It is also worthy of note that all of this can be achieved without any loss in efficiency.

It is not hard to see why the demand for the custom-built radiator has grown so dramatically in recent times and will continue to grow as these radiators are now

available to all sectors of the market, from the hospital and office block to the domestic dwelling.

It is also very clear that good communication between consulting engineers, architects and manufacturers has played a major role in the more recent innovations in radiator development.

We would hope that with further cementing of relationships between designer

and manufacturer — and a commitment towards research and development on the part of manufacturers — we will see significant developments in radiator design emerge more rapidly in the future.

## The Domestic Scenario

Most of what has already been said in relation to the commercial/domestic sector also holds true for the domestic radiator market.

This is particularly so in relation to purpose-designed units which are intended for specific usage. Indeed, with the choice and variety of domestic radiators presently on the market, there is something to suit every domestic situation, no matter how big or small the home. However, what's important is that the contractor marries up the correct type of radiator (a) to the boiler and (b) to provide the most cost-

effective heating given the intended home usage.

Presently the market for domestic radiators is undergoing a very healthy period with the level of new central heating installations rising dramatically from month to month.

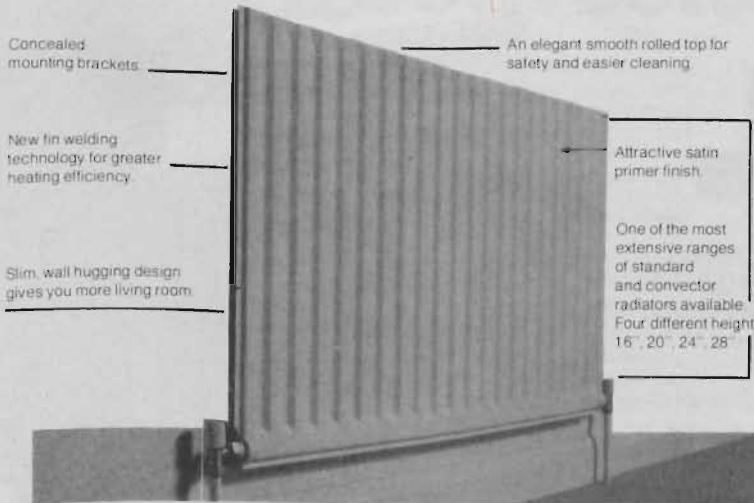
Dublin Gas is conducting more installations than ever with those operating outside of the DG Panel conducting as many new installations again, covering all types of fuel types.

The net result is a very healthy demand for domestic radiators, a fact reflected by the growing number of brands now represented on the marketplace. There are reportedly over 20 different brands to choose from at present.

For the overall size of the market this may seem like a lot, and indeed perhaps it is, but such an extensive choice makes it possible for the installing contractor to offer the consumer a tailor-made heating system. Such a situation can only serve to enhance the overall perception of the domestic heating sector.

# SUPERPLUS

## High-Output Convectector/Radiators



**Slim,  
Wall-Hugging  
Design**

**Stocked by  
all leading  
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**Quality heating products with style**

**Contact: BARLO HEATING LTD.**

Long Mile Road, Dublin 12.

Phone (01) 501399. Clonmel (052) 22822.

## Heating by Sun

No, this is not to do with solar heating, but rather the range of radiators imported from Belgium by Terence O'Connor and distributed throughout the whole of Ireland through a network of appointed outlets.

Branded Sun, these radiators are made from welded panels manufactured on modern equipment from high-quality steel plate with an overall thickness of 1.25 mm.

A complete range is offered covering varying heights, lengths and different types. Heat emission is established according to DIN 4704, registered under No. 1036/80 with a maximum working pressure of 8 bars (114 p.s.i.g.) and test pressure of 10.4 bars (148 p.s.i.g.).

All radiators are fitted with an air vent, two standard 1/2" connections and concealed wall-fixing brackets. They are

also treated by way of a phosphating and passivating cycle before being painted in ivory white satin lacquer and baked at a high temperature.

Finally, they are shrink-wrapped in polythene and fitted with tough cardboard end-shields for full protection during transport and while awaiting installation on site.

However, Terence O'Connor also has a more up-market range of radiators called Alurad which is intended for high-specification installations. These aluminium radiators have exceptionally-high outputs and are guaranteed for 10 years.

Both ranges are distributed by Terence O'Connor via his appointed network. However, it is known that he wishes to appoint further outlets to that network, particularly in the Midlands and on the east coast, including Dublin city and county.

Full details from Terence O'Connor, Castleisland, Co Kerry. (Tel: 066 41344).



• Exterior view of the Barlo manufacturing plant in Clonmel.

## Barlo Radiators — Designed For Living With

Early last year Barlo launched a new radiator range called Superplus comprising high-output, convector models. Since then they have achieved

significant market penetration with the new addition proving to be a perfect complement for the remainder of the Barlo range.

Radiators are often positioned very prominently, so good looks are important, which is one of the main reasons Barlo designed their radiators with a rolled top, instead of a conventional welded top seam. But an attractive appearance isn't the

## TERENCE O'CONNOR

Tralee Road, Castleisland, Co Kerry.  
Telephone (066) 41354

**PLUMBING AND HEATING SUPPLIES**



Its finish of impeccable quality and of perfect technique guarantees a reliable and longlasting use and thanks to its carefully studied construction it supplies a considerable heat emission.

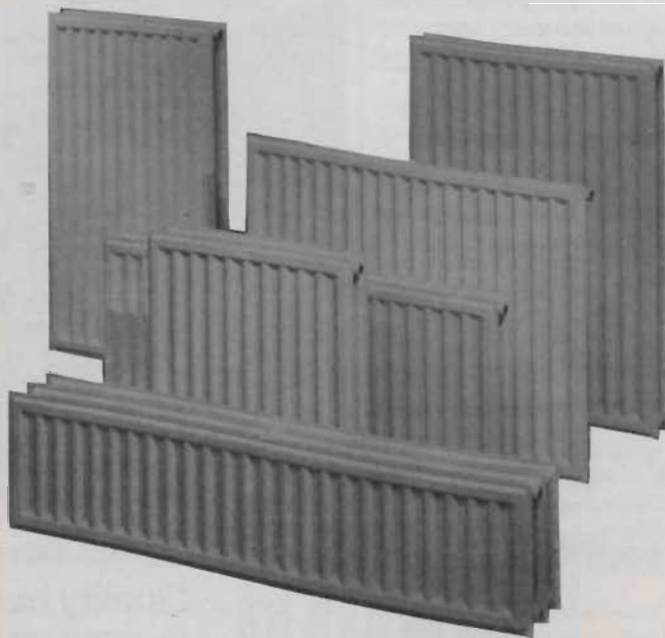
This moreover makes it perfectly suitable for the heating techniques of the future, such as low temperature heating.

In short, specialists know why they prefer "SUN" radiators ...

**SOLE IMPORTER:**

Agents required in the following areas:  
**DUBLIN — MIDLANDS — EAST COAST — NORTHERN IRELAND**  
**TELEPHONE FOR FURTHER DETAILS**

Suppliers of:  
**All Solid Fuel Appliances**  
**Oil Fired Boilers**  
**Gas Fired Boilers**  
**Free Design**  
**Ergas Agents**



# Radiators ... Radiators ... Radiators ... Radiators ... Radiators

only reason. They're easier to clean and safer too, with no sharp top edge to injure tiny hands or snag clothes.

Barlo radiators are specially designed for this country. This gives several benefits over most other radiators, which are adapted from Continental designs.

There are no unnecessary fittings at the top which push the radiator further away from the wall than it needs to be. Even when a double panel radiator is needed, Barlo manufacturing technology enables them to make a significantly slimmer radiator than many of its competitors, which in turn leaves more room for living. To complete the slim elegance of the Barlo range concealed mounting brackets are also provided.

Convector fins welded to the back of a panel radiator dramatically increase heat output. Almost all manufacturers offer some type of convector radiator, usually with a version of a type of fin, which is welded to the panel between each of the waterways.

The Barlo convector

incorporates a high-technology fin design with the fin welded to the panel both between the waterway and on the waterway itself. This design puts much more of the fin surface into contact with the heated surface of the panel, thus providing substantially increased heat output compared to ordinary convector radiators.

This technology ensures that the Barlo high output convector radiators give you the neatest, most compact solution for those hard to heat places like bathrooms.

Behind Barlo's good looks is a toughness and durability that comes from meeting only the most demanding manufacturing standards. Barlo tests each and every radiator at 105 lbs per sq inch, which is many times the working pressure normally used on a domestic central heating system.

After a 6-stage cleaning, degreasing and anti-rust process, they are fully immersed in a satin primer to give them their attractive finish. Each radiator is individually packaged for protection during

transit and installation.

All manufacturing methods and procedures comply with the British Standards Institution Kitemark programme for certifying both heat outputs and the quality of manufacture.

For further details contact Barlo Heating Ltd, Long Mile Road, Dublin 12, (Tel: 501399).

## Diamond — 'The Radiator for the Future'

The Diamond range of high-efficiency convector radiators was designed to give much greater heat output and take up less space than ordinary radiators.

At a time when the running costs of a central heating system is as important as the installation cost, it is essential to every household that their system is the most efficient available.

The narrow waterways of the Diamond radiator hold less water therefore the whole system heats up faster. As the

hot water circulates, the increased convector fins on the back of the radiator efficiently disperse this heat.

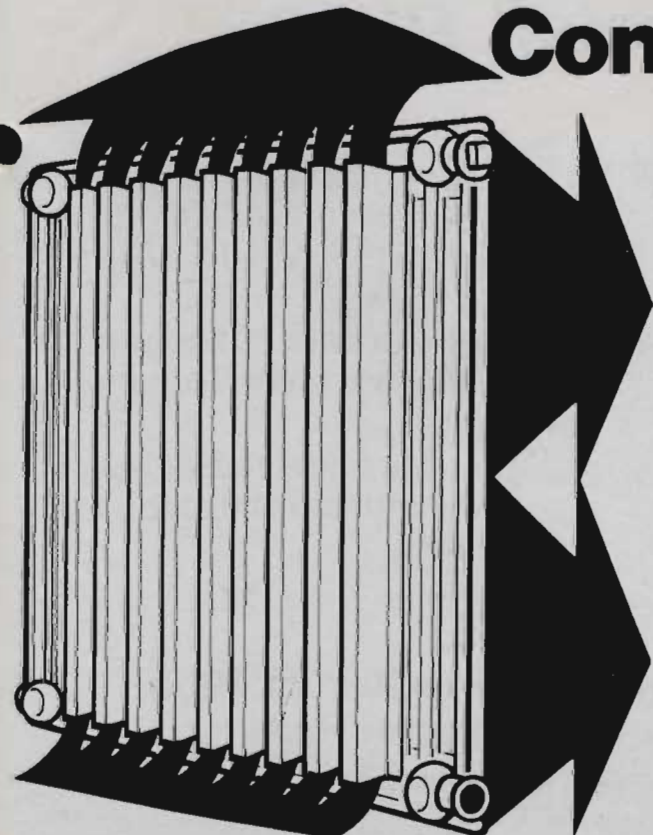
Because Diamond radiators are so much more efficient, they are made smaller, so they allow greater design flexibility, and being smaller, they are easier and quicker to install.

Diamond radiators have been independently certified by BSI to BS3528 and carry the British Standard Kitemark which also means that they are quality assured and comply with BSI 5750. They are available in two models — single and double panel — and are supplied in a choice of five heights and up to 18 lengths. Diamond — elegant, energy saving radiators for the future.

**Outputs:** Heat outputs have been derived from official independent British Standards Institute tests conducted in laboratory conditions, the object of which was to provide an accurate analysis of radiator output.

**Painting:** The Dia-norm is degreased, phosphated, dipped in a primer and stoved in a special paint plant before being

# The new Dia-norm 'DIAMOND' Convector Radiator



### More Grace ... Less Space

When you come up with a convector radiator that gives up to 20% greater output than its predecessors, the sensible thing to do is to make it smaller — which we have. The revolutionary new Dia-norm 'DIAMOND' is smaller to handle and therefore easier to install. Taking up less space in the room yet providing the same amount of heat. It is finished with a stoved coating which carries a five year guarantee.

- Smaller size — more efficiency.
- Low water content — high convection.
- Immediate reaction to temperature changes.
- Decorative top and side covers available.
- Stove enamelled finish — requires no further painting.
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# Radiators ... Radiators ... Radiators ... Radiators ... Radiators

epoxy-coated in a light ivory colour and again stoved at 230° celsius. A minimum thickness of 0.12mm paint protects each Dia-norm against corrosion.

**Test Pressure:** Each radiator is tested at a pressure of 7 bar (100 lbs. p.s.i.).

**Water Content:** Diamond radiators have an extremely low water content. This provides immediate reaction to control changes and because less water needs to be heated up this tends to save energy.

Further information is available from Heatmerchants: (Athlone) 0902-92755; (Cork) 021-506944; (Dublin) 01-505155, (Kilkenny) 056-62244; (Limerick) 061-311206, (Sligo) 071-62133; and (Waterford) 051-77304.

## The Compact BIASI

The Compact BIASI panel radiator is a finished steel radiator manufactured from 1.25mm thickness cold rolled steel. All models have, as standard, 4" x 1/2" connections

and are tested to 110 psi.

All Biasi radiators conform to ISO, DIN and BS Standards.

The Biasi is designed and manufactured to exacting standards with all radiators being given a double paint finish. Each model is degreased, then phosphate coated before it leaves the production line.

Biasi radiators can be painted quite normally by the user, should a particular colour be required to match a colour scheme. These radiators have a top and side cover of attractive design which are manufactured by new methods. The cover is made in two pieces and has rounded corners and edges.

The radiators save space as a result of their narrow projection off the wall and are economical, due to their low water content. They have a fast warm-up time, which means a useful saving in fuel costs.

Their convactor fins, which are welded directly on to the waterways, give a more efficient transfer of warmth to one's rooms.

HeatOvent are the sole Irish agents for Biasi and they stock

a range of 500mm and 400mm single and double-convactor radiators. Biasi literature and technical information is available from HeatOvent Ltd, HeatOvent House, Mount Argus Road, Harold's Cross, Dublin 6, (Tel: 975562).

## Double Choice from H&V Sales

H&V Sales Ltd of Dubber Cross in Finglas, Co Dublin offer a wide choice in domestic radiators, being main distributors for two principal brands — Pensotti and Thor.

Taking Pensotti first, this range comprises a collection of cast-iron radiators made to the most exacting standards. The high-quality specification results from a combination of high-tech design and strictly-controlled production processes.

Greater heat output is due to "irradiation and the rational development of finned surfaces".

As for the Thor range, all radiators are made from cold rolled 1.25mm quality steel, construction being of either plain panel type or convactor style with fins welded direct into waterways for maximum heat output.

All Thor radiators are degreased, iron phosphated then air dried and anti-rust synthetic primer coated and finally finished to a high quality surface by electrostatically polyester powder coating and oven hardened at 200°C.

Enamelled radiators are shrink-wrapped, Compact convectors are enamelled and shrink wrapped with factory-fitted top grilles and side panels.

Thor radiators are guaranteed for a period of five years from date of installation against defects which may occur as a result of faulty materials or workmanship. No responsibility is, however, accepted for ancillary fittings used in or with the unit.

Details from H&V Sales Ltd, Dubber Cross, St Margaret's Road, Finglas, Dublin 11, (Tel: 345561/345457).

# If It's Convactor Radiators You Need You Should Install Biasi



- Biasi radiators are manufactured from 1.25 mm steel and in accordance to ISO/DIN 4704 and BS 3528 1977.
- Biasi radiators are hot degreased and phosphate coated against corrosion.
- Biasi double panel radiators are complete with attractive top and side covers.

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# Self Tuning Controllers Come of Age

By Peter R.J. de La Nougerede, Director of Engineering, Gulton Ltd., West Division.

During recent years, a number of control equipment manufacturers have introduced new products described as "self tuning" PID controllers. Variably, these new products have been presented as a major step forward, offering better control performance combined with dramatically simplified setup and operational procedures. However, in many cases these self-tuning controllers have been found to suffer from serious limitations and shortcomings which have restricted their application.

Over the last two or three years these problems have been addressed and in many cases corrected by the controller manufacturers, with the result that some of today's self-tuning controllers are far more satisfactory than their predecessors.

Potential users who have evaluated and rejected self-tuning controllers in the past, would be well advised to re-evaluate the products available today, as the best of these should allow significant performance improvements to be achieved in many

applications. This article reviews the fundamentals of self-tuning PID controllers and illustrates the advances now possible.

Before examining the principles of self-tuning control, it will be useful to refresh our memory on the basics of PID (or 3-term) control. **Figure 1** shows a block diagram of a simple process loop (such as control of one temperature zone in a furnace or a plastic extruder).

The difference between the setpoint value and the actual process value at any time, is known as the

deviation or process error (e). In a PID controller the relationship between the output power demanded by the controller and error signal is defined by an equation such as the following:

$$\text{Power} = 100.e/P + 100/P.I e.dt + 100.D/P de/dt$$

It can be seen that the output power demanded by the controller is the sum of three terms, which gives rise to the name "3-term controller" as an alternative to 'PID' controller'. The three constants P, I and D (standing for Proportional,

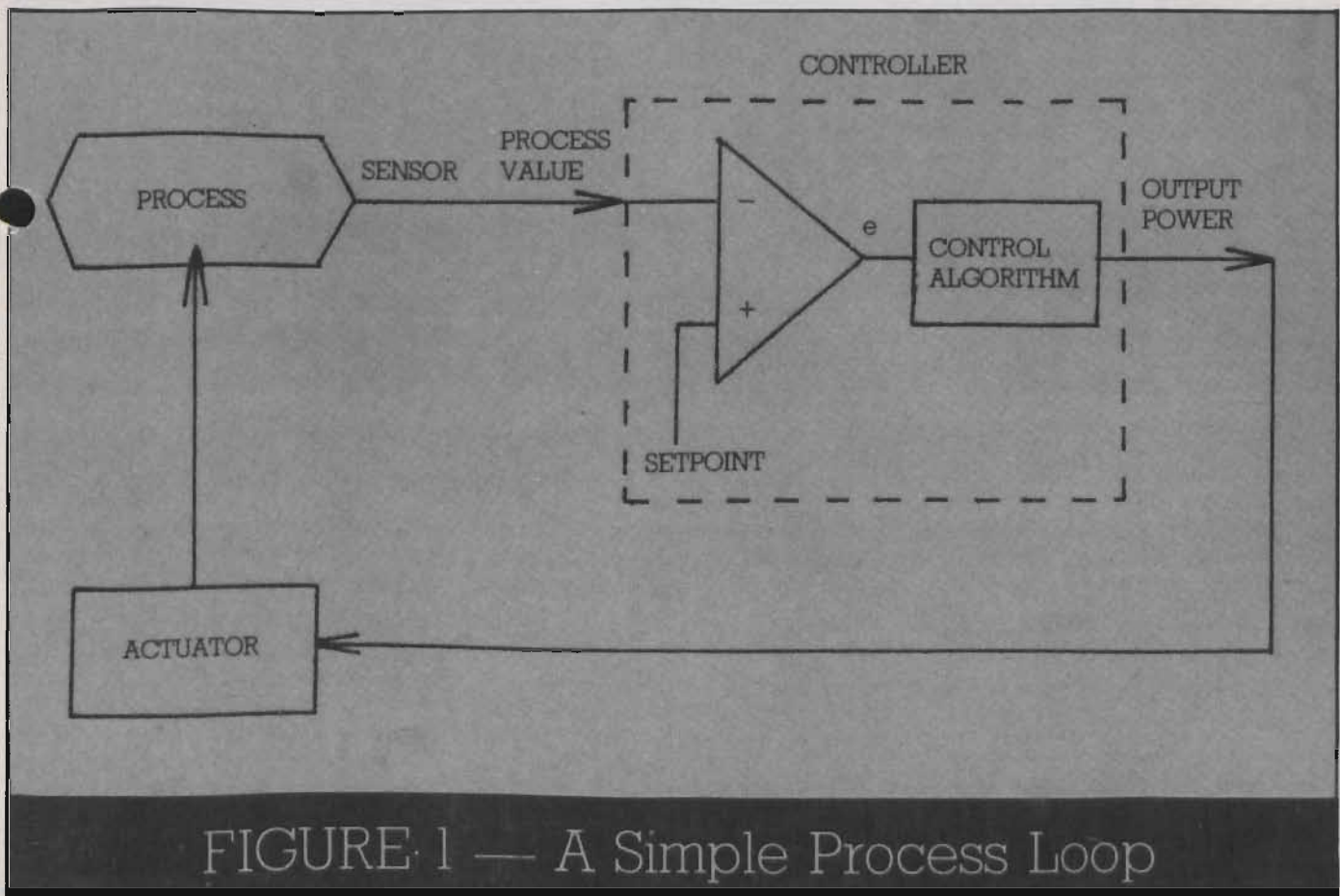


FIGURE 1 — A Simple Process Loop

# INSTRUMENTS & CONTROLS

Integral and Derivative) are known as the control terms and by adjusting these in any particular application the closed loop response can be altered.

## Manual Tuning

For optimal control (for example, to achieve minimum overshoot on startup) the PID control terms must be individually adjusted for each application or process loop. This is known as "tuning" the controller, and conventionally it has always been done manually. Even when carried out by a highly-skilled process engineer however, manual tuning is difficult, time consuming and highly inconvenient. Several alternative standard procedures are available for manually tuning a PID controller — for example the Ziegler-Nichols Closed Loop Method and the Minimum Overshoot Method.

These alternative procedures are generally similar in that they attempt to determine the point of marginal stability of the process loop by adjusting

the system gain (100/P) with  $I = 00$  and  $D = 0$ . At the point of marginal stability, it is necessary to note the system gain and the frequency of the (decaying) oscillations, and from these values a suitable set of PID constants can be calculated. However, it should be appreciated that it is neither easy nor quick to determine the marginally stable condition, as this may involve iterative adjustment of the system gain and observation of the controller output over many hours (on certain processes).

Clearly, such manual tuning procedures are inconvenient and indeed impractical on a regular basis. For this reason, process loops are rarely retuned manually to compensate for the effects of different load conditions or process ageing etcetera, and under such circumstances and control performance may be far from optimum.

## Self-Tuning Algorithms

A "self-tuning" PID controller can be simply defined as one in which the

PID terms for optimal control are calculated and set automatically. This has been the control engineer's dream for many years, but has only become practical since the advent of microprocessor-based controllers. In such devices the self-tuning algorithm is a software routine, which generally fits into one of the following two categories:- (1) Process Identification Methods; (2) Pattern Recognition Methods.

Process Identification Methods are the theorists' approach, and have been the subject of academic research for a number of years. **Figure 2** illustrates the principle.

With this method the self-tuning software package monitors the controller input and output signals continuously, and from this information attempts to construct a mathematical model of the process. Having determined the process transfer function, it is possible to calculate the optimum PID values, and these are loaded into the controller.

The process model is recalculated regularly, and where necessary new PID values are loaded. Unfortunately Process Identification Methods have not in general been successful in providing low-cost, user-friendly solutions to the self-tuning problem. The mathematics involved in accurately determining the process transfer function is highly complex, and therefore does not readily lend itself to a low-cost, microprocessor-based solution.

Furthermore, various attempts to simplify the mathematics and provide more effective self-tuning performance have been based on compromises such as requiring the user to enter an amount of process data (for example process transport delay) at the controller front panel. This is a serious complication which for many users defeats the main attraction of self-tuning controllers, which is simplicity of operation.

Pattern Recognition Methods are based on a more pragmatic approach

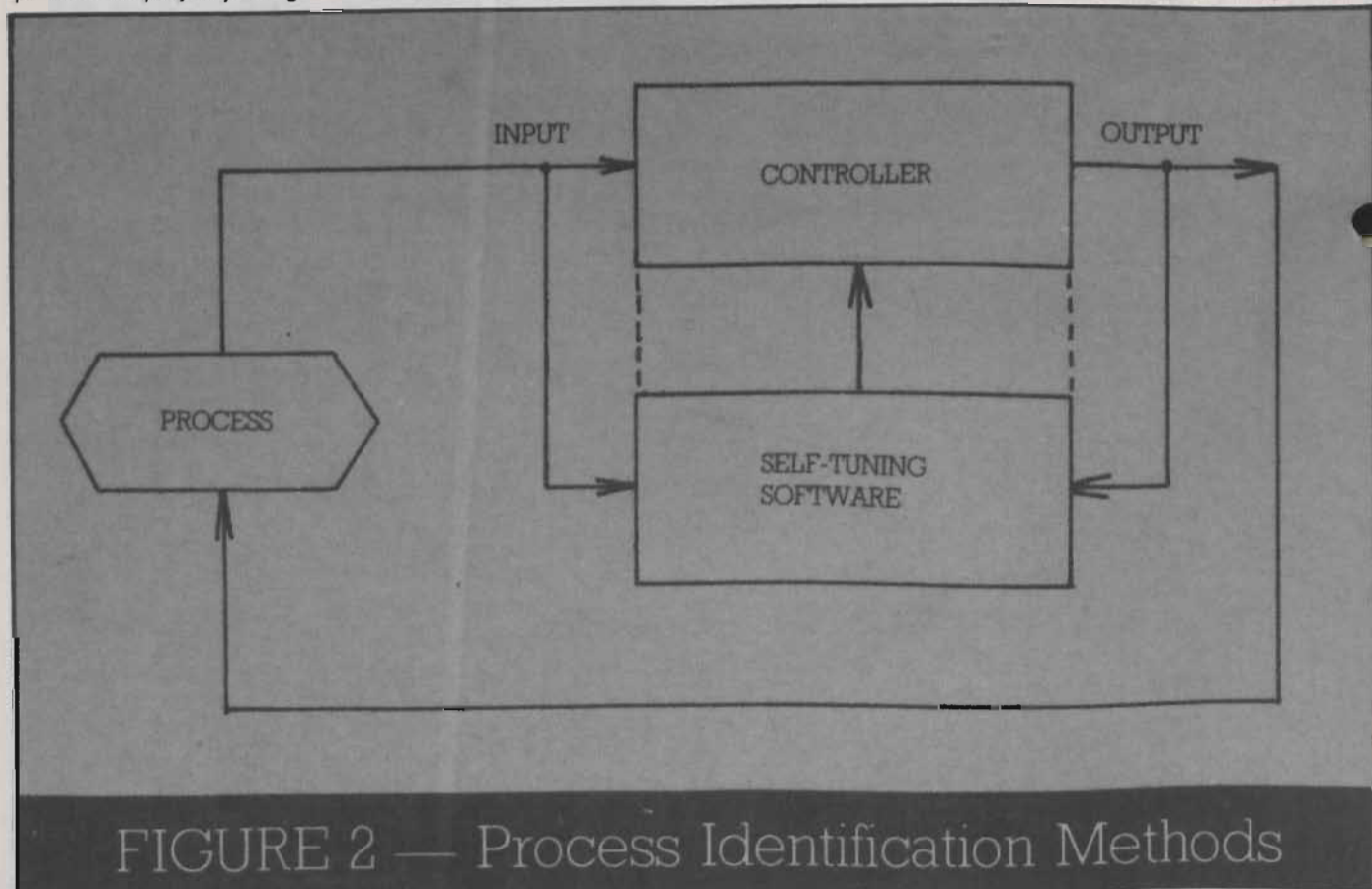


FIGURE 2 — Process Identification Methods



*Barber-Colman Company*

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Barber-Coleman's MICROFLO digital VAV terminal unit control system, first introduced in 1986, has established its reputation as being the industry leader for digital control of VAV terminals in terms of capability, flexibility, reliability and ease of use. MICROFLO is ideal for application to virtually any configuration of pressure independent, and pressure dependent VAV systems.



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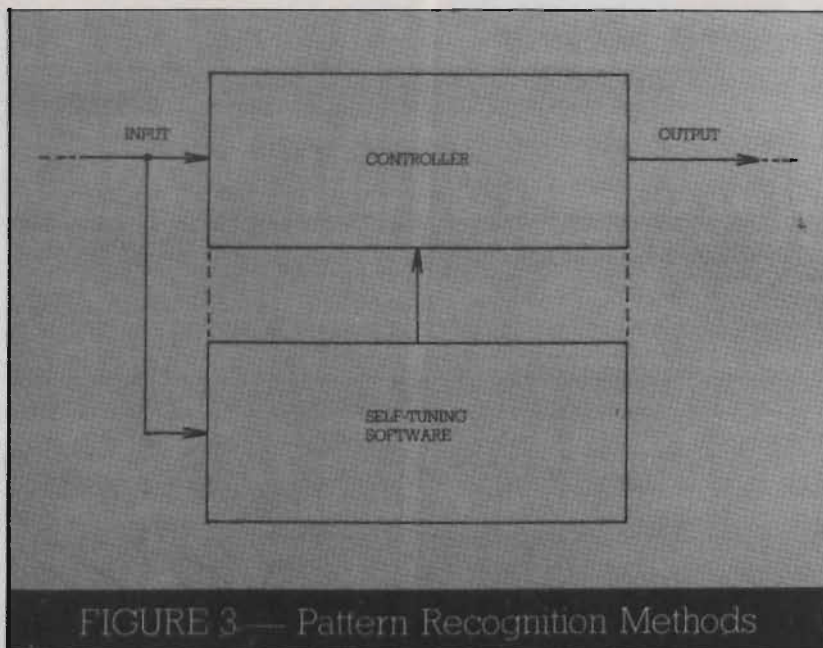


FIGURE 3 — Pattern Recognition Methods

as indicated in **Figure 3**.

With Pattern Recognition Methods, the software makes no attempt to determine the process transfer function. Instead it monitors the process variable input signal only and does not concern itself with the controller output. In particular the process response to startup, setpoint changes and load disturbances is monitored closely, with characteristics such as oscillation frequency, overshoot amplitude, damping ratio etc being measured and recorded. From this data it is possible to adjust the PID

terms on a rapidly convergent iterative basis, so as to optimise the closed loop response. Pattern Recognition Methods can give excellent self-tuning performance with few disadvantages.

The far simpler mathematics lends itself to a low-cost microprocessor-based implementation, without (in a well designed instrument) having to compromise simplicity of operation in any way.

#### Conclusions

Hopefully, the foregoing discussion will serve both as an introduction to the subject of self-tuning PID

controllers, and also as a useful reference when comparing alternative products. The technology of self-tuning has advanced considerably during the last year or so, and controllers are now available which really can tune automatically for optimum control performance. However, it is vital for potential users to also consider the product logistics when comparing controllers. There are products on the market with an effective self-tuning algorithm, which are so difficult or inconvenient to use that the benefits of self-

tuning are lost.

In deciding whether self-tuning is right for any particular plant or process, the user should carefully examine what real advantages will result. Generally these advantages will fall into the following categories, but the size of the advantage in each category will depend on the particular product being evaluated.

- Simplicity of installation and operation. Skilled process engineers not required to tune process;
- Optimal control regardless of setpoint changes or load disturbances;
- Automatic adjustment of PID terms to compensate for process ageing, or other process changes;
- More efficient plant operation. Optimal control can mean energy and material savings.

Miscellaneous other advantages could be cited such as reduced maintenance time, increased operator confidence and so on. In certain industries (such as plastics extrusion) these various advantages are already recognised, and the use of self-tuning controllers is already fairly wide-spread. It seems likely that adoption of this technology will now rapidly spread to other industrial sectors — because Self-Tuning Controllers have finally come of age.

## West's New Series 2075

West Instrument announces the availability of their new Series 2075 temperature/process controller. It accepts a wide range of thermocouple, RTD and linear inputs and utilises advanced digital technology to generate a variety of time

proportioning, linear valve positioning and thyristor pulse outputs with a high degree of stability. The 2075 is a ¼ DIN, microprocessor-based, fully-adjustable, single-loop, general purpose, digital PID controller. It is available with up to two control outputs and two fully-configurable alarm outputs.

Self-tuning, computer compatibility auto-manual capability dual digital LED display and simple field range changing, are leading features of this controller. Self-tuning, sometimes known as automatic or adaptive tuning, has become a popular feature

for consistency of production. The operator simply plugs in the instrument, enters the desired setpoint and presses the self-tune button. The 2075 will monitor, learn, and establish the optimum PID parameters.

The process will perform with a higher degree of consistency allowing the operator more freedom while insuring more uniform product quality. If desired, users can render the self-tuning feature inoperative by moving a link jumper on the front panel pcb. The Series 2075 is West's fifth self-tuning controller.

The 2075 also offers

West's unique pre-tune feature that produces PID parameters faster and virtually eliminates overshoot on start-up. The automatic pre-tune feature can be turned on or off from the front panel.

Through the addition of RS485/RS422 communications ports, the 2075 becomes compatible with most computer systems, PLC's, and external data loggers. A simple ASCII protocol allows interfacing at a low cost.

A feature exclusive to the 2075 is the ability for simple, yet *secure* field range changing via DIL switches

# INSTRUMENTS & CONTROLS

on the outside of the PCB's and easily accessed by *partially* removing the instrument from its case. Thus, it is not possible for an unauthorised person to inadvertently make a range change from the front panel.

Of significance is the dual LED display that is easier to read and which offers more information at a glance. The digital display is more precise than the traditional bargraph.

The upper display is a four and a half digit readout that, in the operating mode gives the process variable, and in the set up mode gives the value of the parameter being adjusted.

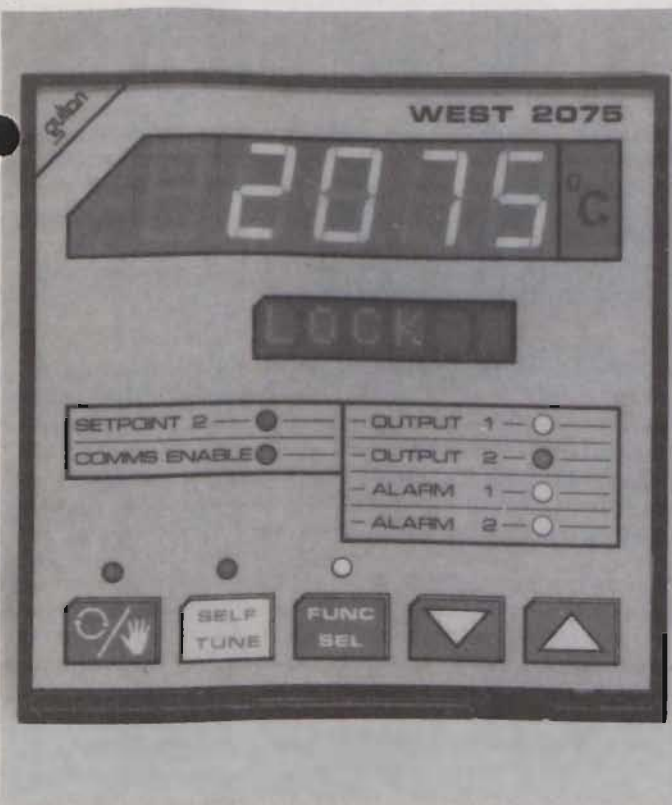
The lower display is a six-character alphanumeric readout. In the operating mode it provides the setpoint. In the set-up mode it prompts the operator through the set-up procedure.

A wide range of T/C RTD and linear input ranges are available to meet most application specifications, including temperature ranges over 2300°C. Linear inputs can also be scaled so the upper display will read directly in desired engineering units; e.g. psi, gpm, RH, etc.

Other features include single and dual heat/cool output options; two optional independent, fully programmable alarms, or one alarm and one scalable recorder output; full noise immunity; dual setpoint model option; adjustable setpoint rate of change limit for controlled (soft) start-up; programmable, lockable setpoint minimum and maximum for process safety; pass code software security to prevent unauthorised tampering; and interchangeability of case and option PCB's with popular West Series 2070, 2071, 2077, 2050, 2052 and 2054 instruments.

The Series 2075 is a high-technology, highly-reliable, multi-purpose controller designed for the application needs of the plastics, chemical, petrochemical, ceramic, metals processing and other industries where optimum performance with reasonable cost is desired.

Details from Wests exclusive distributors — who this year incidentally celebrate 30 years of association with the company — Manotherm Ltd, 4 Walkinstown Road, Dublin 12, (Tel: 522355); Fax: 516919.



• West's new Series 2075 temperature/process controller from Manotherm.



• Barber-Colman's MicroFlo is distributed by Coolair Ltd.

## Barber - Colman MicroFlo

Barber-Colman MicroFlo is a digital VAV terminal control system with integral flow transducer and actuator. With a room temperature transmitter and setpoint, MicroFlo provides stand-alone digital control of virtually any type of VAV terminal.

Unique features make MicroFlo life cycle cost-competitive with pneumatic controls, with vastly improved control stability and energy efficiency. Automatic recalibration of flow sensing (patent pending) gives MicroFlo long-term accuracy unattainable with inherently "drifting" pneumatic controls.

### MicroFlo Features —

- P or PI control modes;
- Local control modes or remote control of set-up parameters from Network

8000;

- Room adjustable setpoint;
- Local indication;
- Night setback;
- Morning warm-up cycle;
- Dual minimum operation;
- Adjustable minimum and maximum flow settings;
- UL 873;
- UL 465.

MicroFlo communicates via an RS-485 datalink with Network 8000, allowing a co-ordinated network of Network 8000 controllers and MicroFlo's to provide system-wide monitoring, adjustment and optimisation.

As part of a Network 8000, CFM (cubic feet per minute) consumption of conditioned air can be centrally monitored for all MicroFlo zones and used as data for apportionment of operational costs. Occupied schedules, setback and morning warm-up can all be centrally co-ordinated from Host 8000 or other Network 8000 terminals.

Details from Coolair Ltd, 26 Cookstown Industrial Estate, Tallaght, Dublin 24, (Tel: 511244); Fax: 511565.

# PLUMBLINES



# PLUMBLINES

## Congratulations

**Rosco** — Yes, my congratulations to Gerry Ross who has just recently taken the brave step of leaving Walker to set up his own company — **Ross Air**.

Gerry intends to use his extensive experience and expertise to provide a specialist service within the air conditioning sector. \*

The news comes as a bit of a surprise to many but those who know Gerry well always knew that he had both the **ambition and capability** to go it alone. This he has now done.

He is trading from 2 Lansdowne Terrace, Shelbourne Road, Dublin 4. Tel: 765012; Fax: 683829.

**Building Services News** will have a **full scale interview** with Gerry detailing the manner of the service he is now offering in the December issue.

In the meantime, best wishes Gerry with the new venture.

\*\*\*\*\*

## Grundfos Bonanza

— Denis Walshe, General Manager of Grundfos Ireland, told me recently that the new-styled **Holiday Bonanza** promotion has gotten off to a tremendous start.

This year the scope has been broadened to take a greater number of contractors and merchants' counter hands forward to a grand draw which will be held in the new year. The prize

is a two week Continental holiday for two — for both a contractor and counter hand.

Each month between now and January **four names** will go forward by way of the preliminary draws.

The October winners are: Contractor — **Tony Carrabine**, Bunnairia, Ballina, Co Mayo; Counterhand — **Andrew Clarke**, Ballina H&P Supplies, Station Road, Ballina, Co Mayo; Contractor — **John McCarthy**, McCarthy Heating, 9 Ardbeg Park, Dublin 5; Counterhand — **John McCarthy**, McCarthy Heating, 9 Ardbeg Park, Dublin 5; Counterhand — **P Mullen**, Suppliers Ltd, Ballyboggin Industrial Estate, Ballyboggin Road, Dublin 11.

**Denis Walshe** said that the new format had gone down especially well, a fact which was reflected by the large number of entries and, more importantly perhaps, by the measurable increase in the sale of domestics over the last month.

\*\*\*\*\*

## CIBSE Dinner —

The growing strength and importance of the CIBSE was clearly demonstrated at the Riverside Conference Centre on Friday, 4 November last, by the massive turnout for the Institution's **Annual Dinner**.

Literally hundreds attended, representing a very broad cross-section of the building services industry. Indeed, it was even more encouraging still to see **three ladies present** at this once "stag" occasion.

The location proved exceptionally well suited with the catering facilities and the actual food presented being of a much higher calibre than that often experienced on such occasions.

**Colin Izzard**, Senior Vice-President, CIBSE was one of the principal speakers and his address contained just the correct mix of seriousness and humour to be appreciable.

Unfortunately, the same cannot be said of the Minister for Science & Technology, **Dr Sean McCarthy, TD**. His address was, at best, disappointing and there is no doubt but that he wasted an ideal opportunity to say something of significance to a

very **influential body** of people.

\*\*\*\*\*

Still on the CIBSE Dinner, but on a lighter note, it was nice to see **Paddy Clonan** so proudly sporting his ex-officio **medal**. The story that he got it — and an accompanying life-long pension — for injuries received when he fell off a tram at **Beggars Bush** is, I am reliably informed, the figment of someone's over-active imagination.

\*\*\*\*\*

On a more serious note, my congratulations to **Bob Gilbert** of Manotherm Ltd. Bob is one of the father-figures of the industry and he has contributed in a very significant way to the **well-being** of the industry. He has an enviable business reputation and is living proof that it is possible to be successful and still pay your bills on time and conduct your affairs in a

## gentlemanly manner.

This year sees Bob **celebrating 30 years** in business. Once again, my congratulations Bob and here's to the next 30 years.

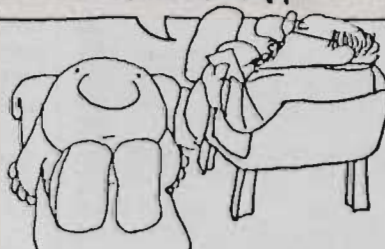
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**SMOG** — Not too late for the industry. While recent reports in the media point to a growing dissatisfaction with the proposed timescale over the introduction of **Orders covering smoke-free zones** in Dublin, the news for the industry is good.

Obviously, those concerned with the health and environmental issues have reason to be annoyed but, in the main, both contractors and product suppliers can look forward to something of a **bonanza** over the coming months. The 800-house zone in Ballyfermot, which has been earmarked as the first phase in the Government's smog control programme, offers an unheralded **opportunity**, while the fact that the local authority tenants are to be given 100% conversion **grants** is especially encouraging.

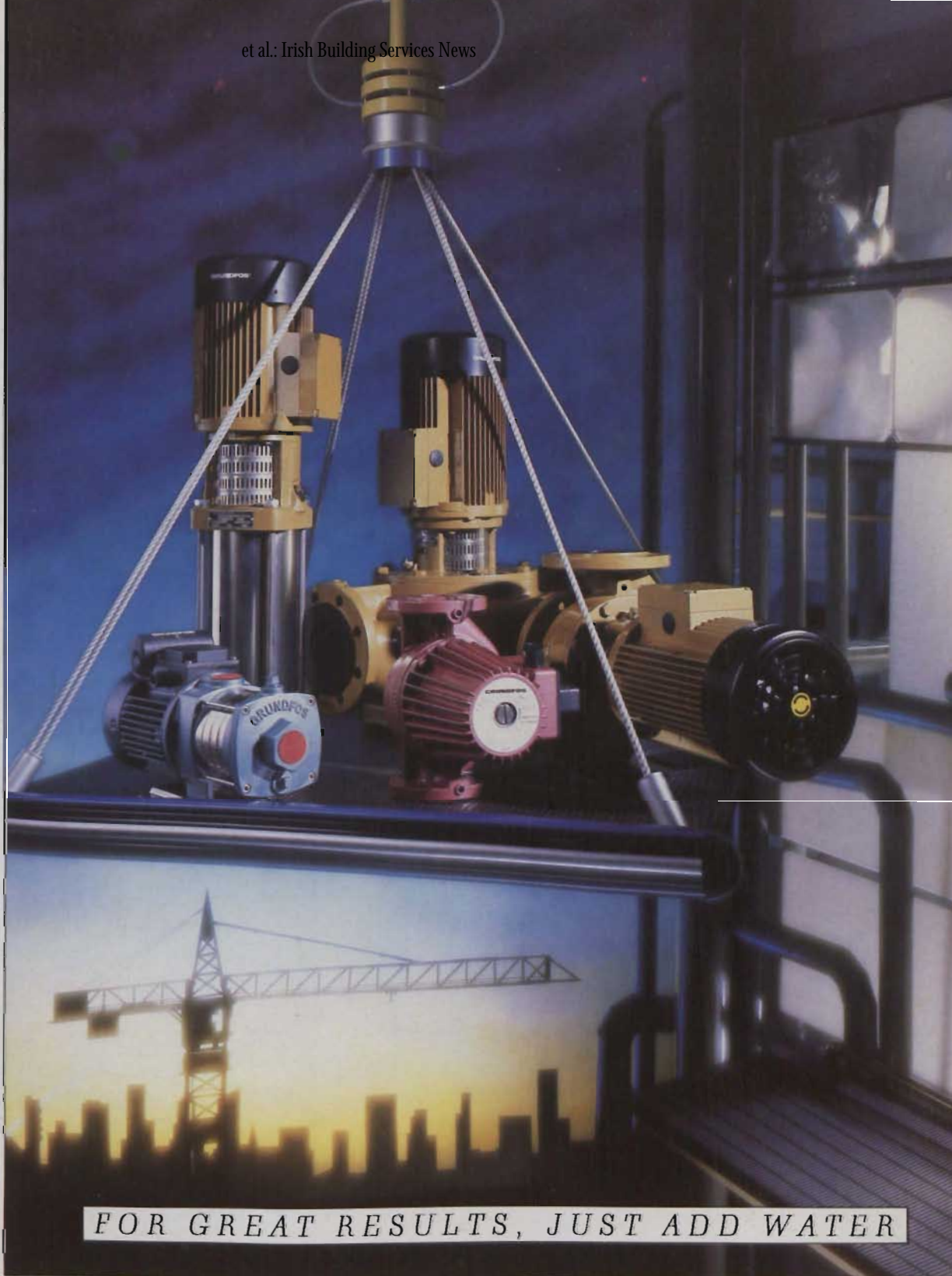
Additionally, the Order covering Ballyfermot is but the beginning. **Similar Orders** covering Finglas, Cabra, Rathmines, Crumlin and Clondalkin are expected to follow shortly. ... It's an ill wind.

REMEMBER ZIGGY...  
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- ★ Compact 1/8th DIN plug-in compatibility
- ★ Multi-colour deviation bargraph
- ★ Unique security feature
- ★ Simple front panel set up



### 2070/71

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- ★ Continuous, automatic self tuning Model 2071
- ★ RS422 computer interface option
- ★ Plug in 1/4 DIN construction
- ★ Dual process/deviation display
- ★ Broad range of input/outputs
- ★ Parameter security



### 2072/73

- ★ Pressure/temperature/flow/level
- ★ Micro-processor-based fully adjustable PID control
- ★ Model 2073 automatic self tuning
- ★ RS422 computer interface option
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- ★ Scalable remote setpoint
- ★ Dual four digit display



### 2068 + DS

- ★ Micro-processor-based, fully adjustable PID control
- ★ Unique software lock
- ★ User-simple front panel
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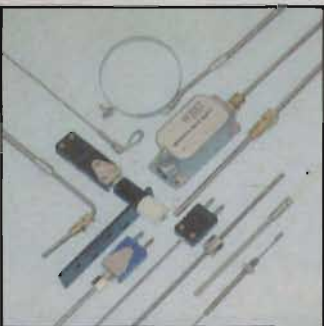
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- ★ Plug in construction



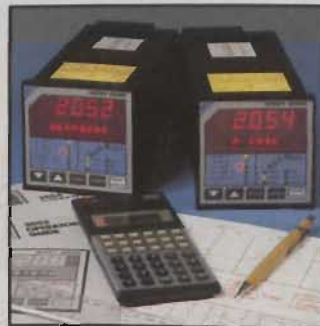
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- ★ Glass filled nylon case
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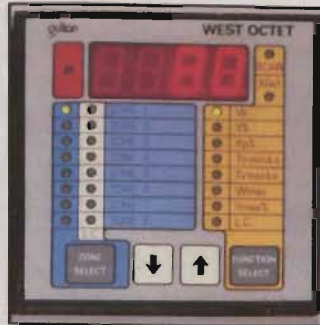
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- ★ Guaranteed soak feature
- ★ Unique scrolling program review feature
- ★ Plug-in 1/4 DIN Construction



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