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## ISH: Hydronics pacesetter never runs out of steam

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THE THEME of this year's ISH was to present fully developed, well-tested and marketable products that have evolved from the mind-boggling innovations hastily put together for ISH '95. Nothing new and revolutionary caught my eye in comparison with two years ago. The trend in the field of residential boilers is clearly in the direction of gas-fired, wall-hung boilers. With a total European market potential of 3 million units for this year alone, 10 % of which are condensing units, it is not surprising that companies such as Viessmann, Buderus, Vaillant and Junkers/Bosch pulled out all the stops at the show. The units produce seasonal efficiencies of 104 % (European ratings) or 92 % (U.S. ratings) and emission standards that environmentalists worldwide were only able to dream of until now.

The standard-setting technology once again comes from the Viessmann Co., the European market leader in super low-emission combustion heating equipment. The company's radiant gas-fired "Matrix" burner, which is catalytically coated, produces only 235 mg of NOX per 100,000 Btuh and 9 % by volume of CO<sub>2</sub>.

Equally amazing is the company's oil-fired "Rotrix" burner, which produces only 1,760 mg of NOX per 100,000 Btuh, 146 mg of CO per 100,000 Btuh and 13.5 % of CO<sub>2</sub> per volume. Both burners were firing into specially designed boilers and venting directly into the exhibit hall, essentially releasing warm air substantially cleaner than the air that we breath in our everyday environments.

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To prove it, computer screens displayed actual NOX, CO and CO<sub>2</sub> produced during operation and constantly varying modulation input conditions. In addition, to the amazement of spectators, video cameras were showing the actual burner flame within the boiler combustion chamber on overhead screens.

The image of conventional burner flames is history. Gas combustion resembles the sun rising on the horizon: oil combustion looks like an almost invisible miniature tornado at the end of the burner tube.

Interestingly enough, high-tech vacuum tube solar collectors for domestic hot water production is catching on big time in Europe with a total market of 7.4 million sq. ft. of collectors being sold this year alone.

The boiler manufacturing giants are all getting into the act with Viessmann setting the market standards again in this field.

What is happening in the field of radiant floor heating? In the exhibition hall that housed the floor heating and plumbing systems, nothing revolutionary could be detected.

Electronic and Engel PEX tubing dominate the market in Germany with a 73 % market share. Silan PEX is a non-factor for both heating and plumbing with a 0,5 % total market share, and rubber tubing does not

exist.

Polypropylene and polybutylene are the only other accepted thermoplastic materials for radiant tubing with 5.6 % market share each. Copper has a 14 % share and multilayer pipe has a 1.3 % share in a market which has matured over 25 years.

Switzerland and Austria seem to be the only countries realizing the advantages of radiant wall heating. Radiant cooling system manufacturers were limited, displaying their ceiling panels and mini-chillers.

The most notable new product idea in the field of temperature control definitely was the wireless thermostat. At least a dozen new zone-control systems operated by radio-controlled T-stats can be considered the innovation of the ISH '97 show. Many were still only being introduced as prototypes.

Imagine a future of installing wireless thermostats and controls with no roughing in of thermostat wiring. All that needs to be done is to mount a multi-zone receiver next to the distribution manifold, wire the powerheads to it and give the customer a box full of sick-on thermostats which can be placed on any wall in any room in any spot, wherever the customer wants the correct temperature to be.

The idea is simple and makes sense. Now technology has finally made it practical.

Among all the high-tech boilers, combustion, solar and control equipment, a surprisingly large amount of wood-fired boilers could be seen. Mostly smaller companies specialize in this market niche. Many European homeowners install them strictly for peace of mind to be prepared for the next energy crises. Farmers who have abundant access to wood use this equipment as do woodworking shops that use their scraps and sawdust to heat their facilities.

Don't, however, think for one minute that these wood-burning marvels are low-tech, pollution-producing dinosaurs. They are zero-pollution, non-smoking, invisible exhaust, blue-flame, high-tech wood gasification machines with digital control panels resembling those of an airplane cockpit. The controls tell you everything from fuel consumption to wood moisture content. Producing Btuh output on demand is as controllable as it is on an oil or gas

burner. Split-log or pellet-burning versions include automatic feed and sawdust pelletizers as upfront equipment.

Overall ISH was, as always, an inspiring show as far as hydronics is concerned. The show was carried by the European drive to meet relentless pollution standards, to find ways to cleanly burn all heating fuels and to push combustion efficiency to its physical limits with condensing technologies, all the while following rule No. 1 - the less fuel we burn the less we pollute.

The European "green" movement within our industry has become a major marketing issue. This has become evident not just with product design but also with packaging materials made from recycled newspaper, two-way foldable boiler crates and non-solvent, powder-coating painting techniques all designed to save our planet for future generations.

The Europeans are leading the way here, realizing the millions of miniature residential heating plants are the single biggest polluters worldwide after industrial pollution. A single 10,000 Btuh residential gas-fired conventional boiler or furnace installed today produces the following pollutants per average heating year: 35 lb. of Nox, which is responsible for acid rain; 24 lb. CO<sup>2</sup>; and 17 tons (yes, tons) of CO<sup>2</sup> which is responsible for global warming and the greenhouse effect.

Based on an assumption of about 65 million residential U.S. heating plants, this translates into 1,137,500 tons of nitric oxide, 780,000 tons of carbon monoxide and 1.1 billion tons of carbon dioxide released into the atmosphere by residential heating plants in the United States. These staggering numbers can be reduced by 80 % for Nox, by 80 % for CO and by 50 % for CO<sup>2</sup> with

off-the-shelf modern combustion equipment at a relatively small cost.

On top of that, the remainder of the three pollutants can be cut in half again by utilizing low-temperature hydronic radiant systems as building heat distribution systems, simply by cutting fuel consumption in half.

The yearly pollution tonnage caused by all of these innocent little residential heating plants is mind-boggling! Don't we owe it to our kids to do something about it? Of course we do! Will we actually do it? Probably not, unless Uncle Sam tells us to. That's where the impetus originated in Europe - with government regulations. I'd like to think we will be able to do it on our own!

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