

BUILDING POWER

NOV/DEC 2009

VOL. 2

NO. 9

ENERGY SOLUTIONS FOR COMMERCIAL BUILDINGS

.....
State-of-the-Art HVAC
.....

A supplement to Commercial Building Products

The State Of The Art In HVAC

The latest in commercial heating and cooling products goes on view at the AHR Expo in January 2010. Here's an armchair tour of some of the newest hydronics, heat pumps, gas boilers, and solar products.

• John Vastyan •



The FlexBalance hydraulic balancer from Taco acts as a hydraulic bridge between the primary and secondary circuits in hydronic heating and cooling applications. The 5900 Plus model uses a Pall ring assembly that removes gases from water.

This is a new and exciting time for building-systems technology. There are so many new products coming to market. Owners, architects, and contractors can see new and emerging technologies at the 2010 AHR Expo, Jan. 25 to 27, 2010, in Orlando, FL. It's billed as the world's largest marketplace for heating, air-conditioning, ventilation and refrigeration products. The Expo, managed by International Exposition Co., Westport, CT, will attract 1,700+ exhibitors. Here is an update of systems from some of the leading manufacturers of HVAC products.

Taco Inc., Cranston, RI, is the nation's leading manufacturer of hydronic-based pumps, heat exchangers, expansion tanks, flow-measurement devices, air separators, valves, and other components for use in heating and cooling applications. Taco seeks to grow beyond its roots as a maker of hydronic/HVAC components to become a highly sophisticated systems integrator with its own system analysis, design software, and integrated building-management controls.

Taco's iWorx is designed chiefly for commercial buildings smaller than 100,000 sq. ft. The self-configuring iWorx control integrates HVAC, radiant heat, hydronic, BTU metering, access, and lighting control with Web-based, remote monitoring and digital notification at the sign of trouble.

The firm also has broadened its line of efficient, variable-speed circulators, hydro-separators, and so-



lar-heat technology. Among the introductions are solar pumps, a solar pumping station, and Solar X-Pump Block with an integrated flat-plate heat exchanger.

For commercial and industrial applications of all sizes, Taco's LoadMatch optimizes the operation of many system components. LoadMatch replaces two-pipe hydronic arrangements with a one-pipe system that eliminates most balancing valves and expensive, energy-consuming control valves. The results are lower pump head and less power to move system fluids. The new, low-kilowatt circulators deliver water or refrigerant only where they are needed. (LoadMatch is an alternative to conventional reverse-return piping of hydronic and chilled-water systems, which are imprecise and require tedious adjustment and many control valves to force water through the loop.)



A Watts Radiant snowmelt system is installed at the headquarters of J.B. Hunt Transport Services, Lowell, AR.

Thermal-energy transfer

ClimateMaster, Oklahoma City, OK, is the world's largest producer of water-source heat pumps and a leader in the field of thermal-energy transfer. The newest generation of water-source heat pump heating and cooling technology for large buildings has pushed operational efficiencies into the 500% to 600% range. That is, for every unit of energy used to operate equipment, five to six units of energy are returned (a 1:6 ratio is called the COP, or coefficient of performance, and can be equated to a 600% efficiency level).

That is smart use of energy. Add new and sophisticated controls to the picture, system integration with building-automation systems, and supplemental energy sources, such as photovoltaics and hydrogen cells, and the potential for significant energy savings

in the commercial-building market becomes immediately apparent.

When a design engineer can calculate a three- to four-year payback for new equipment, there is real incentive to install or retrofit with new technology.

A water-source heat pump (or thermal-energy transfer) system delivers efficient, zone-controlled heating and cooling throughout a building. The system circulates water in a closed-piping loop to move and exchange thermal energy. A building might use many separate heat pumps.

Individual heat pumps add or remove heat from the air within each zone, as required to meet the heating or cooling load. During zone heating, a heat pump extracts thermal energy from the common water loop. During zone cooling, heat is rejected into the water loop where it can be shared with other heat pumps in the building. It is in this way that rejected heat—which most HVAC systems discard—is put to full use before any new energy source is used to heat or cool the building.

The newest member of ClimateMaster's family of water-source equipment is the Tranquility large vertical series, in sizes from 7 to 25 tons and in multiple cabinet configurations. The heat pumps use EarthPure HFC-410A refrigerant. The series is eligible for additional LEED credits because of its design. The units are suitable for geothermal ground-loop or groundwater applications, and water-loop, thermal-energy transfer (boiler-tower) applications.

Packaged boilers, solar panels, water heaters

Laars Heating Systems Co., Rochester, NH, introduces a new modulating-condensing gas boiler. The NeoTherm is a fully packaged boiler that offers 95% thermal efficiency. The line includes six commercial sizes,

from 285 to 850 MBH (one MBH equals 1,000 BTU/hour.) Five new volume water heaters were added, from 150 to 500 MBH, and three additional volume water heater sizes (600,

750, and 850 MBH) will be introduced in early 2010.

The direct-vent, sealed-combustion NeoTherm modulates with a 5-to-1 turndown. Zero-clearance to combustibles and convenient top connections make it a good choice for tight installations. The natural-gas or LP-fired boiler features an ASME stainless-steel heat exchanger, optional factory-supplied boiler pumps (for sizes to 500 MBH), and low NOx emissions. Features include top-mounted water and gas lines and air intake, permitting close installation of multiple boilers.

The NeoTherm line includes Laars' integrated control system with PID logic that governs ignition, temperature, and indirect water heater functions; outdoor reset; frost protection and high limit; and new controls. NeoTherm boilers can be integrated into building-automation systems or used with other controls for boiler sequencing.

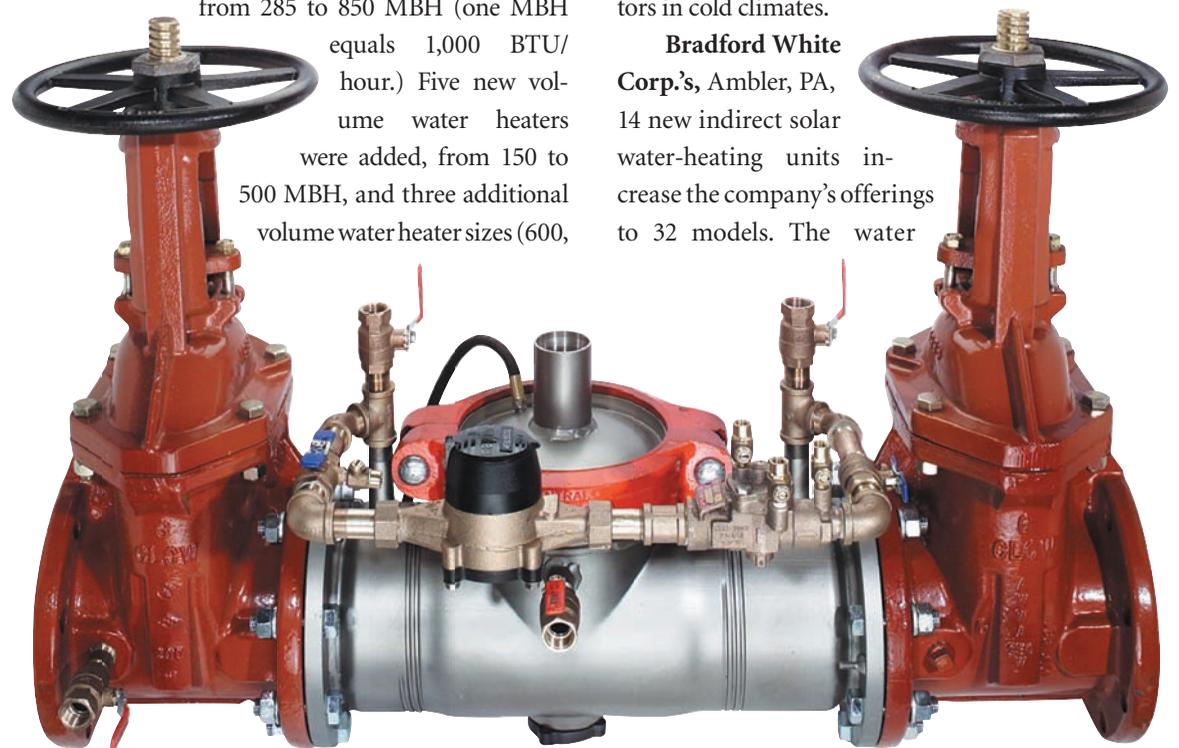
Germany's **Oventrop**, with North American operations in East Granby, CT, markets a variety of solar panels, solar pump stations, and thermal storage tanks. Its new Regusol X is a solar-energy flow center for the generation of domestic hot water. The unit comes with a brazed-plate heat

exchanger (50,000 or 85,000 BTUs) for controlled heat transmission from a solar closed-loop circuit to a pressurized water storage tank. Its integrated three-way valve and control permits heat exchange to two separate storage tanks.

The Regusol X is matched with the firm's flat-panel or vacuum-tube solar collectors. Oventrop's borosilicate-glass evacuated tubes are built to withstand the impact of 1 1/4-inch hail. The tubes produce higher water temperatures than similarly sized flat-plate collectors and significantly outperform flat-plate collectors in cold climates.

Bradford White Corp.'s, Ambler, PA, 14 new indirect solar water-heating units increase the company's offerings to 32 models. The water

With a short payback period, there is real incentive to install new technology.



Stainless steel has many advantages over cast iron for the purpose of making and maintaining backflow prevention, including manageability of much lighter-weight construction. Shown is a backflow assembly from Watts Water Technologies.

heaters include double-wall, single-coil models with gas backup. The firm has invested heavily in storing and enhancing heat from ultra-green, low-input sources with high storage needs, such as with solar, heat-pump, and geothermal systems. Bradford White's ultra-high-efficiency commercial water heater line, the eF series, includes a 100-gallon-capacity unit with 399,999 BTUs. The fully condensing design recovers at 93% thermal efficiency. Other 100-gallon units come in 150,000, 199,999, 250,000, and 300,000 BTU sizes. Sixty-gallon units range from 125,000 to 199,999 BTU. All eF models feature thermal-efficiency ratings to 99.1%. The simple, plastic venting offers flexibility for installation.

Backflow prevention

Lead-free, stainless-steel backflow-prevention assemblies make great sense, especially for engineers, specifiers, building and plant owners, municipal authorities, and backflow-prevention and irrigation-system experts. **Watts Water Technologies**, North Andover, MA, makes assemblies in diameters from 2 1/2 inches to 10 inches.

Stainless steel has many advantages over cast iron for the purpose of making and maintaining backflow prevention, including manageability of much lighter-weight construction. Watts' configuration of the valves and the way the devices are so easily opened to access them for inspection, service, or testing, are unique.

The company's DeadLevel trench drain is a lightweight, all-plastic drainage system for commercial and industrial uses. The rugged drain channels are UV-resistant and off-the-shelf ready for a concrete pour. The flanged channel, end cap, and frame connections create proper joints and alignment, while molded outlets guarantee a good connection to discharge pipes.

The OneFlow anti-scale system prevents mineral build-up and calcification within potable water systems. It is a no-salt, non-discharging, non-electric scale-control process. OneFlow is an alternative to water softening systems that require routine maintenance, large volumes of salt, and other chemicals (which are rejected into sewage systems). OneFlow prevents scale by transforming dissolved hardness minerals into harmless crystal par-



NeoTherm boilers from Laars Heating Systems can be integrated into building-automation systems or used with other controls for boiler sequencing.

ticles. These particles make their way through plumbing systems without latching on to pipes, valves, or heating elements. The technology can handle flow rates from 0.5 to 900 gallons/minute.

Air-to-air heat pumps

Fujitsu General America (based in Tokyo with North American HVAC headquarters in Fairfield, NJ,) is known for its 25 and 26 SEER ductless split-system heat pumps, the industry's most efficient mini-splits. Now it has two new products for light-commercial application. The 9,000 BTU model provides 26 SEER with a heating seasonal performance factor (HSPF) of 12. The 12,000-BTU system offers 25 SEER and 12 HSPF. These wall-mount systems provide quiet operation and nearly full heating capacity to 5 F ambient and cooling operation to 14 F (suitable for year-round cooling of computer centers).

Fujitsu's Halcyon line includes 21 single-zone systems with capacity ranges of 9,000 to 42,000 BTUs. Mix-and-match evaporators of the multi-zone systems add another possible 110 combinations and allow contractors and owners to create optimal climate control for any size space.

Standard features include wireless remote control, ion filtration, sleep timer, 24-hour timer, dry mode, four-way auto louver, and auto mode. A coil dry-mode feature helps inhibit mold and bacteria growth by reversing the cycle of refrigerant to dry out condensation in the indoor coil without changing room temperature.

Radiant heating systems, accessories

Watts Radiant, Springfield, MO, developed R-flex piping for transporting hydronic, solar, or geothermal heat to distant locations (even underground) without losing more than a fraction of the BTUs.

One of the fast-emerging "green" changes in the heating industry today is the use of ultra-efficient, low NOx wood boilers or water-to-water geothermal systems. Many applications require the transportation of heated water trenched underground to remote locations where heat is then distributed. The insulated piping consists of single or dual PEX carrier pipes surrounded by a thick layer of cross-linked PEX foam insulation. All of this is protected by a thick, double-wall corrugated outer shell.

Flexible Onix radiant-heat tubing is suitable for large-surface, year-round commercial applications (especially when winter temperatures make working with PEX tubing a near impossibility). The multi-layer



Bradford White's eF series is a line of ultra-high-efficiency commercial water heaters.

cross-linked Durel EPDM extruded tubing includes tough aramid cord and is wrapped with an aluminum oxygen barrier unaffected by UV radiation, moisture, or high or low jobsite temperatures.

Modular HydroNex panels are an off-the-shelf hydronic control package ready for any light-commercial jobsite. The pre-engineered and pre-assembled panels can save hundreds of hours of jobsite assembly time. The preconfigured panels, including primary loop panels, distribution panels, zone panels, direct-pump panels, and those for thermostatic mixing or outdoor reset, can be linked together or used individually.

Watts Radiant's HeatWeave brand is introducing an electric snowmelting line of mats and cables called ProMelt. All have a single-point connection, and the mats are available in 2-foot and 3-foot widths. Maintenance-free ProMelt helps to reduce the risks of an icy slip and fall, and damage to plants, vehicles, and driveways from salt and solvent. The cost of snow removal is reduced or eliminated.

Learn more details about the specifications of these products, new HVAC/R technology, and offerings from other manufacturers at the AHR Expo. **BP**

AUTHOR

John Vastyan is president of the trade communications firm, Common Ground, Manheim, PA. Vastyan specializes in the geothermal, hydronic, solar, radiant heat, plumbing, mechanical, and HVAC industries.

Continue Your Research Online

Bradford White Corp.,
circle 20 or visit www.cbpmagazine.com

ClimateMaster,
circle 21 or visit www.cbpmagazine.com

Fujitsu General America,
circle 22 or visit www.cbpmagazine.com

Laars Heating Systems Co.,
circle 23 or visit www.cbpmagazine.com

Oventrop,
circle 24 or visit www.cbpmagazine.com

Taco Inc.,
circle 25 or visit www.cbpmagazine.com

Watts Radiant,
circle 26 or visit www.cbpmagazine.com

Watts Water Technologies,
circle 27 or visit www.cbpmagazine.com