

HYDRONICS ZONE

WET HEAT ELITE

Blackrock HVAC Founder Creates Hydronic System Masterpieces

Old Toronto home receives full gut remodel, premium HVAC treatment

BY ANGELA D. HARRIS
ACHR NEWS STAFF

Among hydronic/plumbing and mechanical professionals, there are a few professionals who turn their trade into craftsmanship, and Orest Omeliukh is one. Founder of Blackrock HVAC Ltd. in Mississauga, Ontario, Canada, Omeliukh was born in Ukraine and immigrated to Canada when he was three. Although his company takes on many projects throughout the year, Omeliukh himself takes on only two custom home projects per year. Blackrock was approached by a custom builder, Gonell Homes, for a full gut remodel of a home in one of Toronto's older neighborhoods. Inspired by his father and European influences, this was the project Omeliukh chose to showcase his personal mastery of and flair for hydronic systems.

"I build the Bentley of HVAC systems," he explained. "The systems are complex in regard to what they accomplish, but they're very simple for the service contractor and the homeowner."

WAR AGAINST BULKHEADS

To start, Gonell's two-story, 3,000-square-foot home was stripped to the studs. The second floor was expanded to include a new master suite. Spray foam insulation and new windows were added throughout, and the domestic hot water recirculation line was insulated. These steps greatly reduced heat loss.

From there, the concept that evolved between Gonell and Omeliukh was to use six zones of radiant in-floor for primary heat, with a seventh zone served by a hydronic air handler, which shares high-velocity ductwork with a heat pump. Domestic hot water is also provided by a sidearm tank. Snowmelt in the driveway also draws from the condensing boiler in the basement, meaning that Blackrock had to provide four different water temperatures.

"This job was unique in that it was an old home," said Omeliukh. "I wanted to show off the



BUNKER APPEARANCE: Blackrock started with plywood walls covered in a very convincingly poured concrete mural, giving the impression that each penetration was neatly core-drilled.

mechanical equipment within the mechanical space, yet eliminate it from view elsewhere. I called it 'The War Against Bulkheads.'

For air conditioning and backup heat, Blackrock installed a 2.5-ton Midea heat pump condenser paired with a Unico high-velocity air handler, allowing the branch ducts to be run within 2x4 stud walls. Proprietary sound attenuator branch ducts provided quiet airflow.

This air handler, along with the home's Lifebreath HRV and an AprilAire 800 steam humidifier, was installed in a smaller mechanical space in the attic. Splitting the mechanical components between the basement and the attic was a tactic that helped Omeliukh win the War Against Bulkheads.

HIS MASTERPIECE

"The basement mechanical room is the showpiece here,"

said Omeliukh. "Everything was selected carefully for function, then assembled in a manner that catches the eye and provides ample room and lighting for service work. I used a 'bunker' theme, as the room is like none other in the house, and really feels like a high-tech bunker."

Blackrock started with plywood walls covered in a very convincingly poured concrete mural, giving the impression that each penetration was neatly core-drilled. In the past, Omeliukh has used murals portraying graffiti, art by Picasso, and a map of the Canadian Shield.

The 160 MBH IBC condensing boiler is piped primary-secondary. Omeliukh has calculated that the home's heating load will only require 40 percent of the boiler's capacity. When domestic hot water or snow melt calls, the boiler will fire at 100 percent for rapid



CRAFTSMANSHIP MASTERY: Orest Omeliukh, founder of Blackrock HVAC Ltd., builds the Bentley of HVAC systems as a craftsman and designer.

recovery. The rest of the time, it coasts along at low-load, condensing as intended.

The primary loop is circulated by a Taco Comfort Solutions 0018e circulator with Bluetooth capability. An identical pump is used on the 80-gallon indirect tank. This allows Blackrock to select between multiple constant speed, proportional pressure, and constant pressure modes as well as activeADAPT™, Taco's self-adjusting proportional pressure mode.

The secondary loop consists of the eight heating zones: six radiant, one for the hydronic coil, and one for the master bathroom towel rack. These zones are pumped by a pair of Taco VT2218 circulators, and use Zone Sentry valves for control. With the temperature sensing radiant circulators, Blackrock maintains a 20°F Delta-T. The zone valves are

wired to expandable Taco zone controls, which communicate with tekmar Wi-Fi thermostats.

"I use a lot of Taco products because of their reliability," said Omeliukh. "They're simple, the tech support is great, and the company culture breeds innovation and long-term relationships."

From the radiant manifolds in the downstairs mechanical room and two remote manifolds hidden neatly in the house, half-inch PEX was installed at nine-inch centers. This was poured over with a thin layer of Agilia lightweight concrete for optimal thermal performance and floor rigidity.

The system was designed with a -21°C (-6°F) outdoor design temp, and the boiler responds to actual conditions via outdoor reset for any heat call except domestic hot water. Omeliukh said that servicing the system is simple.



BULKHEAD WAR: An air handler, along with the home's Lifebreath HRV and an AprilAire 800 steam humidifier, was installed in a smaller mechanical space in the attic. Splitting the mechanical components between the basement and the attic was part of the aesthetics war.



HIDDEN TECHNOLOGY: Gonell Homes – the custom builder on this project – wanted discrete HVAC that was highly visible only in the mechanical area and invisible elsewhere. For example, this recessed panel, once closed, removes any appearance of controls

Every zone features a label that was 3D printed in the Blackrock studio, and each loop has a pair of isolation valves. One wall of the mechanical room features a black box wrapped in carbon fiber and illuminated with LEDs. This was for aesthetic purposes,

according to Omeliukh. He was simply hiding the wires and piping that would otherwise clutter the installation. The box also contains piping and wiring diagrams.

“Unlike some contractors, I want the homeowner to be able to tweak the system or

make adjustments in the event of an emergency,” explained Omeliukh. “And if a technician other than myself is going to work on it, I want to make their experience a good one.”

PUSHING THE LIMITS

When Omeliukh dusts off his hands after a job, he goes home knowing that he’s done everything possible to deliver premium value. This often means taking extra, unconventional steps.

Gonell wanted discrete HVAC that was highly visible only in the mechanical area, and invisible elsewhere. That meant no thermostats. Instead, Blackrock installed flush mount tekmar 084 sensors throughout the home. The tiny sensors are installed in a small indent in the drywall, then mudded and painted over. Wired to the tekmar 562 T-stats in the mechanical room, this approach allows occupants to manipulate temperature in any zone via an app.

The need for comfort paralleled Gonell’s desire for aesthetics. After installing radiant systems for years, Omeliukh’s recent visit to Germany reshaped the manner in which his company installs radiant tubing.

“If you look at an in-floor system through a thermal camera, you’ll find that loop ends are significantly cooler than the supply side. Most radiant installers use the ‘serpentine’ method of laying

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– Orest Omeliukh
founder
Blackrock HVAC Ltd.

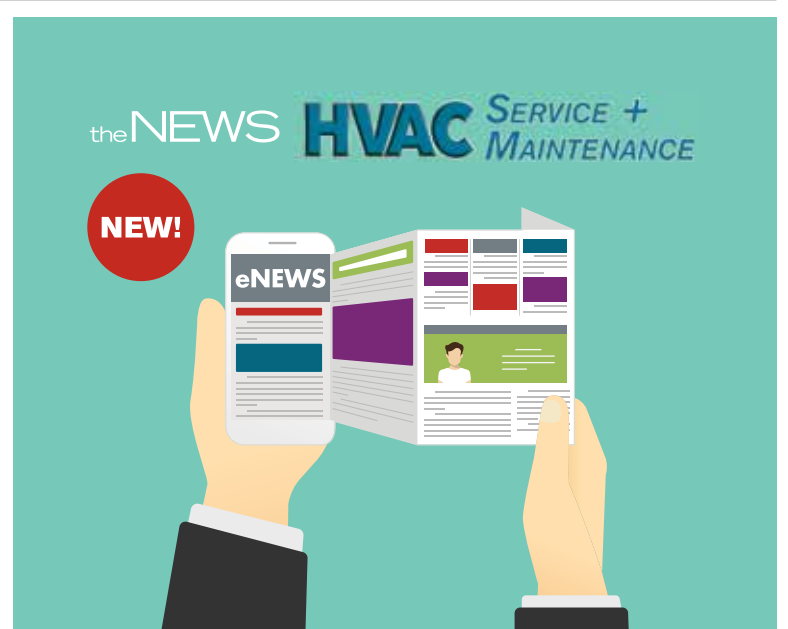
tubing. While this is fast and easy, it tends to group all of the hottest pipe together, same with the cooler loop ends. Lately, we’ve been using the ‘counter-flow’ layout, which is common in Europe.”

The counter-flow design takes more planning and a little more time to install, but it alternates the warmest portions of a loop with the coolest across the floor. This provides even heat distribution across the floor.

“I like to push the limits on all our installations — it forces us to grow and develop new skills,” said Omeliukh. “On this

job, that included a third tubing layout, which we’d never tried before: double-wall serpentine.”

The master suite featured two exterior walls. The double-wall serpentine method places the warmest portion of the radiant loop in close proximity to exterior walls, concentrating the most heat in the area with the most heat loss. It required some extra thought, and Omeliukh and his partners — as he calls the other HVAC tradesmen that he collaborates with on extensive projects — to pull tubing and re-staple it on one occasion. 



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