



Real world hydronic system technology for Green Building design.

KPMG office building

NEW CONSTRUCTION, ISLAND OF CURACAO, NETHERLANDS ANTILLES





Taco LoadMatch® Real world hydronic system technology for Green Building design.

KPMG office building

Taco's LoadMatch® System helps keep humidity at bay in new office building on the island of Curacao.

Project Snapshot: A new office building housing 200 accountants and tax advisors for KPMG, the global audit, tax and advisory services firm, is up and running on the island of Curacao in the Netherlands Antilles. It's being kept cool by an HVAC system that includes Taco's LoadMatch single pipe system.

In planning the new building to house its operations on Curacao, KPMG approached the local engineering and installation firm of Omni B.V. to design an innovative HVAC system that would save on energy, be quiet in operation, meet precise indoor comfort conditions and be green.

The most critical requirement of the system – and the most challenging according to Omni B.V.'s engineering director, Henk Soeterboek, was for it to consume as little energy as possible, considering the fact that tropical Curacao has one of the highest energy costs per KW in the world (\$0.33 per KW).

Other KPMG mandates for the system included an advanced Building Management System that could be locally supported; noise levels from mechanical rooms and air distribution systems to be below 29 DBA; individual space controls provided through the BMS (no thermostats), and an ability to make use of green gas. Requirements for indoor design conditions were: 22° C (71.5 °F) and +/- 50% RH CO2 below 900 ppm

In keeping with KPMG's global presence (offices in 148 countries) Omni B.V. decided to specify the best equipment available from world class suppliers located in different countries.

Main components used were:

- Daikin chillers from Belgium
- Helpman condensers from the Netherlands
- Carrier modular air handlers from Brazil
- ASI Controls for the BMS system from the U.S.
- Solid Air distribution supply grills from the Netherlands
- Thermacore cold water pipe from the U.S.
- Taco LoadMatch system from the U.S.





Having read about Taco's LoadMatch® system, Omni's engineers investigated using an unconventional single pipe system that has been installed in over 200 buildings of all types. They were impressed by a number of its features, including elimination of most control and balancing valves; reduced first costs of installation due to about 30% less cold water pipe needed; use of much smaller LoadMatch distribution pumps for better energy savings, and the fact that Taco provides extensive front-end LoadMatch design support, including consultation with Taco LoadMatch experts and use of its proprietary Hydronic System Solutions (HSS) software system. HSS is an intelligent CAD software design system that helps designers reduce errors, speed up calculations and save substantial time in total design and construction administration. According to Soeterboek Taco provided "super support."

Selection of specific LoadMatch circulators – there are 13 total in the building – was based on the power supply parameters in Curacao – 400/3/50Hz. "We had to select the circulators carefully," says Henk Soeterboek. "Due to flow volume and head, the Taco circulators needed to be slightly bigger than standard size. All pumps were selected from Taco. In practice, this worked out very well."

Taco's LoadMatch system combines a single pipe hydronic system with wet rotor circulators for zone control. It is a self-balancing system that provides required flow to all cooling (and/or heating) units in

a building at all times. Because it is a single pipe system (with a decoupled secondary piping circuit to each terminal unit, it requires less pipe and eliminates control valves and most balancing valves. As a result, lower pump head and less horsepower are required to move water throughout the system.

LoadMatch has a proven track record of maintaining relative humidity levels even in very humid climates. On the island of Curacao absolute humidity averages between 22-24 gram/kg (+/- 180 grains per pound of dry air. Outdoor climate conditions place a very high load on air conditioning systems, especially the fresh air requirements. Careful selection of the air handling equipment for the KPMG building was required due to the relative humidity requirements, and heat recovery equipment was a must not only for relative humidity but also for energy savings.

Relative humidity in the KPMG building was an upfront concern for Omni B.V. because of dynamically changing water temperatures – the temperature cascade – experienced by the LoadMatch system. However, concerns about the temperature cascade with the Loadmatch system have been effectively answered: with proper sizing of the cooling coils – to account for the cascade and system diversity from one installation to the next – humidity levels in LoadMatch-equipped buildings have been very good

"After careful analysis and support from Taco," says Soeterboek, "we were convinced that humidity problems were not going to be a major

issue with the LoadMatch system.

To date, he reports, "the building feels very comfortable, and load shifting from one side of the building to the other side takes place without any complaints." Omni B.V. will be closely monitoring the building's indoor comfort levels during the hottest months of the year.

The combination of Daikin chillers and Helpman condensers made for a very efficient package of COP > 3.45 at full load. The chillers were placed in a remote underground equipment room because cooling towers, considering the high price of water on Curacao, were not feasible for use. The building total COP is +/- 3.1 taking into account all additional loads like the 13 air handler motors at 3.0 HP each; the building management system, and 13 recirculating LoadMatch pumps at ¼ HP each.

According to Henk Soeterboek, the LoadMatch distribution system has been a success, and since start-up there has been no need to balance any water flows. In fact, during its first nine months of operation the building remains right on design specifications, and the Omni engineers are extremely happy with the results. Total building fresh air is +/- 14,000 m³/hr. (8400 CFM), of which 72 percent is recovered by the Daikin VAMs heat recovery system.

"We would highly recommend the Taco LoadMatch system to anyone that is energy conscious and concerned about first cost savings," says Soeterboek, who's looking at using the LoadMatch system for an upcoming hotel project. "Taco did a great job for us."

You'll be more comfortable.

LoadMatch® provides better comfort than both all air or conventional hydronic systems. LoadMatch is a self balancing system that assures the required flow to all heating and cooling units at all times. Your heating and air conditioning system will deliver BTU's where they're needed, and when they're needed.

You'll save energy.

With less pipe and the elimination of control valves and most balancing valves, lower pump head and less power is required to move the water.

You'll save money.

Fewer parts, about 40% less pipe and fittings, no control valves and almost no balancing valves reduce first costs. Lower pump head and operation of pumps to match the load reduce operating and maintenance costs. All this adds up to big savings on the system, typically up to 30% of life cycle costs.

Contact Us

Taco engineers are at the forefront of Green Building hydronics, designing components and systems to help you meet the challenges of environmentally sensitive – and budget conscious – design and build. Visit our web site at taco-hvac.com or e-mail greenteam@taco-hvac for more information or to talk to a Taco Green Building professional.

