

New Sydney Luxury Apartments Use Lu-Ve Dry Coolers

David Goodwin

Mechanical services engineers chose dry coolers as part of the air conditioning package for residents of luxury residential apartments featuring stylish living and magnificent views up and down Sydney's Parramatta River.



Stage 3 of the Waterpoint Development at Meadowbank

The new Waterpoint apartment at Shepherds Bay development is centrally located at Meadowbank in Sydney, within minutes of major business districts with a Rivercat ferry terminal nearby. Stage 3 of development has views up and down the Parramatta River leading to Sydney Harbour in the east and across the River to the Rhodes Peninsula in the south and the Homebush Olympic Park. Bill Beriar and JK Developments was the builder/developer for the project.

James Aye, a qualified mechanical engineer was the project manager for A.M.Z. Engineering of Rockdale in Sydney who were responsible for the mechanical services on the project which started in December 2004. The company has been in business for 17 years.

"The company is involved with mechanical services consisting of the design, estimation and installation of heating, ventilation, air conditioning and refrigeration systems for commercial, government, institutional, industrial and domestic projects.

"My role was project manager and supervisor on this job, looking after all the installation works, and commissioning.

"We installed the air conditioning and ventilation systems at the Waterpoint Shepherds Bay, Stage 3 project," he said.

"The main reason for choosing dry coolers was to eliminate the potential for Legionella associated with cooling towers.



Side entrance with building A and D on the right and stage 2 on the left

"Stage 3 of the Waterpoint residential development involves six buildings. The buildings house luxury apartments and modern air conditioning was a part of the residential package," he told *Celsius*.

The builder/developer had gone for high quality finishes and didn't want the facade of its luxury units covered with a minimum of 248 ugly split system, outdoor units, according to Aye. They could have gone with a complicated and expensive system using chillers, but would still have had to circulate cold water around each building to individual fan coils. They would have had to meter the cost to each apartment's owner.

"There are many ways to design air conditioning systems which need to examine all the costs for the end user including: future service, maintenance, installation, will it fit in the space provided and many other issues," Aye said.

"It would be difficult to do that fairly if an owner was spending only six months of the year in their apartment, compared to someone else who was using the air conditioner full time.

"The system they needed was a 'user-

pays' where power usage is metered to a unit's switchboard.

"The only cost that all apartment shares as a community is the cost of the water pump and running the fans on the dry cooler, which in terms of the overall system cost, is quite small.

"The development needed an ecologically sustainable cooled water air conditioning system. Cooling towers were not considered. With cooling towers, not only is there potential for harbouring Legionella bacteria but with the continuous maintenance and the harmful chemicals needed to treat the water they were looking for an energy efficient alternative.

"The systems been designed for 40°C ambient dropping to 30° C with pre-coolers, so that precooled air is passing into the intakes of the dry coolers. When the ambient temperature is lower the precoolers don't need to run.

"Each building has got two dry coolers selected to service the full load. At reduced load only one dry cooler will be working and again the fans are all simultaneously speed controlled to precisely control the leaving water temperature.

"We could have got away with one large dry cooler on all buildings, but because of space constraints, two had to be installed.

"We bought Lu-Ve Contardo Dry Coolers from Cosair Products - NSW airconditioning distributor for Lu-Ve Contardo of Thomastown in Victoria - because their price was competitive and we had worked successfully together on other developments," Aye said.

"There are other products out there but we made our decision based on price, style and how much work is involved with the installation."

The reason for the design of using the Lu-Ve Dry Coolers was because there is zero threat of Legionella contamination because it's a closed loop system.

"There is a water cooled package unit in each apartment. Water circulates through the units through a common branch flow system and the inlet and outlet is going through the dry coolers and through the water pumps as well," Aye said.

"Each unit's water cooler package condenser unit ranges from 6 to 20 kW largest being a 30 kW with an electric elements in them."

Matt Cosgrove is the managing director of Cosair Products in Sydney. "We first supplied 10 Lu Ve Dry Coolers SHLT361A 250 kW. Each has eight fans," he said "In addition there were two SHLT450A's 320 kW Lu Ve Dry Cooler units with 10 fans each. Buildings A, C, D, E and F had the SHLT361A Building B was the only one that had the two bigger units because it is a larger building with higher load, which had the two SHLT450A's.

"Each dry cooler incorporates Lu-Ve's patented Safetube System. This eliminates all tube contact with the dry cooler's steel frame giving internal protection for the coil tubes.

"Fan Shrouds eliminate back-flow and reduce noise. Each Dry cooler has been selected for very low noise operation because of the residential nature of the project. Each fan section is separated from the other with fan guards conforming to safety standards. Fan motors are high performance, low energy consumption 415 V/3 Phase. Each dry cooler incorporates a switchboard and Lu-Ve's variable fan speed control module. The high efficiency external rotor motors include the sickle blade axial fan technology for optimum efficiency and noise control. The motors are life lubricated and thermally protected. Motors and fans are statically and dynamically balanced," Cosgrove said.

"Cabinet construction is galvanised steel, polyester powdercoated and corrosion resistant. Header bends and junction boxes are guarded. Coils include Lu-Ve's alupaint anticorrosion treatment.



James Aye from AMZ Engineering with AIRA Pre-Cooler in front of Lu-Ve SHLT361A 250 kW Dry Cooler unit

"The dry-cooler draws hot, outside air over water-saturated pre-cooler pads. Water evaporation from these wet pads lowers the dry bulb temperature of the air before it enters the dry cooler. This pre-cooling enables the dry cooler to work more efficiently and use less energy." The add-on cooling system - pre-coolers works on recycling the water from the tank into the wet pads then back into the tank. Once a day the water is dumped into the sewer to avoid water treatment.

Cosgrove said each of the dry coolers were fitted with pre-coolers supplied separately by AIRA P/L.

"The pre-coolers around the perimeter of the unit are separate entities to the unit. They have been designed to reduce the ambient temperature so that cooling, or the performance of the dry cooler is not adversely affected by higher temperatures.

"For most of the year they may need cooling the dry coolers can handle without the need to run the pre-coolers. They work like a normal air cooled condenser with a pre-cooler attached.

"You've still got your coil tubes passing through the unit itself and within a casing you've got your fans, and all you're doing is drawing in ambient air and discharging the hot air so it's rejecting the heat from the condenser water loop," Cosgrove told *Celsius*.



One of the apartment 30 kW water cooler package units

"The dry coolers each have variable speed drives within their control systems so that they precisely control the leaving water temp during the cooling cycle. The water pumps are running on pressure. If there is only one dry cooler unit operating the pumps don't have to run at full speed, further increasing the efficiency of the system".

AMZ used a tower crane to lift each set of two Lu-Ve units onto the roof top of each building. The legs needed to be assembled then each unit was hoisted into position. Each unit took them approximately an hour to position, said Aye.

"The plumbing was done by our plumbers and we also installed the pumps VSDs and ancillary equipment

and did all the commissioning," he said.

"The dry coolers are pretty



The view from down the Parramatta River with the second Unit in the foreground

straightforward to set up and run. Then we switch it on and the machine does the rest. It has its own control system and self diagnosis.

"We sub-contracted electricians and commissioning engineers. The commissioning was done by Dewpoint Engineering for water and air balancing. Our electrical contractor is Inscope Building Technologies and they've done all the electrical, control systems, switchboards for the mechanical services air conditioning and ventilation systems in all six buildings.

"We're also going to supply Lu-Ve



The Lu-Ve Variable Speed Drive

dry coolers for stages 4 and 5 of the development.

"Waterpoint has been a very successful development unlike some other developments that are struggling in the downturn," Aye said.

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