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Bahman Al Nadaf, Hot Water Heat Pumps Ltd

Resort Style Retirement at Pacific Coast Village

The population of New Zealand is aging and many of the baby boomers are choosing to live in retirement villages. One of the latest villages catering to this population is Pacific Coast Village. Pacific Coast Village is “Resort Style Retirement living at it’s finest.” The complex is designed by award-winning Sumich Chaplin Architects and has been built to the highest standards.

The indoor Pool Pavilion features a 25 metre long pool heated to 32°C, a separate spa heated to 39°C, cardio room and sun deck that are enjoyed by residents every day of the year. The role of the pool pavilion is “to create a lifestyle comparable with resorts on Australia’s Gold Coast” says Graham Wilkinson, Managing partner of Pacific Coast Village.

On the official opening day, 15 December 2015, the chairman of the residents’ committee, Don Allan said, “residents are thrilled with the latest additions and I believe that facilities like the pool are one of the reasons for the strong growth of the village over the past year.”

The Challenge

Richard Mora, project manager at Generus Living Group, was researching Indoor Pool heating and ventilation options. He had a preliminary design from a consulting firm based on a gas boiler system and simple duct design. The design had potential to create problems of uneven air distribution, leading to condensation in certain areas of the pool enclosure, and a high energy bill.

Bahman Al Nadaf from Hot Water Heat Pumps Ltd explained the benefits of using Hot Water Heat Pumps Ltd heating and condensation control systems. “Maintaining good air quality within and around the pool enclosure, for the health and comfort of pool users, is one of the most important tasks of the design team,” says Bahman. He recalls Richard’s subsequent factory visit where he demonstrated their method of using

integrated heating, ventilation and condensation control systems with “Duoheat” and “Vent-Air” to provide thermal comfort for indoor pool users. This presented a credible option for a successful, reliable and functional Indoor Pool Heating and Condensation Control System for the bespoke Indoor Pool Complex under construction at the Pacific Coast Village.

The Method

There are three major components to the integrated Duoheat and Vent-Air system.

1. Heat Source – For energy efficient pool, spa, air and shower water heating
2. Air Handling Units – To supply fresh outside heated air and return air handling system to remove humid air from the enclosure with heat recovery
3. Air Distribution Ducting – To distribute air evenly on all surfaces by either an exposed under ceiling or underground duct work around the perimeter of the pool

One of the main criteria for any indoor pool is to create a comfort zone for swimmers and maintain good indoor air quality, especially for the elderly. However, it is equally important to protect the structure from excessively high humidity levels and condensation. Condensation in an indoor pool is not only unsightly but if ignored, could damage the integrity of the building envelope, which could create a dangerous environment and expensive maintenance costs.



Artists Impression of the Indoor Pool Pavilion



Inside the Indoor Pool Pavilion looking out



Indoor Pool Pavilion an external view

Our design team's goal was to ensure good quality indoor air by introducing 100% outdoor air, preheated as necessary and exhaust 100% of the stale and moisture laden air from the pool enclosure for humidity control through a recovery system.

To achieve thermal comfort for swimmers in the Retirement Village Indoor Pool, it is required to keep pool water at 32°C. This warmer temperature leads to a much higher evaporation rate. Energy is also needed to compensate the heat loss from the pool and the ventilation to minimise the rate of evaporation from the surface of the pool. Indoor pool facilities consume a great deal of energy. Therefore being able to find a cost effective system is essential.

The core of the heating system is a dual purpose "Performance Plus" heat pump custom built at the West Auckland factory of Hot Water Heat Pumps Ltd. This "Duoheat" heat pump has a unique design using two independent heat exchangers; a titanium one to heat the pool water and another heat exchanger to heat a buffer tank to a higher temperature very economically. Each application has its own control systems controlling the desired set temperature to achieve a higher COP.

The "Vent-Air" ventilation and condensation control system is based on a Supply Air Handler with an extra heating coil. All unit frames are powder coated for extra protection and the coils are epoxy coated as well to provide a long lasting life in an environment that promotes corrosion. The return Vent-Air is equipped with heat recovery coils to recover as much energy as possible from the departing air to preheat the water for the incoming air in the first stage or recovery. The second stage of recovery is when the exhausting hot and humid air passes through the "Duoheat" heat pump(s) evaporator coil(s), producing more favourable conditions for the heat pump, and reducing the total heating cost.

Air Distribution

The air distribution is designed to ensure air flow prevents condensation build-up and to create a comfortable environment in the pool deck area. Extra care is taken with ducting at the design stage to avoid creating drafty areas by using nozzles to direct air evenly to all needed surfaces.

The Result

Pacific Coast indoor pool and spa runs on a fraction of cost of an equivalent size indoor pool facility. The core of the heating system consists of two eco-friendly and energy efficient "Duoheat" heat pumps, providing all the heat for the pool enclosure, pool water, spa water, hot water for showers, and air heating for condensation control.

A year on from the project Hot Water Heat Pumps Ltd has managed to deliver all the promises that were made before being awarded this project. A big thank you goes to Richard Mora for choosing Hot Water Heat Pumps Ltd approach to heating and ventilating indoor pools. The project team at Hot Water Heat Pumps Ltd would also like to thank all the parties and trades people involved in this project. Without their full co-operation, Hot Water Heat Pumps Ltd would not have finished this project successfully.



SHOWCASE AT A GLANCE

Village Owner	Pacific Coast Village
Architect	Sumich Chaplin Ltd
Builder	Tristar Construction Ltd
Pool Builder	Tranquility Pools Limited
Pool Heating, Spa Heating, Domestic Hot Water and Condensation Control Systems	
Hot Water Heat Pumps Ltd	

Equipment

Vent-Air system comprising of a supply and return air handlers with heat recovery option

Duoheat heat pump for Pool & Air model: 7GP50A63-3

Duoheat heat pump for Domestic Hot Water & Spa model: 7GS11D10-3

Air Distribution system under ceiling air delivery