

Pioneering Groundwater Sprinkler System Depends On Advanced Drives



A recently completed hotel adjacent to the Rotterdam Zoo, featuring a pioneering system for utilizing groundwater in the fire sprinkler system, has at its heart two Affinity variable frequency AC drives from Control Techniques.

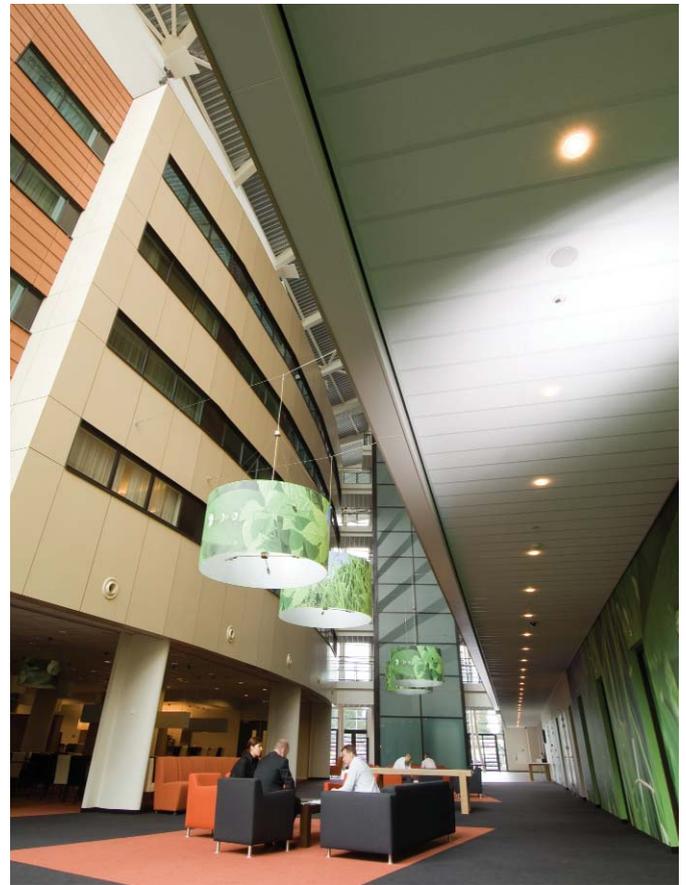
The system, designed and installed at the Domina Inn by Quintess B.V. of Holland in conjunction with Control Techniques' Rotterdam Drive Centre, is believed to be the first system of its type controlled by inverter drives and eliminates the need for a high volume mains water supply or roof-mounted water tanks.

"We chose the Affinity range to power the pumps because of its 'Fire' mode," explained Quintess' general manager, Paul Caspers. "This gives us a guaranteed 150% of rated current with no trip during the emergency operation. One drive and pump is sufficient to provide maximum flow and the second pair give 100% redundancy cover."

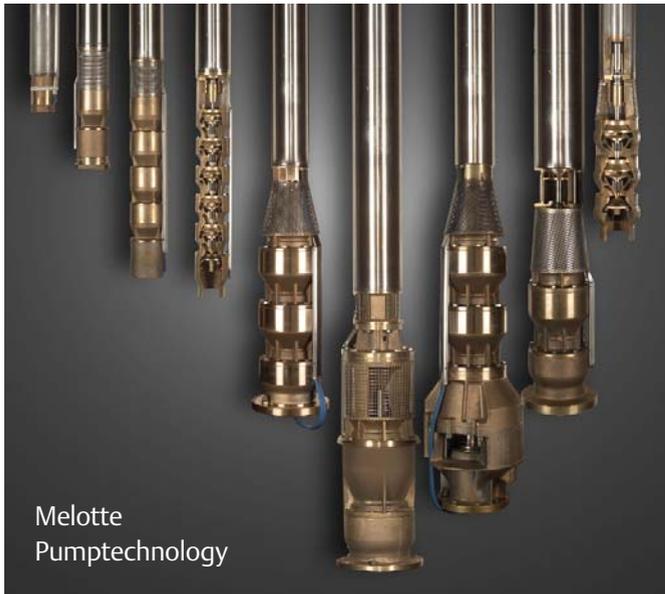
The six-floor, 200 room Domina Inn and Conference Centre, located between Rotterdam airport and the city centre features this unique sprinkler system that utilizes groundwater pumped up from a sand layer 60 metres underground.

The Melotte low inertia submersible pumps are installed in boreholes (wells), some 15 metres below the surface. These boreholes have slots in the filter sections enabling the groundwater to enter the borehole and provide a flow of 125 cu.metres/hr to the sprinkler system.

"We were asked to look into a system that is independent of the mains drinking water or the need for water tanks," explains Paul Caspers. "Traditionally, the pumps would be started with Star/Delta starters, but, with the high starting torque required, we proposed the use of inverter drives."



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In cooperation with Instalect, the mechanical design consultant for the project, we had to convince the client, that this would be a better solution and, with help from Control Techniques and detailed information on waveforms, product quality and drive performance, we were able to achieve this.”

The Affinity AC drives are heavy-duty rated at 37 kW (BA 4402) and are fitted with both RFI filters and PWM correction to provide a near perfect waveform, required by the unusual operating characteristics of the pump motors. The system provides a pressure of 8 Bar (10 Bar on the manifold) with a minimum water flow of 20 cu.metres/hr rising to a maximum of 125 cu.metres/hr. The system has to be capable of accelerating from start up to maximum flow in three seconds.

As standard drives have integrated network connectivity with Metasys N2, Modbus RTU and this building’s BACnet network/building management system, this provides communication with a PLC controlled fire control panel providing sprinkler control over 47 areas of the hotel. There is a hard control link between the drives and this PLC. Via Ethernet, Quintess can access the drives at any time to check operational readiness, set parameters and pump motor condition.

The drives provide 4 main modes of operation; for both fire mode and test mode there is a choice between a, PID controlled pressure setpoint at 8-Bar (regardless of the preferred flow) and a fixed drive setpoint (54 Hz). A cut-off valve is also controlled by the Affinity drives to guarantee the minimum flow of 20 m³/h over the pump for cooling when the requested flow over the manifold is less than 20 m³/h .

Control Techniques’ Affinity range of drives has been designed specifically for the HVAC market and building control functions, incorporating extensive market research and 40 years’ experience from sister company, Emerson Climate Technologies. Affinity reflects the sector’s requirement for no scheduled maintenance, comprehensive 2-year warranty, ease of integration with building management systems, remote access from anywhere in the world, whisper-quiet operation and energy-saving operation.

Packed with special features as standard, Affinity incorporates an onboard controller with real-time clock, motor pre-heat, low-load detection, a sleep/wake mode and free software tools for easy installation and commissioning. At the Domina Inn, the system was installed and running within one day.

“This is Netherland’s first approved groundwater sprinkler installation with variable frequency inverter control,” says Paul Caspers, “and this would not have been possible without considerable input from Control Techniques,” he says.

Quintess B.V., based in Boxmeer in Holland, provides complete solutions in system integration for HVAC and refrigeration and is in the forefront of new technologies such as energy-saving cold storage systems (GeoMini, GeoThermal, GeoDoublet) and air treatment systems.

KEY BENEFITS

- EASY INTEGRATION WITH BUILDING MANAGEMENT SYSTEMS
- REMOTE ACCESS VIA ETHERNET
- WHISPER QUIET OPERATION
- FIRE MODE
- ON-BOARD CONTROLLER WITH REAL-TIME CLOCK
- FREE SOFTWARE TOOLS



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