

Phoenix Controls Aids Patient Healing at City of Hope National Medical Center

Background

City of Hope National Medical Center in Duarte, California, is one of the world's largest bone marrow transplant and cancer care hospitals. Housed in its six-story, state-of-the-art Helford Clinic and Research Hospital are:

- 144 patient care rooms
- Six surgical suites
- Research laboratories

The patient care rooms are designed to accommodate people battling the most serious diseases, including many



City of Hope National Medical Center in Duarte, California.

who are immunocompromised. To keep these patients comfortable and safe from airborne infection while they are recovering from illness, the hospital chose precision airflow valves from Phoenix Controls' Healthcare Solution for its isolation rooms and adjacent spaces throughout the hospital.

Meeting the Challenge

During the design phase, a key goal of the facility was to enhance the patient care environment for contributing physically and psychologically in the healing process. To accomplish this, non-traditional isolation rooms were designed by Seattle-based architects NBBJ and the engineering firm Syska Hennessy Group. The isolation rooms were organized in a more socially connected series of six "pods" around a central nurse's station. While this new layout presented opportunities for faster patient recovery, it also created challenges in designing proper room airflow and pressurization.

City of Hope had four main criteria for isolation room ventilation design. First, the airflow valves needed to be maintenance free so there would be no need for regular and costly service above the ceiling. Second, during routine HVAC maintenance procedures, the backup air-handling system needed to provide quick, accurate turndown to 10 air changes per hour (ACH). Third, the overall system could not disrupt the balance of airflow in adjacent parts of the hospital. And fourth, the ventilation system must be reliable and not require calibration at any time in the operational life cycle.

Traditional isolation rooms consist of a single patient room and a connecting anteroom or airlock that protects patients from airborne pathogens that may exist in other parts of the building. The unconventional pod design connected to a 345-square-foot central nurse's station required special engineering work because the middle alcove would serve as the central airlock for all six rooms. The area needed to be under negative pressure, returning surplus positive pressure air from the isolation rooms through HEPA filters back through the ventilation system. The venturi design of the Phoenix Controls valve was uniquely suited for this configuration because of its ability to precisely control airflow, thereby providing the positive pressure required for protecting immunocompromised patients.

Furthermore, the California Office of Statewide Health Planning and Development (OSHPD) requires strict regulation of isolation room airflow at a minimum of 15 ACH.

Benefits of the Phoenix Controls Healthcare solution:

- Maintenance free
- Proven reliability
- Pressure-independent operation
- ±5% accuracy through the valve's full airflow range

The designers went beyond these guidelines to allow for more air changes, ensuring additional protection for patients. In normal operating mode, the air handlers provide 18 ACH to the isolation rooms. While in maintenance mode, for service such as HEPA filter replacement, the rate is reduced to 10 ACH. This was achieved using a dual air-handling system that provides ventilation to all the floors where the isolation rooms are located. When one system is shut down for maintenance, the other takes over normal ventilation operation. The Phoenix Controls Healthcare Solution gave City of Hope assurance that pressurization would be maintained during such service, and over time, ACH would be maintained reliably without expensive calibration or frequent balancing.

Confidence in the Solution

The nature of cancer treatment inherently requires many pressurized rooms within a single facility—more than is typically required in public hospitals. Hence, there is increasing risk over time that irregular HVAC service could result in the entire building's ventilation system being out of balance and compromising proper pressurization in the isolation rooms. Rob Yardley of The George Yardley Company, sales representative for Phoenix Controls in California, understands these issues, and is an expert at designing and installing Phoenix Controls valves to address such concerns. Yardley and his team worked together with Syska Hennessy engineers to ensure City of Hope was confident that the Phoenix Controls Healthcare Solution would work the best for the new isolation room design and the facility as a whole. Computer modeling was used to verify the positive pressure of the patient rooms and negative pressure



The pod design of the isolation rooms in the Helford Clinic at City of Hope National Medical Center.

of the nurse's station would work as a functional system. This was also necessary to obtain OSHPD approval to implement the pod design concept.

The Phoenix Controls Healthcare Solution was installed throughout the facility's six floors. During operation, the accuracy and reliability of the system was important for many reasons. Patients undergoing cancer treatment or bone marrow transplant are often inpatients at the hospital for many weeks. Confinement in a single room is already difficult, and improper airflow and temperature regulation can make daily living even more unpleasant.

Since Phoenix Controls valves do not require airflow measurement, there are no flow sensors that could clog. The flow sensors required in other ventilation solutions are prone to dust build-up, caused by frequent changes of bed linens, towels and garments in the room. Clogged sensors, if not cleaned frequently, send false readings to the ventilation control system, which then command changes in airflow, contributing to wasted energy and drafts over patient beds. Elimination of flow sensors was a key benefit to City of Hope, and seen as a way to reduce maintenance costs and increase the reliability of the pressurized spaces.

As an added benefit, all Phoenix Controls valves are pressure

independent and do not require straight duct runs to provide accurate airflow control. At City of Hope, this meant the valves could be placed in the ceiling with greater mounting options around oxygen lines, gas supply lines, and patient care instruments fitted into the wall behind each headboard. Phoenix Controls valves also maintain airflow mechanically and accurately without power during emergencies when fan speeds and duct static pressure may be reduced—an essential safety measure for immunocompromised patients.

The Results

City of Hope is in the business of patient care and saving lives. The hospital chose to build a facility that would deliver the highest quality patient treatment, addressing the physical and psychological aspects of disease management and recovery in a state-of-the-art building. Phoenix Controls helped City of Hope turn their bold design into reality by providing an airflow solution that ensures long-term, maintenance-free performance of accurate room pressurization and ventilation balance throughout the hospital. This met all of City of Hope's original goals for patients and staff, while saving the hospital's precious budget resources each year through reduced maintenance costs and optimized energy use.