A commercial real estate corporation that owns, develops and operates premier properties in major North American cities was one of the earliest companies to recognize the benefit of individually metering tenants for their utility usage. When designing a prestigious building complex in New York City, the company sought a flow meter that would facilitate this task. After careful consideration of several options, the choice became clear: clamp-on ultrasonic flow technology from Siemens.

In any district cooling operation, a well-balanced system based on accurate and reliable flow and temperature measurement is extremely important. It is therefore imperative that every company regularly check the efficiency and performance of their cooling system, and be prepared to make drastic changes if required. Since heating and cooling costs account for more than half of a building’s total energy consumption, the extra time and cost may very well be worth the effort.

Background
While in the design phase for their new complex, the real estate corporation began looking at alternative ways to address tenant utility billing. Instead of utilizing the popular square footage methodology in apportioning such costs, the company recognized that determining real costs would allow them to run their cooling plant more efficiently.

Rather than having four individual HVAC systems, one for each tower, the complex installed a single central district cooling plant – one of the largest in New York City. The entire system consists of ten chillers that satisfy the cooled water needs of all four buildings. On each floor, one or more air handling units produces the cold air that circulates throughout the cooling system. The complex’s close proximity to a large body of water was taken into consideration when designing the HVAC system. The central cooling plant is supported by a 3.3 million gallon, 13-tank chilled water thermal storage system used to adjust peak usage. In lieu of the commonly utilized cooling
towers found on top of most other buildings, the body of water acts as the cooling tower for this complex, which helps reduce utility costs.

Problem

Once the real estate company decided to implement individual tenant billing, they had to find a suitable flow measurement technology. They were looking for flow meters that could be installed, repaired and, if necessary, replaced without ever having to cut open the pipes, which would simply be too expensive and labor intensive. In addition, they required a combination of easy installation, low maintenance and high accuracy.

After a long and intensive research process, the company made the decision to go with the SITRANS FUE1010 clamp-on ultrasonic flow meter from Siemens, which would offer the best return on investment. Apart from the obvious advantage of nonintrusiveness since the sensors are installed on the outside of the pipe, the SITRANS FUE1010 is available in both single and dual-channel versions, is easy to maintain and is known to be highly accurate – an important aspect when considering that the real estate corporation needed to use the meter for billing purposes.

Solution

To accommodate the requirement for individual tenant billing, multiple SITRANS FUE1010 flowmeters were installed in strategic locations around the complex. Since the chiller plant distributes chilled water to each tower individually, a single-channel meter measures the amount of water leaving the plant while additional meters monitor what is received at each tower. Another device is used to track the amount of energy stored in the thermal storage tanks during the charging cycle and to monitor the amount drawn down during peak hours.

The largest grouping of meters was installed in three of the four towers. These three towers had the most tenants and at least one meter was required for each of them. The type of meter installed varied from tenant to tenant. In cases where a major tenant occupied several floors, installing one single channel meter was sufficient. In other instances, a dual-channel version was installed, which made it possible to measure energy consumption on two floors with only one meter, saving substantial amounts in initial equipment investment.

With this setup, the facility managers could keep track of the exact amount of water flowing from the chillers to the tenants and the difference in temperature between the supply and return water, which is all they needed to accurately calculate how much energy was being consumed by each of the tenants. An added benefit of the system is that it monitors the flow between the pumps and the chillers, which is a prerequisite for determining efficiency level and detecting performance issues.

LEED certification

Another positive effect of measuring tenants’ individual consumption involves Leadership in Energy and Environmental Design (LEED) certification from the U.S. Green Building Council. One of the numerous prerequisites for attaining the minimum rating of “certified” is that a building’s energy performance must be documented based on actual metered energy consumption. So simply by installing SITRANS FUE1010 flow meters at their building complex, the real estate corporation has made significant progress toward achieving LEED certification.

Conclusion

All in all, the thoroughness and rigorousness with which the real estate corporation approached the flow meter selection process has resulted in great dividends. The clamp-on system that was finally installed has lived up to the specified requirements and has simplified what is usually considered a very complex flow metering task while improving the overall efficiency of the HVAC system.