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LEED Credits for Healthcare

U.S. hospitals are significant water users—with many local facilities using an average of 300 gallons of water per bed each day and large research hospitals using up to 700 gallons of water per day. An American Society for Healthcare Engineering study in 2002 reported an average of 504 gallons of water per bed per day. Compare this to hospitals in Jordan, which average around 200 gallons of water per day. While the exact numbers vary, the fact remains that hospitals use a lot of water, but much of this water usage can be reduced, even with the special needs of a modern hospital.

Previous LEED rating systems did not address the special issues that hospitals face when trying to reduce water usage. Hospitals that pursued LEED certification could use measures such as water-efficient medical vacuum and air systems, but such efforts were not eligible for credits and recognition in the original LEED for New Construction system.

All of that changed, however, with the release of the long-awaited LEED for Healthcare (LEED-HC) rating system this past spring. The U.S. Green Building Council has developed a rating system that fits the special needs of hospitals, and plumbing engineers now can incorporate water-saving elements in a hospital to obtain LEED credits.

This article discusses how plumbing engineers can incorporate these credits into their designs. It is not a complete design guide, so plumbing engineers will have to review the USGBC reference guides and consult LEED facilitators for more detailed information.

LEED-HC WATER-EFFICIENCY CREDITS

Following are some of the water-efficiency credits in the new LEED-HC guidelines.

Water Use Reduction: WE Prerequisite 1 and WE Credit 3

Designers with LEED experience will recognize this credit from the New Construction system. In full-service hospitals, the plumbing fixtures use approximately 25 percent of the total water consumption. Thus, using efficient plumbing fixtures will not have the same effect on total building water usage when compared to a typical office building, but they are still important.

Water Closets Low-flow, 1.28-gallons-per-flush (gpf) fixtures have been around for a few years and have proven to work very well in hospitals. If the hospital staff is reluctant to go with the low-flow fixture, you can use the dual-flush fixture. With proper training, the installation of these fixtures can reduce water usage.

Urinals The typical hospital does not have many urinals, and maintenance staffs often find that water-free urinals work well in hospitals. However, in many real-world applications, personnel are reluctant to use them. In these cases, a 0.8-gpf or 0.5-gpf urinal can be used.

Process Water The different types of clothes washers, dishwashers, and ice machines are listed under this credit. While the plumbing design team is usually not responsible for specifying this equipment, they should recommend that the owner coordinate this equipment with the LEED requirements.

Showers Lower-flow showerheads can be used in healthcare facilities. However, personal preferences can be an issue with showerheads, so it is important for the staff to become familiar with a particular brand before it is used throughout a facility. In many applications, patient rooms will have both handheld and fixed showerheads. In these cases, 2.5 gallons per minute (gpm) can be used for the handheld showerhead, while a reduced flow can be used for the fixed showerhead. However, it is not recommended to use less than 2 gpm for showers in most healthcare facilities. When using different flows in one shower, confirm that the mixing valve is rated for both of the flows.

Lavatories and Sinks Public toilets require 0.5-gpm faucets. However, fixtures for clinical uses such as in exam rooms and patient rooms do not have to meet this requirement and can be exempt from the LEED calculation. This is because some facilities and local health codes require staff to wash their hands for prescribed lengths of time before seeing patients or performing procedures.

WE Prerequisite 2: Minimize Potable Water Use for Medical Equipment Cooling

Some medical equipment, such as an MRI, requires cooling. In some installations, domestic water is used as the primary source to cool the equipment, and the water is then wasted down the drain. The current trend is to have a mechanical chiller with a closed water loop that cools the equipment. For LEED projects, it is acceptable to use domestic water as an emergency backup cooling method in the event the chiller breaks down.

Integrated Project Team

Many design professionals specify fixtures and systems that meet code requirements without communicating with the users and maintenance staff of a facility. This reduces the design cost and can reduce construction costs. Schedules are shortened, and at first glance it appears to be a win-win for everyone. In reality, this practice can lead to user dissatisfaction at best or higher health risks at worst.

An example of this is water-free urinals. Some design teams and contractors will specify and install the fixtures and then turn the building over to the owner to maintain with no communication with the staff. To add to the problem, the staff may not even be aware that the fixtures are installed and do not know how to maintain them. The design and construction team justifies this by stating that they meet code and that is all they are responsible for doing. While technically they are correct, buildings that operate efficiently need input from the staff during design and construction.

Another example is water heaters that are not maintained, resulting in inefficient operations that can add energy or water costs to the facility.

To respond to these problems, organizations such as the U.S. Green Building Council are now requiring an integrated project team for healthcare projects as a prerequisite. The team includes as many of the following professionals as feasible (with a minimum of four), in addition to the owner or owner's representative.

- Owner's capital budget manager
- Architect or building designer
- Mechanical engineer
- Electrical engineer
- Structural engineer
- Energy modeler
- Equipment planner
- Acoustical consultant
- Telecommunications designer
- Controls designer
- Building science or performance testing agents
- Green building or sustainable design consultant
- Facility green teams
- Physician and nursing teams
- Facility managers
- Environmental services staff
- Functional and space programmers
- Interior designer
- Lighting consultant/designer
- Commissioning agent
- Community representatives
- Civil engineer
- Landscape architect
- Ecologist
- Land planner
- Construction manager or general contractor
- Life-cycle cost analyst or construction cost estimator
- Other disciplines appropriate to the specific project type

WE Credit 4.1: Water Use Reduction—Building Equipment

A credit that is similar to WE Prerequisite 2 is WE Credit 4.1 for water reduction in building equipment, which includes medical and industrial air compressors and vacuum pumps. This equipment usually is specified by the plumbing engineer. For instance, liquid-ring equipment wastes water because the domestic water that seals the compressors is discharged down the drain, so equipment that does not use water is becoming the industry standard.

WE Credit 4.2: Water Use Reduction—Cooling Towers

Cooling towers for air-conditioning systems can account for 15 percent of the total water usage of a hospital. They are made to recycle water, which requires the owner to develop a method to maintain this water in the proper condition to operate the equipment efficiently. Most systems use domestic makeup water to maintain the quality of the water in the tower.

One of the biggest concerns is to keep the water soft. As the water evaporates, the concentration of the solids that remain increases, which is referred to as the cycles of concentration. The first part of this credit contains the requirements for the cycles of concentration. Setting the cycles is usually not the responsibility of the plumbing engineer, but the plumbing engineer may be responsible for specifying blowdown meters, conductivity controllers, and overflow alarms. The HVAC engineer typically specifies the efficient drift eliminators.

WE Credit 4.3: Water Use Reduction—Food Waste Systems

Hospital kitchens require water for dish washing, cleaning procedures, and equipment (approximately 15 percent of the total water used in a facility). This credit is usually the responsibility of the food service vendor and not the plumbing engineer because it covers disposers, pulpers, and strainers. However, the plumbing engineer will be responsible for ensuring that the food waste disposer system uses no hot water.

WE Credit 2: Water Use Reduction—Measurement and Verification

Many other systems in a hospital use water. It is important to monitor these systems to find leaks and malfunctioning equipment and to monitor operational and procedural changes. For this credit, meters are required to track the following water uses:

- Cooling tower makeup and blowdown
- Incoming water to the project
- Purified water system (reverse osmosis and/or deionization)
- Filter backwash water
- Water used in the dietary department
- Water used for laundry
- Outdoor irrigation systems
- Steam boiler system makeup water

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Points can be earned for the installation of meters to track the water use in any two (for one point) or any three (for two points) of the following:

- Water use in laboratories
- Water use in central sterile and processing departments
- Water use in physiotherapy and hydrotherapy treatment areas
- Water use in surgical suites
- Closed-loop hydronic system makeup water
- Cold water makeup for domestic hot water systems

The plumbing engineer usually specifies these meters, and the owner is responsible for developing a procedure to collect the data.

WE Credit 1: Water-Efficient Landscaping—No Potable Water Use or No Irrigation

The largest irrigated crop in the United States is turf grass, and irrigation can be 12 percent of a typical hospital's water usage. A trend in the last few decades has been to maintain hospital grounds to golf course standards because hospital administrators think that this shows the community that the hospital is clean and orderly. In contrast, bioswells and retention ponds are viewed as unclean and disorderly. However, these views are changing, and hospital staff and users are becoming more used to seeing natural diversity on hospital grounds.

To obtain this credit, the facility has to eliminate the use of potable water or other natural water resources for landscape irrigation. This can be done by designing a system that uses captured rainwater, recycled wastewater, or recycled graywater. Packaged systems are available for these purposes, or an irrigation designer can specify the systems. Another option is to use water treated and conveyed by a public agency specifically for nonpotable uses.

After reviewing these credits, the plumbing engineer usually discovers that there is nothing exotic, strange, or difficult in obtaining them. When these systems are implemented and maintained by the facility, the water usage in a hospital should be reduced when compared to a facility without these benefits. PSD

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