Horizons

Cleaning Up the Restroom

Hands-free technology and more maintainable surfaces

Public restrooms are an important consideration for many nonresidential construction projects, despite the fact many are only visited strictly out of necessity. Indeed, the washroom has garnered a reputation for being an unclean location. The Centers for Disease Control (CDC) recently reported that after using a public restroom, a person's hand can host as many as 200 million bacteria. As such, it is little surprise that last October, ABC's 20/20 reported half of American women refuse to sit on the toilet seat.

When it comes to creating a healthier restroom, there are many variables the design team cannot control in restrooms-users trying to vandalize toilet partitions, cleaning staff not properly disinfecting, and reluctant hand-washers, to name a few. However, an understanding of germs and bacteria can assist in the specifying of certain products and fixtures to decrease the odds of disease transmission.

Going hands-free

Dr. Charles Gerba, a microbiologist from the University of Arizona, has spent the better part of his career studying germs in the restroom. (Much of his focus has been on the microorganisms ejected from the toilet during flushing.) He points out the biggest myth among consumers is that toilet seats are the dirtiest surface in the bathroom.

"The floors in front of the toilet, sink basins, and the outside of the sanitary napkin disposal are the most contaminated areas of any restroom," he says. "Germ levels vary in restrooms from day to day, but microorganisms such as the Hepatitis A virus, coliform and E. coli are among the usual bacterial suspects that we routinely find in our samples."

Gerba notes the influenza virus is also frequently found on restroom surfaces. The flu can be transmitted by mouth or hand contact; since the virus can survive up to three days on surfaces, it is easy to imagine the hundreds of restroom users that can be infected by touching a contaminated faucet to turn off the water after washing, or pushing open the restroom door when leaving.

As such, one of the best solutions for minimizing harmful germs and bacteria is to create a hands-free restroom environment-fewer surfaces to touch equals less cross-contamination. Facility managers often also appreciate these devices, because keeping user's hands off knobs and handles can help prevent wear-and-tear and vandalism.

Automated flush valves on toilets and urinals, touchless faucets, touch-free hand dryers-virtually everything in the restroom can be specified in a no-touch model. While sensor-operated fixtures and accessories are not new, improved operation and better technology makes these products' use and maintenance easier.

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The author demonstrates hands-free technology at an experimental 'green design' Wal-Mart Supercenter in Aurora, Colorado. These restroom fixtures have come a long way from the non-responsive hassles of earlier models.

Initially, hands-free fixtures relied on infrared technology. When a user's hands enter the infrared light, it breaks the beam and activates the faucet. The next generation of technology was adaptive infrared sensing, which was designed to be smarter by adapting to the environment. For example, these products can detect a change in light reflected back into the sensor receiver that activates the flow of water. The loss of reflected light is a signal for the water to stop. This improved technology reduced the number of problems that occur when vandals place an object in the sink, causing faucets to run and overflow the basin.

However, these sensors faced glitches and would occasionally malfunction-many people have experienced the predicament of a touchless faucet that would not activate; it can be annoying to have to proceed down a row of sinks in search of the one working model. Adaptive sensing products can also be problematic because shiny reflective surfaces (e.g. mirrors or countertops) and soap scum may interfere with faucet performance. Additionally, users with darker skin tones reflect less light to the sensor, and can effectively reduce the faucet's detection range.

Improving touchless operation

Capacitive sensing technology is quickly proving to be a better approach for public restrooms. A faucet with capacitive sensing has an electrical field surrounding the entire faucet, which detects a user's presence from any angle of approach. The faucet activates because the user creates a significant change in the field, adding to the overall conductive capacity.

Rather than a small sensor or `sweet spot' under the spout, this omni-directional detection zone makes for easier, trouble-free use. Capacitive sensing virtually eliminates false activations and provides consistent operation in nearly any restroom environment. Reduced maintenance is the critical benefit for owners, as there are no above-deck sensors, handles, or knobs to vandalize.

Another product improved through better technology is the touch-free hand dryer. Some newer models have a sleek design and feature two powerful jets of hot air directing the air down and out to dry hands in less than 25 seconds. Infrared sensors activate the dryer when hands are placed 76 to 152.4 mm (3 to 6 in.) below the nozzle. When specifying a surface-mounted unit, one should look for units less than 102 mm (4 in.) deep to conform with the protrusion requirements of the *American with Disabilities Act (ADA).*

For those who prefer hand towels to dryers, there are also 'hands- free' options. Center-pull towel dispensers allow users to dispense one towel at a time without touching any other towels or pushing or turning a lever. Some models have built-in waste receptacles that help maximize floor space by eliminating the need for a separate trash can.

Another hands-free option available is the automatic towel dispenser, which advances a preset amount of paper towel when hands are placed below the unit. Many of these dispensers also offer ways of limiting the amount of towels dispensed at one time. As with some faucets, hands-free towel dispensers employ capacitive sensing to prevent false activation from the motion of the paper towels.

Reducing germs at the sink

As mentioned earlier, sinks are among the dirtiest areas of the restroom. Wet backsplashes, corroded faucets, and dirty sink drains are the norm rather than the exception. The wet environment, combined with residual grime from hand-washing and other contaminants brought over from other areas of the restroom, creates a haven for germs and bacteria.

Selecting easy-to-clean surfaces with fewer germ-hiding places makes for a more sanitary hand-washing area. Many facilities have found solid surface lavatory systems to be