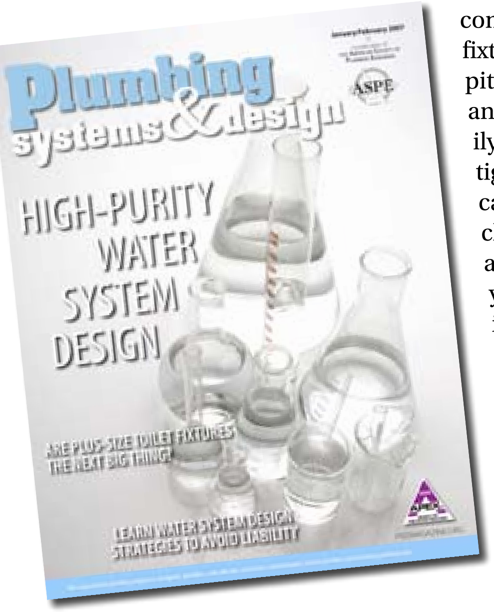
PLUMBING DESIGN IN A PLUS-SIZE WORLD

I want to thank Winston Huff for his work compiling the information for the article "Plus-size Plumbing Fixtures and Design" [January/February 2007]. I suspect that even if dietary regimes tumble and exercise routines soar, this issue will continue to be of more than passing interest to readers of this magazine.

Thanks to an inquiry from an architect in Charlotte, North Carolina, last year, I had an in-depth indoctrination. At his prompting, I spent the better part of an afternoon and the following morning researching the available resources to determine load capacities, problematic issues surrounding exceeding the load capacity, as well as potential alternatives in fixture design and material composition. Since wall-hung fixtures are specified in hospital settings most often (for antiseptic purposes, primarily), I began with an investigation of wall-hung and carrier-mounted back outlet china water closets. Based on application of more than 25 years of experience, my findings were rather remarkable. Although I was not able to document specific instances of fractured water closets, there is anecdotal evidence that the structural integrity of a china water closet has been compromised by a so-called bariatric user, resulting in serious injury.



Since the health of patients using water closets in a hospital setting is likely to already be compromised, injury in a scenario where a water closet fractures, exposing bare skin to shards of sharp china, should be of special concern. One salient feature of using alternatives to carrier-mounted fixtures involves altering housekeeping practices to combat an increased risk of sepsis that is not present when the fixture is above the floor. The hospital staff needs to be aware of the trade-offs. Potentially, bariatric-only toilet rooms may be considered.

I am encouraged by the range of materials that are available in the marketplace today; there are good applications for all the materials used in plumbing systems. In addition to china, stainless steel is available, and as market share increases, economic constraints become less formidable.

As always, information is the best tool we have at our disposal; see to it that you have the information available for your customers (architects and hospital staff). And those of you who specialize in other areas of public consumption, prepare yourself: this is NOT an isolated issue.

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HOT WATER SYSTEM DESIGN TIPS

Donald,

Your article ["12-Step Program for Avoiding Liability for Hot Water System Injuries," January/February 2007] was a very good compilation of all the topics needed to be considered regarding hot water system design. There is one area that I must take issue with you. Step 5, Recirculate Water Continuously, recommends continuous recirculation of hot water (from Step 1 at 122°F). Step 3 recommends redundant protection with a main mixing valve. If a master mixing valve (ASSE 1017) is used, then continuous recirculation will lead to the stored hot water temperature (typically 140°F) being recirculated. This is a very undesirable outcome. It would be better, when a master mixing valve is installed, to recommend that recirculation be controlled by an aquastat and to pipe a heat trap (if needed) to prevent hot water migration. Great article.

Robert W. Castle, PE
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Robert,

Thanks for your comments. Briefly, if I used an ASSE 1017 valve, I would split the hot water return piping so that a portion connected to the mixing valve's hot water return connection and a portion connected to the cold water inlet to the boiler. In this configuration, the mixing valve adjusts the proportion of hot and cold water admitted to the mixing valve to obtain the set-point temperature downstream of the valve. When water is removed from the system, boiler temperature (coil water) and mixed water return water are drawn through the mixing valve, producing water at the temperature setting of the mixing valve. When there is no water consumption in the system, hot water (boiler coil) trickles into the system to compensate for cooling that occurs due to the heat loss in the piping loop. In both configurations, hot (boiler coil) water and warm return water are mixed in the proportion required to maintain the desired mixed water temperature.

If the recirculating pump is oversized, it will be possible to obtain excessively hot water. Basically, if you recirculate the water too fast, it will not cool enough as it completes the loop to have a sufficient load on the valve to maintain mixed water temperatures. Likewise, if the mixing valve is not properly sized and admits too much hot water in its minimum flow position, the water temperature can creep upward during periods of non-use. These are sizing and adjustment issues, however.

Having gone back and reread Step 5, I can see that I was not clear enough about the purpose of continuous recirculation. It is not only to avoid allowing buoyant hot water from entering the system (something that a heat trap could prevent), but it also is intended to maintain the flushing of the distribution piping with hot water to prevent stagnate water from creating an ideal habitat for Legionella bacteria growth. A final benefit is that the time required to obtain hot water when the circulator is off can be enormous and lead to overcompensation attempts, which cause other problems.

Your suggestion is also acceptable. An aquastat-controlled circulator could also be used effectively to control circulation based on temperature.

Thanks,
Don Wise

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