7.1 Introduction to Laboratory and Medical Equipment

From dental and doctor's offices to large general hospitals, veterinary clinics, and research laboratories, medical and laboratory facilities have special operations and equipment. These systems can consume a significant amount of water through water purification, sterilization, photographic and X-ray processes, and vacuum systems. As shown in Figure 7-1, equipment such as steam sterilizers and reverse osmosis systems can account for 5 percent of a laboratory's total water use.[1] Hospitals can attribute more than 15 percent of their total water use to laboratory and medical equipment, including steam sterilizers and X-ray processing equipment, as shown in Figure 7-2.[2]

Figure 7-1. Laboratory Water Consumption

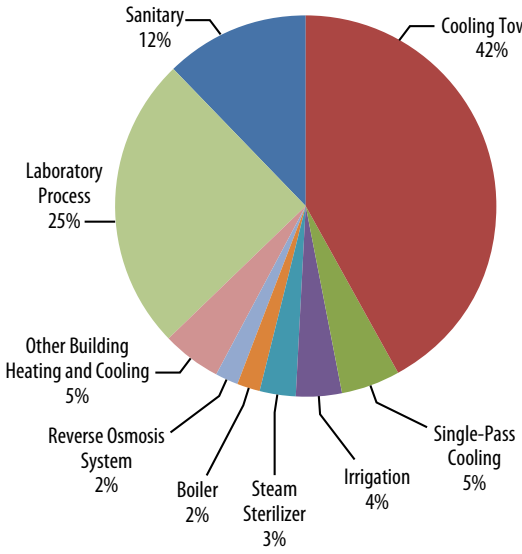
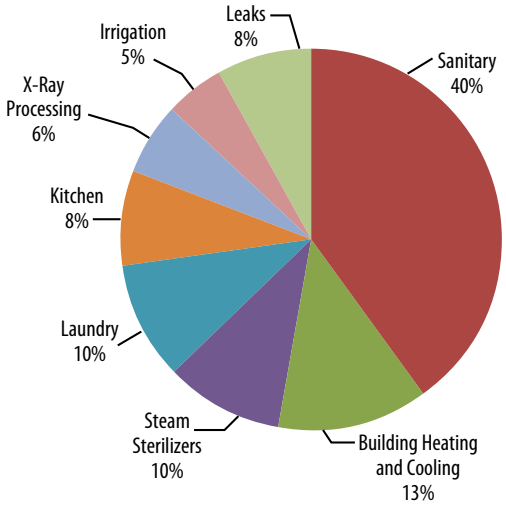


Figure 7-2. Hospital Water Consumption



[1] U.S. Environmental Protection Agency. Laboratory Water Use vs. Office Water Use. www.epa.gov/oaintrnt/water/lab_vs_office.htm.

[2] East Bay Municipal Utility District (EBMUD). June 25, 2003. "EBMUD Hospital Water Efficiency: Water Conservation Division." Page 5. www.cuwcc.org/WorkArea/downloadasset.aspx?id=2230.

7.1 Introduction to Laboratory and Medical Equipment

Many older pieces of medical and laboratory equipment use single-pass cooling continuously for the purpose of keeping equipment cool or for tempering hot water before it is discharged to the sewer. Newer technologies and better practices are available that can significantly reduce this water use. For example, retrofitting a steam sterilizer with a thermostatically actuated valve can reduce tempering water needed to cool hot steam condensate before discharge by up to 90 percent. Vacuum pump recirculation systems can save 50 to 80 percent of the water used to cool the vacuum. For traditional photographic and X-ray equipment, recycling and reusing the final rinse effluent as make-up for the developer or fixer solution can save 50 percent or more of the water required to process film. Converting to digital equipment can eliminate this water use entirely.

One consideration to note is that laboratories and medical facilities might face unique challenges because of the high quality of the water required for their equipment. Most of these facilities require the use of potable water at a minimum and more highly treated water in many cases. Water is frequently used to disinfect parts of these facilities as well. The need to maintain high-quality standards can preclude the use of certain technologies and alternative sources of water, as described in other sections within this document. For example, laboratories often require purified or deionized water to perform tests and experiments. Medical facilities also must maintain high standards for health and safety. These standards can limit the types of technologies that can be utilized in these types of facilities. Water efficiency alone will not be a driver in the choice of technologies or processes in these facilities. Rather, it should be a consideration after other requirements have been met.

Section 7: Laboratory and Medical Equipment of *WaterSense at Work* provides an overview of and guidance for effectively reducing the water use of:

- Water purification
- Vacuum pumps
- Steam sterilizers
- Glassware washers
- Fume hood filtration and wash-down systems
- Vivarium washing and watering systems
- Photographic and X-ray equipment

Laboratory and Medical Equipment Case Study

To learn how Providence St. Peter Hospital in Olympia, Washington, saved 31 million gallons of water by installing water-efficient laboratory and medical equipment and implementing many additional best management practices described in *WaterSense at Work*, read the case study in Appendix A.