



## SCHOOLS

See AOSSG88260 for wash sink data.

### SCHOOLS

#### REQUIREMENTS

The modern school will usually require a large supply of both general purpose 140°F water and 180°F sanitizing water. Generally speaking, a system should have 140°F water in storage for a direct supply to the cafeteria sinks and slop sinks. Gymnasium showers and lavatory sinks should be supplied water at a temperature of approximately 110°F through a mixing valve from this 140°F tank. This 110°F temperature is mandatory in some states, particularly for use in elementary schools.

Schools that maintain swimming pools should provide for pool heating. This is best accomplished by separate direct-fired pool heaters.

The 180°F water for the cafeteria can be supplied by a booster heater selected from models shown for the desired fuel. The two-temperature Booster-Recovery System for gas-fired copper type equipment is also recommended. This system permits storage at the 140°F general purpose temperature and recirculates through the same heater for boosting to 180°F. Pumps are generally required to recirculate the sanitizing rinse water because of the distances usually involved. This recirculation of 180°F water is ideally handled by the patented A. O. Smith Shure-Temp Booster-Recovery System. Separate pump should be used to recirculate 140°F and 120°F water.

Supplying heat and hot water for all types of buildings should be accomplished through separate systems to obtain greater economy and flexibility and better performance for both needs. However, where the hot water supply is taken from the central heating system in the winter, the use of an A. O. Smith commercial water heater with the same storage tank will provide definite benefits. The water heater(s) can be used to augment the capacity of the system and to permit shutdown of heating system for repairs or during mild weather. Again, the patented Shure-Temp Booster-Recovery system will have a dual advantage. When the heating system is in operation, the A. O. Smith equipment will serve mainly as a recirculating booster system. But, when there is no space heating requirement, the system will automatically supply both the general purpose and sanitizing rinse water. With year-round programming at many schools, it is necessary to have a hot water supply available during the summer months.

#### CAFETERIA

Hot water requirements in school cafeterias are generally 30 percent less per pupil than the per person average of a restaurant. By reducing the figure used for the total number of students by 30 percent, it is possible to use the A. O. Smith restaurant sizing tables given in the food service sizing section, to establish the two-temperature hot water requirements for a school cafeteria. When sizing for booster water heaters only, consult the food service sizing section. Most A. O. Smith commercial water heaters are approved by the NSF; see submittal sheets.

In large schools having two-period or three-period lunch programs, the possibility that peak shower and kitchen demands might occur simultaneously should be considered when sizing water heating equipment.

#### GYMNASIUM SHOWER LOAD

Using a flow restricting device, the average shower head delivers 3 GPM of 105°F hot water. This requires 2 GPM of 140°F water. All shower heads, multiple-use wash fountains, and lavatory basins, should be considered to be in operation for 10 minute period after each gym class. In a co-educational school, the girls and boys gymnasium showers are assumed to be in use simultaneously. If the system is for gymnasium shower usage, it will normally supply the hot water for the visiting and home teams. This shower load is essentially a dump load and should be provided by the storage tank, with sufficient heater recovery capacity to replenish the tank between classes, usually a period of three-quarters to one hour's time.

#### MAINTENANCE HOT WATER

The building cleaning load occurs at a time when the showers and cafeteria are not normally in use. This hot water demand is less than either of these loads, so it is not considered in sizing.

# OFFICE BUILDINGS COUNTRY CLUBS LUNCH COUNTERS

## OFFICE BUILDINGS

Hot water requirements in office buildings are usually to supply lavatories during the day and for cleanup during the evening. Tests have shown that 3 peak usage periods normally exist each day with each being approximately 30 minutes in duration. Usage demand will be about 0.4 gallons per person maximum per hour. When expected number of persons is not known, some designers will presume 1 person per 100 sq. ft. areas. Ample storage capacity must be provided to meet these relatively short demand periods. Recovery capacity of the equipment to replenish the storage tanks can be based on a 2 to 3 hour period.

Additional loads around the building such as restaurants, showers, and beauty parlors should be determined from section of this manual that pertain to that usage, and added to the basic load.

Size and type of water heating system recommended, must relate to the total load. Type of fuel generally must relate to overall planning of the building. In all cases, the water heating equipment should be separate from the space heating boilers since heat is not required on a year round basis. In some cases, separate water heaters are installed on each floor and would best be served with a self-contained type water heater.

## COUNTRY CLUBS

There are generally three types of water heating applications in a country club: dining room, swimming pool, and the locker room showers.

The restaurant hot water sizing should be done in accordance with the data given on AOSSG8870, food service sizing.

The swimming pool heater sizing should be considered separately.

The heaviest hot water usage in a country club occurs in the locker room showers. The heaviest usage of the showers will be encountered during a tournament. The recovery capacity of the water heating equipment should be equal to 75 percent of the total possible hot water hourly usage of the shower heads. The storage tank capacity should be equal to approximately one quarter of the maximum hourly usage. The flow rate of the individual shower heads may be obtained from the manufacturer's data sheet, or by specifying a flow re-

stricting device to obtain a specific GPM flow rate. Shower water is calculated at 105°F and should in most cases be limited to a maximum of 3 GPM. This is equivalent to 2 GPM of 140°F water from the hot water heating system. Hot water is usually stored at 140°F and mixed down at the shower head. Hot water for lavatory use should be added to the shower load.

The restaurant and shower demands may be concurrent. If one system is used to supply both needs, the equipment must be sized accordingly. In many cases, it is advantageous to provide separate systems for these two major usages. As with most commercial water heating applications, these demands are best supplied when not incorporated as part of the space heating system.

Normally a country club has its heaviest demand during the summertime when the incoming cold water temperature is at least 50°F. This factor should be considered when sizing heaters.

## LUNCH COUNTERS AND SODA FOUNTAINS

As a restaurant, general purpose hot water and sanitizing rinse are needed. The hot water needs of these similar applications may be obtained by using charts in food service sizing section. A factor of 0.7 is generally applied to the number of people served since a lesser number of dishes is used per meal.

The sizing may also be done on a fixture basis. To determine the total demand, additional lavatories and hot water outlets must be added if used at the same time as the fountain.

General purpose hot water is sometimes supplied by the central heating system of the building. If this is the case, only a booster heater is needed for the sanitizing rinse. See equipment section for selection of booster. Where the heater cannot be located in close proximity of dish and glass washing equipment, the water must be recirculated.

Most A. O. Smith commercial heaters are approved by the NSF; see submittal sheets.