

*Open and Closed Sterilizers*

There are two general classes of sterilizers, *i.e.*, the open type in which the articles to be sterilized are immersed in a water bath heated by steam coils, the limiting temperature obviously being 212 deg. Fahr., and the closed type in which there is no water bath and in which the articles to be sterilized are brought into temperatures corresponding to steam at 40 to 60 lb. pressure per square inch.

The open type is older and has the disadvantage of depositing lime or other impurities, which may be in the water, on the instruments, etc., sometimes requiring them to be dried before storing. The latter type is the newer, and obviously provides better sterilization by the higher temperatures obtainable, does not deposit impurities of the water on the instruments, and the articles are dry when removed from the sterilizer. Obviously sterilizers for dressings and fabrics must be of the closed type.

There is considerable tendency now to the use of so-called *built-in sterilizers* in the operating suites and other places where several sterilizers are installed at one point. Only pressure-type sterilizers, which are loaded and unloaded from one end, are adaptable to this arrangement. With this method a thin partition is built flush with the sterilizer fronts, with only the doors, gages and operation valves visible in the rooms, the bodies projecting into an unfinished space behind the partition. This space must of course be accessible for repairs.

Water sterilizers usually consist of twin reservoirs of the same capacity mounted on one frame. One reservoir is for water kept hot by a steam coil in the reservoir and the other is for water somewhat cooled by circulating cold water through a coil in the reservoir. Both reservoirs, of course, have provisions for sterilizing their contents.

Water stills, when so ordered, are part of the water sterilizing unit and consist of still and reservoir, generally mounted between the two water reservoirs.

Where contagious diseases may be handled provision should be made for dish sterilization. On a large scale dishes from contagious patients are sterilized in special sterilizing dishwashing machines. On a small scale however, a 20 x 20 x 24-in. utensil sterilizer fitted with special racks will serve the purpose. The sterilizing dishwashing machines are referred to in the section on equipment for kitchens.

For sterilization of mattresses, see the laundry equipment section of this chapter.

Sterilizers require many small supply and return pipes and the relative amount of steam used by such equipment is almost negligible if drawn from a central boiler plant.

A 1/2-in. supply and return connection is ample for almost any utensil, instrument or dressing sterilizer. Water sterilizers up to 15 gal. use 3/4-in. supply and 1/2-in. return, and above that size 1-in. supply and 1/2-in. return. Water stills up to 6 gal. use 1/2-in. supply and return.

When sizing the steam and return mains it may be assumed that all sterilizers will be in use at one time in a small hospital and half of them in a large hospital. The mains can then be sized by the usual table of equalization of pipe sizes. A return main one half the diameter of the steam main, with 3/4-in. as minimum size, may be used.

The uniform practice is to provide a separate thermostatic trap on the return from each coil or unit, of the size given previously for return connection. The return main should itself be vented and condensation should return by gravity to a vented receiving tank.

When gas is used a 1/2-in. connection is made to each instrument, dressing and utensil sterilizer. Water sterilizers up to 15 gal. capacity should have 3/4-in. gas line and above that size 1-in. line. The mains should be sized on an equalization basis the same as explained for steam supply lines, assuming all sterilizers in use at the same time in a small hospital and half of them in use at the same time in a large hospital.

*Waste and Vent Connections*

All sterilizers in which the articles to be sterilized are more or less immersed in water which is in turn heated by the steam, must have waste connections similar to plumbing fixtures. With the exception of the bedpan sterilizer in which the trap is part of the fixture, traps on these waste lines must be provided in the plumbing work, the sterilizer equipment merely including a valve on the waste line and pipe to floor or wall, as may be required.

Waste connections are seldom more than 3/4 in. at the fixture. As the usual sanitary fittings for plumbing work are not standard in sizes less than 1 1/4 in. it is customary to provide traps and connections 1 1/4 in. in size from the wall or floor line, as the case may be, to the waste piping of the plumbing system.

Waste connections from bedpan sterilizers are uniformly made 3 in. and the trap is part of the fixture, connected to floor or wall as required. This sterilizer waste should be connected to the drainage system in a manner similar to that for a slop sink or water closet.

Vent connections are also necessary on such sterilizers to avoid the nuisance of steam and vapor in large quantities, which escape into the room, when a sterilization is finished. Such connections usually take the form of a combined overflow and vent, connected at rear of the chamber near the top. This combined connection is usually carried as one horizontal pipe to a suitable location, as close to the sterilizer as possible, where the vent is taken upward directly to the atmosphere, and the overflow and condensation waste is taken from the bottom through a suitable trap and connected to the waste lines of the plumbing system or connected to the waste from the body of the sterilizer between the trap and the sterilizer.

The usual sizes of combination overflow and vent connections to open sterilizers are as follows: Utensil sterilizers, 1 1/4 in. up to 16 x 15 x 20-in. size and 2 in. for larger sizes; instrument sterilizers, 1 1/4 in. for all sizes; milk pasteurizers and sterilizers, 1 1/4 in. up to 72-bottle size and 2 in. for larger sizes and for bedpan sterilizers, 2 in. Vents to atmosphere are the same size as the combination overflow and vent. The overflow connection to the plumbing waste pipes from the combination vent and overflow is 1 1/4 in. in all sizes of all sterilizers and is generally connected to the waste from the sterilizer body between trap and sterilizer.

Where practicable it is well to run the vents from sterilizer equipment through the roof separate from other plumbing vent lines and to make