Table 2 . . . Drinking Water Requirements[a]
(Based on Standard Rating Conditions with Delivery Water at 50 F)

Location	Bubbler Service	Cup Service	
	Persons Served Per Gallon of Standard Rating Capacity	Persons Served Per Gallon of Base Rate Capacity	
Offices	12	30	
Hospitals	12	...	
Schools	12	...	
Light Manufacturing	7	...	
Heavy Manufacturing	5	...	
Hot Heavy Manufacturing	4	...	
Restaurants		10	
Cafeterias		12	
Hotels (Corridors)		...	
		Required Capacity Per Bubbler	
		One	Two or More
Retail Stores, Hotel Lobbies, Office Building Lobbies	12	5	5
Public Assembly Halls, Amusement Parks, Fairs, Etc.	100	20–25	15
Theaters	19	10	7.5

[a] Reprinted by permission from ARI Standard 1010–62.

the compartment. When the compressor operates, both water cooling and compartment cooling take place. The thermostat is usually located to be most affected by the compartment temperature so that the amount of compressor operation and water cooling available depends considerably on the usage of the compartment.

Some compartment coolers, generally pressure types, are equipped with more elaborate systems in which separate thermostats and solenoid valves are used to provide independent control of both water and compartment cooling.

STREAM REGULATORS

Since the principal function of a pressure-type water cooler is to provide a drinkable stream of cold water from a bubbler, it is usually provided with a valve to maintain a constant stream height, independent of supply pressure. A flow rate of ½ gpm from the bubbler is generally accepted as giving an optimum stream for drinking.

RATINGS

Water coolers are rated on the basis of their continuous flow capacity under specified water temperature and ambient conditions. ARI Standard 1010–62, *Self-contained Mechanically-refrigerated Drinking Water Coolers*, gives the generally accepted rating conditions, and test methods are prescribed in ASHRAE Standard 18–62, *Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration Systems*. Table 1, reprinted from ARI Standard 1010–62, gives the standard rating conditions.

Table 2, also from ARI Standard 1010–62, shows the relationship between the number of persons to be served and rated capacity. It must be recognized that the amount of water used by different persons will be highly variable. Table 2 represents an accepted average value for the purpose of selecting the size of water cooler to be used.

STANDARDS AND CODES

In addition to ARI Standard 1010–62 and ASHRAE Standard 18–62, Underwriters' Laboratories Subject 399 covers safety requirements. Federal Specification 00-C-566-c is usually prescribed by government purchasers.

Many local plumbing codes apply directly or indirectly to water coolers. Primarily these codes are directed toward eliminating any possibility of cross-connection between the potable water system and either the waste water or the refrigerant system. Most coolers are made with *double-wall* construction in order to eliminate the possibility of conflict with any code.

CHAPTER 62

BOTTLED BEVERAGE COOLERS AND REFRIGERATED VENDING MACHINES

Bottled Beverage Coolers: Horizontal Dry Type, Horizontal Forced Air Type, Bottled Beverage Vending Machines, Design Considerations, Other Types of Refrigerated Vending Machines, Applicable Standards

BOTTLED beverage coolers, although of lesser prominence than in past years, are still numerous. Bottled beverage vending machines are the most numerous of all refrigerated vending machines. Other refrigerated vending machines are available to automatically dispense many items, including: cups of soft drinks (from post-mix or pre-mix types of vendors), milk (in a cup or carton), coffee, fruit juices, ice cream, salads, sandwiches, candy, pastry, and other foods.

BOTTLED BEVERAGE COOLERS

The types of beverage coolers to be discussed in this chapter are: (1) the horizontal dry type, (2) the horizontal forced-air type, and (3) the vertical forced-air type.

Horizontal Dry (Cold-Wall) Cooler

In the cold-wall type cooler, bottles are cooled by natural or forced convection. The cooler may be arranged for either vending or non-vending operation. The evaporator, in the form of plates or tubing, is often located on the outside surface of the bottle compartment liner (Fig. 1). It may be fastened in position to make good metallic contact with the liner, or bonded to the liner to improve the heat transfer.

The cold-wall construction is vulnerable to moisture migration into the insulation space from both the cooling compartment and the exterior of the cabinet. Any minute openings from either the cooling compartment or the cabinet exterior will allow moisture to enter and will result in frost deposits on the cold surface of the evaporator. During defrost periods, this frost will melt and find its way into the insulation, thereby reducing its effectiveness and causing deterioration. Also, some of the moisture may settle on the inside surface of the inner and outer shells of the cooler during the defrost cycle, and may cause corrosion of these surfaces. A perfect seal from both inside and outside is desirable but difficult to achieve.

Servicing or replacing the evaporator is difficult, but cleaning the cooling compartment is relatively easy.

In some cold-wall coolers the evaporator or cooling coil is located inside the bottle storage compartment. In this design the moisture migration problem is eliminated and servicing of the evaporator is easier, but cleaning the cooling compartment is more difficult. The bottle capacity of the cooler is reduced due to the space requirement of the evaporator and the necessary protective racks. The evaporator usually occupies the entire insider perimeter of the liner.

The cold-wall construction tends to build up some frost on the liner of the cooling compartment when the evaporator is attached to the liner. If complete defrost is not effected on each cycle of the cooler, a frost buildup can occur and will impede heat transfer and reduce the bottle capacity.

The bottles usually are placed upright on the bottom of the cooling compartment liner. In this way better temperature control can be obtained. Horizontal stacking of bottles would result in extremely warm bottles in the center of the cooler and very cold bottles in positions next to the liner. It is apparent that the bottles are cooled primarily by direct contact (conduction) and secondarily by natural convection. Thus, the cooling rate of the bottles in direct contact with the cold-wall surface is relatively rapid, whereas the bottles which are not in direct contact (in the center of the cooler) and depend mainly upon natural convection, are cooled much slower. The result is uneven product temperature throughout the cooler. The use of the cold-wall cooler is limited mainly to such applications as small offices, service stations, and markets.

An advantage of the horizontal cold-wall cooler is the small heat loss that occurs when the lid is opened to obtain the product because the cooled air does not spill from the cooling compartment.

The possibility of lower heat leakage and lower power consumption, due to the absence of a circulating fan in the cooling compartment, are other advantages of the cold-wall type.

Horizontal Forced-Air Type

In this type of cooler the evaporator is usually located as shown in Fig. 2. The air flow is so arranged that the cold air is first directed across the top bottles in the cooler, and then proceeds down through the bottles to the bottom layers from where it is drawn up through the evaporator to be recirculated.

The evaporator and fan assembly generally are located at or near the center of the cabinet. The circulating fan does not cycle with the refrigerating machine but operates continuously as soon as the cooler is connected to an electric outlet. In some cases the fan circuit is opened, stopping the fan, when the lid of the cooler is opened.

Since the bottles can be stacked horizontally in this type of cooler, the bottle capacity is relatively high as compared to the cold-wall cooler, where they must be placed upright.

Capacities range from 5 cases to 60 cases of 6 oz bottles, with the most common capacities being from 10 to 30 cases.

Cooling cost per bottle is quite low with this type of cooler. The exterior size is small, resulting in a low heat leakage per

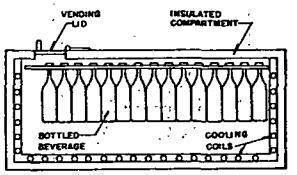

Fig. 1 . . . Horizontal Cold Wall Bottle Vendor

The general responsibility for this chapter is assigned to TC 8.3, Beverage Coolers.