

Calculation Method for Sizing Ice Machines

Self-Serve Beverages or Carry-Out

You need to know the size and quantity of drinks sold. The following table assumes the cups are completely filled with ice.

Self-Serve Beverages or Carry-Out		
Cup Size (fl. oz.)	Average Beverage (fl. oz.)	Average Ice (oz.)
6	3	3
12	6	6
16	8	8
20	10	10
32	16	16
48	24	24

After establishing the number of different sized cups sold in a busy day and multiplying that number by the quantities indicated, a fairly accurate estimate can be determined. If your establishment uses an ice-cooled beverage dispenser, iced salad bar or some other type of display that requires ice, the amounts needed are examined separately under the Product Display/Packaging and Coldplate Cooling sections.

Coldplate Cooling

To calculate the amount of ice consumed cooling the coldplate, choose the appropriate operating conditions and multiply by the "average amount of beverage" in the "average cup size."

Drinks per min.	Soda/Syrup Inlet Temperature (°F)					
	50°	60°	70°	80°	90°	100°
2	0.6	1.1	1.7	2.3	2.8	3.4
4	1.1	2.3	3.4	4.5	5.6	6.8
6	1.7	3.4	5.1	6.8	8.5	10.2
8	2.3	4.5	6.8	9.0	11.3	13.5
10	2.6	5.6	8.5	11.3	14.1	16.9
12	3.4	6.8	10.2	13.5	16.9	20.3
14	3.9	7.9	11.8	15.8	19.7	2

Example:

Find the amount of ice "burned" on a coldplate for a system that has the following operating conditions:

1. 80° F inlet soda/syrup temperature
2. 6 vends/minute
3. 18 fl. oz. average amount of beverage drink

Therefore, from the table choose row "6" and column "80."

This gives a constant of 6.8

$$6.8 \times 18 = 122.4 \text{ lbs./hour}$$

Product Display/Packing

To size an icemaker to handle product display or packing, it is necessary to determine the cubic feet of ice needed in 24 hours (length x width x depth). Since the calculations are done using the foot as the standard unit of measure, the depth must be converted into feet. If the depth is less than 12 ", divide depth required by 12 to make the conversion to feet. A cubic foot of ice weighs approximately 35lbs, so multiply the cubic feet of space to be used for the product display or packing by 35 to determine the ice needs for a 24hr period.

Example:

A supermarket has a fish display case that is 25' long and 3' deep.

They wish to set the fish in ice to a depth of 6" (6" = .50').

$$\text{Ice requirement for 24hrs: } 25' \times 3' \times .5' = 37.5 \text{ cu/ft.}$$

$$37.5\text{cu/ft} \times 35\text{lbs} = 1312.5\text{lbs}$$

Sample:

A restaurant has 200 table seats with 4 turns per night, 20 stools at the bar and the salad bar that measures 6' x 3' with a required ice depth of 4".

$$\text{General ice usage: } 20(\text{bar stools}) \times 3\text{lbs} = 60\text{lbs}$$

$$200(\text{seats}) \times 4(\text{turns}) \times 1.5\text{lbs} = 1200\text{lbs}$$

$$\text{Product Display: } 6' \times 3' \times .33' = 5.94\text{cu/ft}$$

$$5.9\text{cu/ft} \times 35\text{lbs} = 207.9\text{lbs}$$

Finally, add all ice usage to determine the requirement for a 24hr period: 1200lbs + 60lbs + 207.9lbs = 1467.9lbs ice per day.

The previous sizing methods assume that the icemaker will run continuously 24 hrs a day. This total utilization of the icemaker gives the customer the most cost effective way of producing the required ice. It also requires the bin to be properly sized or the you will run out of ice.

The example below shows how two operations can have very different usage patterns, yet still require the same size icemaker.

	Convenience Store	Restaurant
Monday	400lbs	Closed
Tuesday	400lbs	200lbs
Wednesday	400lbs	200lbs
Thursday	400lbs	200lbs
Friday	400lbs	700lbs
Saturday	400lbs	800lbs
Sunday	400lbs	700lbs
Weekly Total	2800lbs	2800lbs

Using our formula-2800lbs weekly usage divided by

$$7 \text{ days} \times 1.2 \text{ ("safety factor")} = 480\text{lbs ice/day.}$$