

Sizing Storage Bins

When ice is used in equal amounts seven days per week, as in our convenience store example, the storage bin can be sized to match the production capacity of the icemaker. Each day approximately 500lbs will be produced and 500lbs will be used.

Some people think that to size the bin they need only match the bin to the highest days usage. This will not always work and often results in a customer running out of ice. If we had used this method for the restaurant example above, we would have specified an 800lb bin. On Friday, the restaurant would have used 700lbs of ice, leaving 100lbs in the bin. With Saturday's production of 500lbs we would have only 600lbs in the bin - and we would need 800lbs - leaving us 200lbs short on Saturday and again on Sunday. The result would be an unhappy customer.

This is the case in our restaurant example. There are three days - Friday, Saturday and Sunday - when the required amount of ice exceeds the production capacity of the icemaker (these are called "peaks"). In this case, the bin and not the icemaker should be sized to take care of these "peak" days.

The best way to determine the size bin required is to work backwards from the last "peak" day - in this case Sunday. Take the amount by which each day's usage exceeds the 500lb daily production of the icemaker.

Peak Day	Usage	Amount Over Production
Sunday	700 lbs.	200 lbs.
Saturday	800 lbs.	300 lbs.
Friday	700 lbs.	200 lbs.
TOTAL		700 lbs.

Add the total (700lbs) to the daily production figure (500lbs) to get the bin capacity required to meet the restaurant weekend demand for ice. This method tells us we need a 1200lb bin.

Once you think you know the size of the bin required, you can check your estimate as follows:

Assuming the bins empty on Sunday evening, 500lbs will be produced on Monday with no usage, and another 500lbs on Tuesday for a total of 1000lbs in the bin. Tuesday's usage of 200lbs will lower the bin contents to 800lbs but with 500lbs of production the bin will be full at 1200lbs on Wednesday. The same will be true for Thursday. As we enter the weekend peak period on Friday we have 1200lbs in the bin from which we will use 700lbs. This leaves 500lbs in the bin, plus 500lbs produced in 24hrs for a total of 1000lbs. Saturday's usage of 800lbs reduces the ice available to 200lbs, plus 500lbs of production for a total of 700lbs - exactly the amount needed for Sunday's usage.

It's always a good idea to add the same 20% "safety factor" to the bin as we did to the icemaker. This adjusts for the ice voids and pyramiding that can occur in the bin. In the case of our restaurant, the addition of the "safety factor" means we would look for a bin with a storage capacity of approximately 1400lbs($1200 \times 1.2 = 1440$). We can see that an icemaker rated at 500lbs of daily product would easily meet the needs of both of the previous examples, provided that the icemaker runs continuously.

A General Review of the Rules for Sizing Icemakers & Bins

1. Ice needs are seldom uniform; more ice is generally needed in summer than in winter. Understanding the ice usage of the customer is a must to assure sufficient ice is available to meet peak demands. Remember, water temperature, as well as the surrounding air temperature, affects the output capacity of icemaker. Determine what these factors will be during the peak demand periods. Then verify the icemaker and storage bin selection by the preceding method and refer to the machine's production chart to determine the expected capacity under these conditions.
2. Determine the size of the icemaker required by dividing the "worst case" week's total ice usage by seven. Then add in a 20% "safety factor".
3. If equal amounts of ice are used each day (including weekends), size the bin to match the ice production.
4. If there are peaks where a day's usage exceeds a day's production), Size the bin to store adequate ice to meet the peak demands.
5. Remember that the per pound cost of making ice is about four times the per pound cost of storing ice. It's always much less expensive for the customer to meet their "peak" demands by using the storage bin when possible.
6. When sizing the bin, double-check the bin's true capacity, using the current ARI directory.
7. A final element to take into account is the shape of the bin, the location of the icemaker(s) on the bin, and the size and location of the icemaker(s) ice discharge. An ice discharge opening centered on an extremely wide bin will result in much more pyramiding and, therefore, less storage.