

Newsletter:**Why is sizing chillers appropriately critical?**

Chiller sizing can heavily impact performance, energy consumption and operating expenses. Therefore, sizing a chiller appropriately is crucial.

How to Size a Chiller



General sizing formula:

1. **Calculate Temperature Differential ($\Delta T^{\circ}\text{F}$)** $\Delta T^{\circ}\text{F} = \text{Incoming Water Temperature } (^{\circ}\text{F}) - \text{Required Chill Water Temperature}$
2. **Calculate BTU/hr.** $\text{BTU/hr.} = \text{Gallons per hr} \times 8.33 \times \Delta T^{\circ}\text{F}$
3. **Calculate tons of cooling capacity** $\text{Tons} = \text{BTU/hr.} \div 12,000$
4. **Oversize the chiller by 20%** $\text{Ideal Size in Tons} = \text{Tons} \times 1.2$
5. **You have the ideal size for your needs**

Although it is common knowledge that the sizing of chillers appropriately is important, still facilities engineers and managers tend to oversize or undersize the chiller for the following reasons.

Reasons for Oversizing

Safety Margins

Load calculation challenges

Uncertainty over change in demand in future

Using thumb rules to calculate the chiller capacity

Reasons for Under-sizing

Load calculation errors

Capital cost savings

Oversizing is more common in the industry than under-sizing largely due to greater awareness of the immediate visible downsides of under-sizing than the long-term negative effects of oversizing. Engineers tend to oversize and give a greater safety margin to cater for future expansion or some uncertain conditions.

The consequences of buying oversized and undersized chillers as follows:

Oversized Chiller:

Chiller operates in part load for extended periods; therefore, efficiency is reduced.

Short cycling of the compressor leading to frequent maintenance issues

Reduced equipment lifespan

Increased wear and tear on most of the parts

Frequent trips due to insufficient water flow

Increased maintenance cost

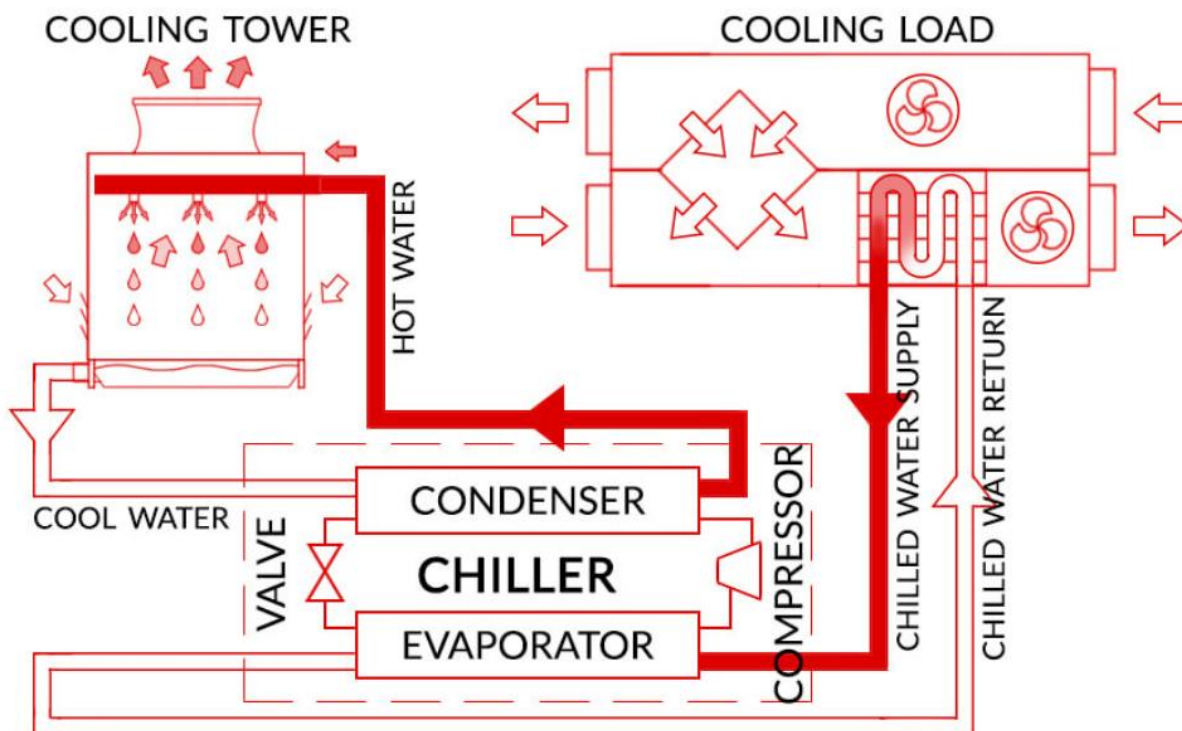
Undersized Chiller:

Unable to maintain the required temperature

Fluctuations in energetic inputs

Overheating of system components leading to failure and costly maintenance issues

Increased power consumption



Conclusion:

Though it might sound like it is cost effective to install a chiller that can handle a wide range of variable demands and future conditions in mind for the same capital cost, it poses challenges during the lifetime of the chiller.

Therefore, it is prudent to determine the running conditions of the chiller as close as possible to the actual conditions and to size the chiller appropriately. This will ensure that the plant can respect the minimum requirements for the chiller such as water flow, water tank capacity required, chilled water temperature required, ambient temperature, cooling water temperature, etc. This will extend the lifetime of the equipment, reduce overall operating costs and maintenance costs, and lessen manpower costs having to attend to frequent breakdowns of the equipment.

It's always critical to consider the overall lifetime costs of the chiller. While cheaper chillers may seem like a low-cost investment, they usually come with higher operation costs due to frequent maintenance and inefficiency. We at Novus can offer energy efficient high-quality chillers for a wide range of applications that will maximize the return on investment over the lifetime of the machine. Please feel free to contact us with your questions, we will be happy to share knowledge and propose a suitable solution.