Lower Capital Cost

Lower Operating Cost

SPOT DZ 2000

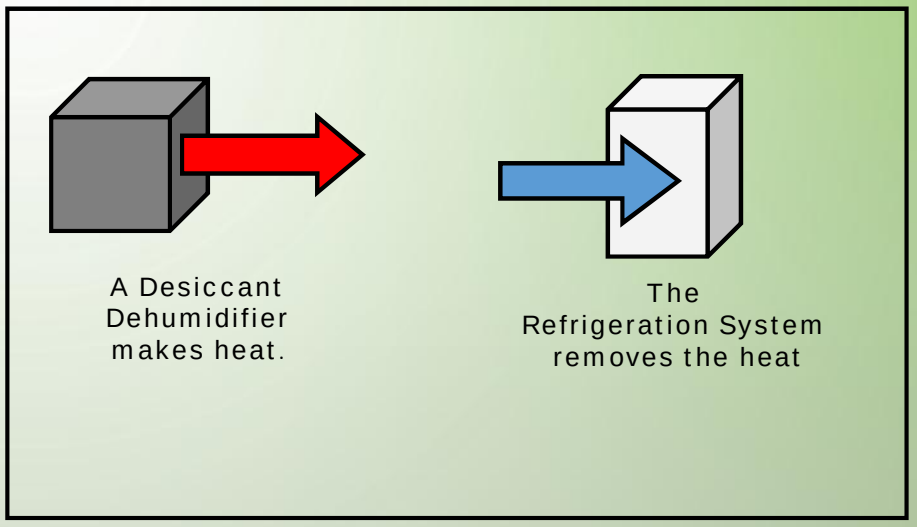
A VERY DRAMATIC IMPROVEMENT IN COLD ROOM DEHUMIDIFIER TECHNOLOGY.

Rooms with a temperature of 50F or lower cannot utilize traditional DX dehumidifiers for humidity control. The reason for this is that the dew point temperature set point is usually below freezing in a low humidity cold room. A DX coil that runs below freezing builds ice on the fins, which blocks air flow.

The technology that works well in dehumidified cold rooms is desiccant dehumidification. This technology adsorbs water molecules from the air and deposits them outdoors. The desiccant wheel is not prone to icing, but it adds much heat to the cold room. The air that passes through a standard desiccant dehumidifier in a cold room gains heat and returns to the room 50F warmer than the cold room temperature.

The heat from a desiccant dehumidifier will increase the refrigeration horsepower required to cool the space. This heat from a dehumidifier is described as parasitic heat.

Traditional desiccant dehumidifiers require two air ducts to reject moisture through the wall of the cold room. The installer must take extra measures to be certain that the wall penetrations do not leak moist air into the cold room.



A case study,
12,000 sq.ft. of seed storage at
50 F and 50% RH.

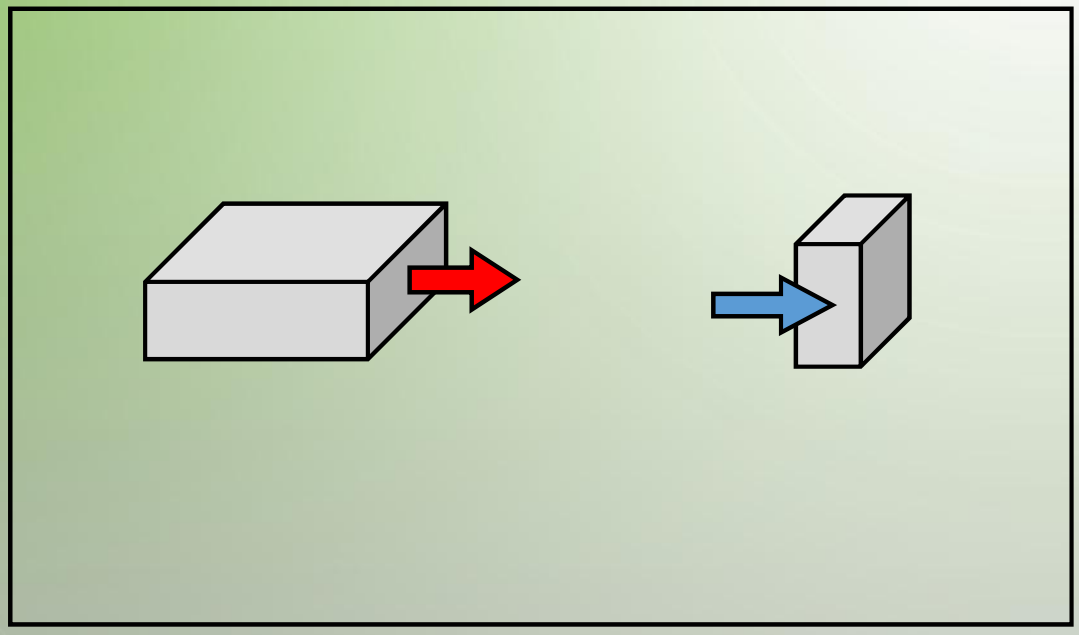
There exists a 12,000 sq.ft. cold room for storing seeds at 50 F, called high temperature refrigeration. The cooling load on this room is 335,000 btu/hr without dehumidification. The refrigeration systems to cool this room without refrigeration will be two at 20 HP. The 40 hp cooling capacity will be 177,000 btu/hr x 2 = 355,000 btu/hr.

In order to hold 50 F, and 50% RH, three traditional desiccant dehumidifiers are selected at 1,500 cfm each = 4,500 cfm of dehumidified air flow. The desiccant dehumidifiers will add heat to the room at the rate of $Q_{btu/hr}$ = 1.083 x 4,500 x 50 = 243,000 btu/hr because the air gains 50F in temperature through the dehumidifier. Now with dehumidification the refrigeration equipment selection must be sized to remove heat from the space at a rate of 578,000 btu/hr. This will require two refrigeration systems of 30 hp. The 60 hp cooling capacity will be 304,000 btu/hr x 2 = 608,000 btu/hr.

Design Step One

Refrigeration = **60 hp**

There is a recent innovation in
cold room dehumidification.
It is the SPOT DZ dehumidifier BMIL. This
dehumidifier does not blow hot air, so it
adds very little
parasitic heat to a cold room.
In fact the SPOT DZ
only raises the cold room air by
3 to 4 F when is passes through the unit.



SPOT DZ desiccant dehumidifiers do not require any air ducts. All of the moisture that is removed goes into a condensation drain.

SPOT DZ
DZ 2000

BMIL®

THE DRY ZONE

Back to our case study,
12,000 sq.ft. of seed storage at
50 F and 50% RH.

This 12,000 sq.ft. cold room has a base cooling load on this room is 335,000 btu/hr without dehumidification. The refrigeration systems to cool this room without refrigeration will be two at 20 HP. The cooling capacity will be 177,000 btu/hr x 2 = 355,000 btu/hr.

In order to hold 50 F, and 50% RH, three **SPOT DZ** desiccant dehumidifiers are selected at 2,000 cfm each = 6,000 cfm of dehumidified air flow. The desiccant dehumidifiers will add heat to the room at the rate of $Q_{btu/hr}$ = 1.083 x 6,000 x 3 = 19,500 btu/hr because the air gains 3 F in temperature through the dehumidifier. Now with dehumidification the refrigeration equipment selection must be sized to remove heat from the space at a rate of 354,500 btu/hr. The refrigeration equipment selection that was already made has the capacity to remove all of this heat. There is no longer a requirement to upsize the refrigeration systems.

Design Step Two

Refrigeration = 40 hp

BMIL®

SPOT
DZ 2000

A third visit to our case study, 12,000 sq.ft. of seed storage at 50 F and 50% RH.

We have established that with the SPOT DZ dehumidification, the refrigeration equipment selection must be sized to remove heat from the space at a rate of 354,500 btu/hr. With traditional R404A refrigeration systems, this will require two 20 HP system for a total of 40 HP.

BMIL is the provider of the Frio Verde refrigeration system as manufactured by Bally. These systems are more efficient than standard refrigeration systems due to the Frio Verde technology. Two Frio Verde 12 HP systems can do the cooling of two 20 HP standard systems. The Frio Verde selection is 180,500 x 2 = 361,000 btu/hr total cooling capacity at 24 hp.

Now our total refrigeration selection drops to 24 hp with Frio Verde.

Design Step Three

Refrigeration = **24 hp**

12,000 sq.ft. Case Study Summary

24 hp instead of 60 hp

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