Grow Room Climate Control

A 2017 Energy Study states that 51% of indoor cannabis grow room energy use is associated with environmental climate control. Climate control efficiency directly affects your monthly electric bill.

Separating heat loads into sensible and latent components provides a basis to review efficiencies of different HVAC and dehumidifier systems.

Air conditioner performance looks at "Useful Heat". This term covers cooling, condensing duty or heat delivered by an air conditioner/heat pump. Useful Heat divided by power input gives a Coefficient of Performance (COP) rating for the equipment. If an a/c delivers 12,000 Btu's (1 ton) of cooling (and condensing) and uses 1 kW of power, the COP is 12,000 Btu's per kW (or 3.51 Btu's/Btu). Room heat is reduced by 12,000 Btu's for each kilowatt of power consumed.

Dehumidifiers are rated by the amount of water removed, divided by power input. A rating of 240 pints per day with power requirements of 1 kW, yields 10 pints per kW.

If COP is calculated for dehumidifiers, "Useful Heat" to the room is water condensed, minus excess heat added. Each hour, condensing 10 pints of water requires about 10,000 Btu's of cooling (heat of vaporization/fusion). If 10,000 Btu's of heat is also added the air, the net result is a COP of ZERO. For each kilowatt of power consumed, no net heat is removed from the room.

Larger climate control packages may use hot-gas to temper (reheat) cold, dehumidified air. Overall package size must be increased to account for reheating air during lights-off and lights-on.

Controlling temperature and humidity separately can yield a simple, energy efficient climate control system. Temperature control with standard air conditioner/heat pump packages provides a technician and parts friendly, reliable means to heat and cool a space. Splitting to two smaller packages is only slightly more expensive and provides the security of redundancy along with variable compressor capability without the complexity of digital scroll compressors and valves.

Water In = Water Out 100 gallons per day watering = 800 pints per day dehumidification

Daily water use and desired lights-off minimum room temperature during flower determines dehumidifier size. Refrigerant dehumidifiers lose water removal capacity in cooler, drier rooms. Less water vapor is in the room air, so less can be removed. Like wringing out a wet rag versus wringing out a damp rag.

Increasing dehumidifier COP reduces room heat load. Less heat means smaller air conditioner(s) and less electric use.

Subcooled 550 Hybrid dehumidifiers remove up to 550 pints of water per day (AHAM 80F, 60%rh) and provide 3 tons of cooling during lights-on. Up to 50% less room heat, results in a smaller air conditioner. Lights-off reheat delivers neutral (near 75 degrees F) dry air.

The Subcooled 550 Hybrid dehumidifier delivers cooling during lights-on and on-demand reheat during lights-off. This hybrid design yields a COP during lights-on of up to 15,000 Btu's per kilowatt. Flower room cooling offers the greatest benefit for energy efficiency from the 550 Hybrid model.

The **Subcooled 705** dehumidifier also delivers cooling during lights-on and on-demand reheat during lights-off. The high-water removal design yields a COP during lights-on of up to 9,000 Btu's per kilowatt.

In both cases Subcooled Air dehumidifiers control humidity and allow you to use smaller air conditioners.

The cost of a Subcooled dehumidifier, condenser and room air conditioner is up to 20% lower than standard air conditioner and plug-in dehumidifiers. Power consumption is up to 15% lower.