



## HVAC CALCULATIONS FOR RACK SYSTEMS

To calculate the amount of HVAC required to remove waste heat that results from dimmer inefficiency, perform the following calculations:

1. Calculate the connected load in kilowatts. Don't confuse this figure with the *load capacity* of the dimmer rack. Also note, that feeder size should be based on connected load and not dimmer rack capacity. Please refer to National Electrical Code Section 520-27(b) & Section 220-10 for additional information.
2. Multiply the connected load by the worst case heat loss percentage (% inefficiency) of the dimmers. For example, a dimmer that is 98% efficient is 2% inefficient. A dimmer that produces 110 volts output with a 120 volt input is 8.3% inefficient.
3. To obtain BTUs produced per hour, multiply the figure obtained in step 2 by 3412.14
4. To obtain Tons of Air Conditioning required, divide the result from step 3 by 12,000  
Note that these calculations address the waste heat that results from dimmer inefficiency only. They do not address any base HVAC requirements that may exist. ETC dimmers should not be operated in an environment that regularly exceeds 35°C (95°F).

Typical ETC Rack Calculation;

A full ETC Sensor dimmer rack (96 - 2.4 kW dimmers) with a connected load of 180,000 watts. Assume 4% inefficiency. \*

Connected load = 180 kW  
 $180 \text{ kW} \times 4\% = 7.2 \text{ kW inefficiency}$   
 $7.2 \text{ kW} \times 3412.14 = 24,567 \text{ BTU/hr}$   
 $24,567 \text{ BTU/hr} / 12000 = 2.047 \text{ Tons AC}$

A Sensor dimmer is actually less than 3% inefficient. Prudent engineering practice allows for worst case scenarios though. Thus the 4% number was used. Note that in this example, the difference between 3% and 4% amounts to 1/2 ton of HVAC, something that would be much more costly to retrofit than to install initially.