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## HVAC Calculations for Rack-Based Dimming Systems

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### IGBT Distributed Dimming Systems

The waste heat produced by an IGBT Distributed Dimming System can be usually ignored in HVAC load calculations. Formulas herein apply to rack-based dimming systems only. Formulas apply equally to chokeless IGBT-based (Capiro™ Plus Dimming Rack) and choked SCR/SSR based dimmer types.

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### Capiro™ Plus & Other Rack Dimming 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(C) & 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 97% efficient is 3% 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.

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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. Entertainment Technology/Lightolier Controls dimmers should not be operated in an environment that regularly exceeds 40°C (104°F) - Recommended 35°C (95°F).

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### Typical Capiro™ Plus Dimming Rack Calculation

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

Connected load	=	180 kW
180 kW x 4%	=	7.2 kW inefficiency
7.2 kW x 3412.14	=	24,567 BTU/hr
24,567 BTU/hr/ 12000	=	2.047 Tons AC

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Note: \*A Capiro™ Plus dimmer rack is actually less than 3% inefficient. Prudent engineering practice demands a worst case scenario though. Thus the 4% number was used. 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.

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