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QUESTIONS AND ANSWERS

A1. What is Power Factor?

Power factor is the ratio (unitless) of true power (measured in watts) to apparent power (measured in VA – Volt Amperes) for AC loads. VA is the true rms current multiplied by the true rms voltage and is considered Apparent Power. True Power will take into account the non-sinusoidal waveform shapes that may be present, and the current lead or lag angles caused by reactive elements in the load. This differs from a DC application since power is a simple product of current and voltage for steady state DC. Under conditions of a purely resistive load, True Power equals Apparent Power and the Power Factor is 1. Power factor can range from 0 for a purely reactive load to 1 for a purely resistive load. Also see FAQ's for "What is VA?" and "What is True Power?"

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A2. What is VA (Volt-Amps, Apparent Power)?

VA is the product of true rms current multiplied by the true rms voltage and is considered Apparent Power. (Also see the FAQ on "What is True Power?" and "What is Power Factor?")

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A3. What is VA used for and why is it used?

VA is very important in the sizing of power sources, wiring, circuit protection etc. used in AC power applications. An example why VA is used in place of Watts for this assessment is that an AC load that draws 2400W from a 120VAC line, does not necessarily draw 20A. The load may have a power factor of .667. If this is the case, then this load draws 3600VA (2400W/0.667PF). At 3600VA with a source voltage of 120V, the load current would be 30A. This is a significant difference when sizing wire gauges, estimating voltage drops, circuit breaker protection, and AC source sizing. (Also see the FAQ on "What is True Power?" and "What is Power Factor?")

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A4. What is Power (True Power)?

True Power will take into account the non-sinusoidal waveform shapes that may be present, and the current lead or lag angles caused by reactive elements in the load. This differs from a DC application since power is a simple product of current and voltage for steady state DC. Under conditions of a purely resistive load, True Power equals Apparent Power and the Power Factor is 1. (Also see the FAQ on "What is VA?" and "What is Power Factor?")

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A5. What is Crest Factor?

Crest Factor is the ratio (unitless) of peak to rms of a waveform. (Peak/rms). Usually used for current but applicable to voltage as well. For a sinusoidal current waveform such as that which a pure resistive load would draw, the crest factor is 1.414 since the peak of a true sinusoid is 1.414 times the rms value. A load such as a switching power supply or lamp ballast that is not power-factor-corrected, would draw a current waveform that is non sinusoidal. Such non sinusoidal waveforms can have Crest Factors well above or even below 1.414.

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