

## Re: Flourescent lamp –Wasting Power?

**Source:** <http://sci.tech–archive.net/Archive/sci.electronics.design/2004–12/3851.html>

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Date: Sun, 19 Dec 2004 14:10:20 -0500

Jeff Wisnia wrote:

>

> *Fred Bloggs wrote:*

>

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>>

>> *Ban wrote:*

>>

>>> *John Fields wrote:*

>>>

>>>> *If the lamps would use 9W they would be \*very\* hot, I suspect the*

>>>> *most current is not "real" in phase with the voltage, but imaginary*

>>>> *as some capacitive or inductive load. I would guess 1–2W as you*

>>>> *describe it, much like the small low voltage xformers when idle. You*

>>>> *cannot measure the power consumption with an amperemeter, even if it*

>>>> *is true rms, but you need a dedicated power meter for it with*

>>>> *3connections at least.*

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>>>> *You can do it with an oscilloscope and a resistive shunt to measure*

>>>> *the current. Display voltage on one channel, current on the other,*

>>>> *determine the phase angle between them and then  $P = IE \cos(\phi)$ .*

>>>>

>>>> *You could also do it with a current transformer once you've determined*

>>>> *its primary–to–secondary phase shift.*

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>>> *John, what you suggest is potentially lethal, as you will have to*

>>> *connect a power line directly to the case and earth, hopefully*

>>> *tripping only the earth leakage circuit breaker.*

>>> *You will need two transformers, which are isolated on the secondary,*

>>> *or you could use an isolation transformer in the power line. But all*

>>> *this is \*not\* appropriate for an unskilled hobbyist.*

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## sci.electronics.design: Re: Flourescent lamp –Wasting Power?

- > > *The OP is an MIT EE grad...note his signature file– he is definitely*
- > > *"old school"– very hands on:)*
- > >
- >
- > *You guys are correct, I didn't take the phase angle into into account, I*
- > *just wired a 25 ohm wirewound resistor in series with the lamp and*
- > *measured almost 2 volts ac across it (lamp switched off) with my olde*
- > *Simpson 260 VOM. I can't properly relate the temperature my fingers felt*
- > *to the real power being dissipated by that electronic ballast. The board*
- > *was mounted in liberally slotted flimsy plastic cage in the center of*
- > *the two nested circline flourescent bulbs in the lamp's bowl. There was*
- > *good convection cooling through those slots, but who knows, maybe it was*
- > *only 2 watts, that wasn't my point 'yknow.*
- >
- > *But, thanks for accepting that even in retirement I could probably drag*
- > *my two channel scope off the shelf, hit the "hellbox" for parts and*
- > *kludge up a setup to measure the real power – without frying myself.*
- >
- > *But, I'm reminded of the words of the MIT prof who taught a course in*
- > *"rotating machinery". He was a Brit, and while we guys were hacking*
- > *around with a bunch of 240v 3 phase apparatus with big exposed knife*
- > *switches, motors without guards over their live parts, and stuff like*
- > *that, he proclaimed, "You boys will never become real engineers until*
- > *you learn to 'take' a shock". (Thanks for the mammaries.)*
- >
- > *I was obviously overly incensed by what I percieved as a wasteful and*
- > *stupid design that I just multiplied current times voltage in my head*
- > *and was probably wishing for a high number to further justify my angst.*
- >
- > *Nonetheless, the principle is the same, and I'm still wondering if there*
- > *was any reason other than saving a few pennies to design those damn*
- > *lamps that way.*
- >
- > *The two other "two tube" flourescent torchier lamps we have in the house*
- > *have two separate skinny electronic ballasts hidden inside the pole,*
- > *controlled by a single pole four position rotary switch which sequences*
- > *like the one in a "3–way" incandescent lamp, except it controls the*
- > *power to the inputs of the two ballasts rather than to the filaments of*
- > *a 3–way bulb. (This I know because I've had to replace a switch in one*
- > *of them when it got lazy had to be teased to get it to work.)*
- >
- > *Happy Holidays guys,*

Designs like this, that expose electronics to line voltage, continuously, and with no load, are subject to destruction by line surges, a lot more than electronics that is only connected to the line when the device is actually in use.

I just fixed my DVD player (blown rectifier and fuse) that got damaged in a storm even though the unit was switched off. The switch was between the rectifier and the rest of the power supply. Idiotic

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design, if you ask me.

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John Popelish