Re: Fluorescent heating

Source: http://sci.tech−archive.net/Archive/sci.electronics.design/2008−12/msg04057.html

- *From*: don@xxxxxxxxxxxxx (Don Klipstein)
- *Date*: Tue, 30 Dec 2008 00:38:10 +0000 (UTC)

In article <kg4hl49vaeiq5gh67ogvpo89avlfmerkh2@xxxxxxx>, JosephKK wrote:

> On Fri, 26 Dec 2008 18:07:46 +0100, Ken <ken_3@xxxxxxxxx> wrote:
>
> > On Fri, 26 Dec 2008 11:35:36 −0500, "Paul E. Schoen"
> > <pstech@xxxxxxxxx>
> > wrote:
> >
> > > A
> > > flourescent
> > > light
> > > is
> > > pretty
> > > much
> > > the
> > > same.
> > > They
> > > consume
> > > less
> > > power,
> > > dissapate
> > > less
> > > heat,
> > > but
> > > still
> > > most
> > > of
> > > the
> > > energy
> > > consumed
> > > is
> > > dissapated
> > > in
> > > the
> > > form
> > > of
> > > heat.

It doesn't take very much energy to radiate light – we just can't do it efficiently. Incandescent is horribly inefficient – but it's cheap and we don't care that we are wasting so much energy. Flourescent lights take a circuituous route to emit light in the visible spectrum – not very

efficient
at
all,
but
much
better
then
incadescent.

LEDs
are
much
more
efficient,
but
still
some
of
the
energy
goes
to
heat
–
I'm
not
sure
what
the
ratio
is.
Visible
light
itself
is
not
very
much
energy.
It
all
goes
to
heat.

I
wonder
whether
LED's

are
more
efficient
than
the
good
old
tube
fluorescent
lamps.

Not yet.

Some white LEDs are
pushing 160 lumen/watt
now − at least if you believe
Cree's press releases (they
claimed 130 lumen/watt
about 2 years ago).

http://news.moneycentral.msn.com/ticker/article.aspx?Feed=PZ&Date=20081

LEDs capable of 90+
lumens/watt are starting to
appear in consumer LED
lighting some of the claims
made are a bit optimistic eg

http://www.arraylighting.com/Story/index.html

But there are very few
fluorescents that can work
as efficiently as
that.

My
gut
feeling
is
they
still
have
some
distance
to
go
to

get
there.

Yes.

Consumer mass produced
ones still lag a bit behind the
best prototypes.
Although for some coloured
light sources like traffic
lights and
indicators LEDs can still
come out ahead.

In answer to the original
question a low pressure
sodium lamp with the
InO coating etched off the
glass envelope would emit a
pretty strong IR
line source at very high
efficiency (with a suitable
low pass filter to
stop the obvious visible
yellow sodium D line
escaping).

High Lumen/watt is not all we need.
The color temperature (Kelvin) and Color
Rendering Index (CRI)
are very important factors.
Today I can't buy LEDs that have better
efficiency than
fluorescents with 2700K and >CRI90 for my
home lighting.

The other important factors are longevity (LEDs are typically
50,000+ hr),
ability to work in cold environments, and the true
environmental costs of
manufacturing and disposal. I think there are white LEDs
with a wide range
of color temperature, and those that use RGB can be adjusted
to whatever
you need. Earlier white LEDs used a phosphor coating that
made them less

efficient, while newer ones I think use the light output directly, perhaps
from a cluster of component colors.

Also the power conversion from line voltage to LED current can approach
97%, while I doubt that most CFLs are much better than 90%, but I'm just
guessing by how hot the base of CFLs are. I think there has been a major
investment in CFL technology and manufacturing that causes resistance to
switching over to LEDs, and the fact that CFLs need more frequent
replacement is also a plus for those who want a continuing business.

Paul

This is my favorite http://tekniken.se/misc/philips_tld36w−92.jpg
This tube is 20 years old now and still going strong.
I can't find any LED that have this light quality. 2700K CRI95

I challenge both the color temperature claim and the CRI claim, and especially the combination. 2700 K would be rather yellow−orange colored. Standard incandescent are around 3200 K color temperature and do not have over 90 CRI.

http://www.betterphoto.com/article.asp?id=24

http://www.techmind.org/colour/coltemp.html

http://en.wikipedia.org/wiki/Black_body

Most household incandescents have color temp. 2700−2900 K, and have CRI of 100 by definition. The 100 watt 750 hour 120V A19 has a color temp. of 2865 K according to Kodak.

http://www.kodak.com/US/plugins/acrobat/en/motion/support/h2/h2fltrs.pdf

(Though their figures for daylight sources appear a bit high to me. They say 5800K for direct sunlight in midsummer − and the color of the sun's light would have to be not yellowed at all by the atmosphere for that to be true. The color temp. of sunlight in outer space is a bit less. I suspect they are stating effective figures for usual films, including the ability of the film to react to UV.)

− Don Klipstein (don@xxxxxxxxx)

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