

# EMTF Breakfast

This is not your  
Grandma's light bulb

Brent Hancock, MIES



- OSRAM SYLVANIA: North American operation of OSRAM, one of the world's two leading lighting manufacturers – Canadian Headquarters in Mississauga, ON
- Founded in Massachusetts in 1901 as the Bay State Lamp Company. Adopted SYLVANIA name in 1931.
- Acquired by Munich-based OSRAM, a Siemens subsidiary, in 1993.



*The art project SEVEN SCREENS at global headquarters in Munich features 700,000 high-power RGB LEDs (16 million different colours possible) installed on the masts and can be controlled via fibre optic cable from a central computer room.*



• Employees:  
Over 10,000

• Factories:  
17 in N.  
America

• Revenue:  
€1.75 billion



• Employees:  
Over 43,500

• Factories:  
46 worldwide

• Revenue:  
€4.6 billion



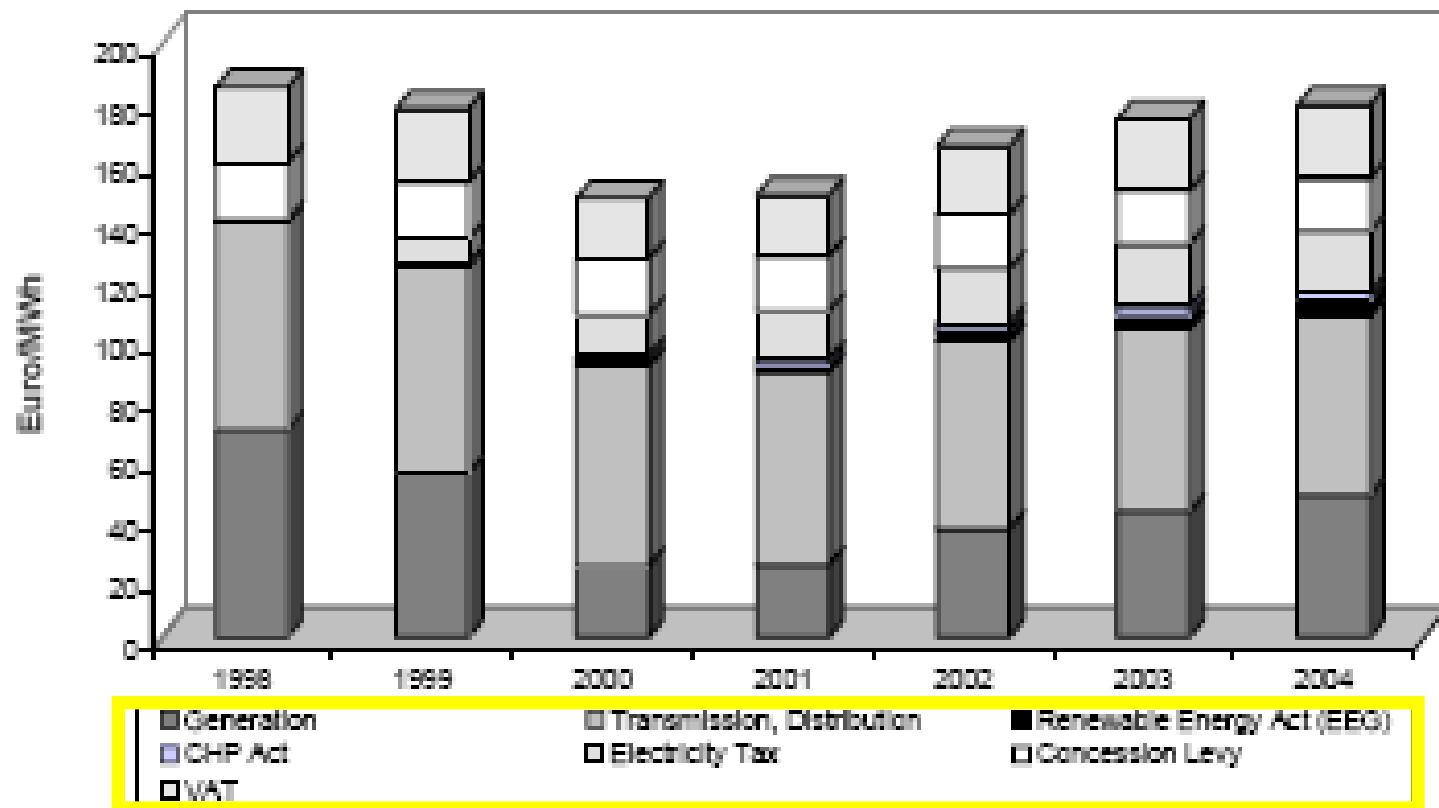
• Employees:  
Over 400,000

• Factories:  
264 worldwide

• Revenue:  
€2.5 billion

- **What drives innovation?**
- **T12 / T8 / T5 – Regulation and Product Direction**
- **Induction and HID**
- **Incandescent Halogen Regulation and Product Direction**
- **LED 1 - Indoor**
- **LED 2 – Outdoor**
- **CFli**

Figure 1: Development of Electricity Prices, Representative Household Customers, Euro<sub>2004</sub>/MWh



Europe  
C\$0.252

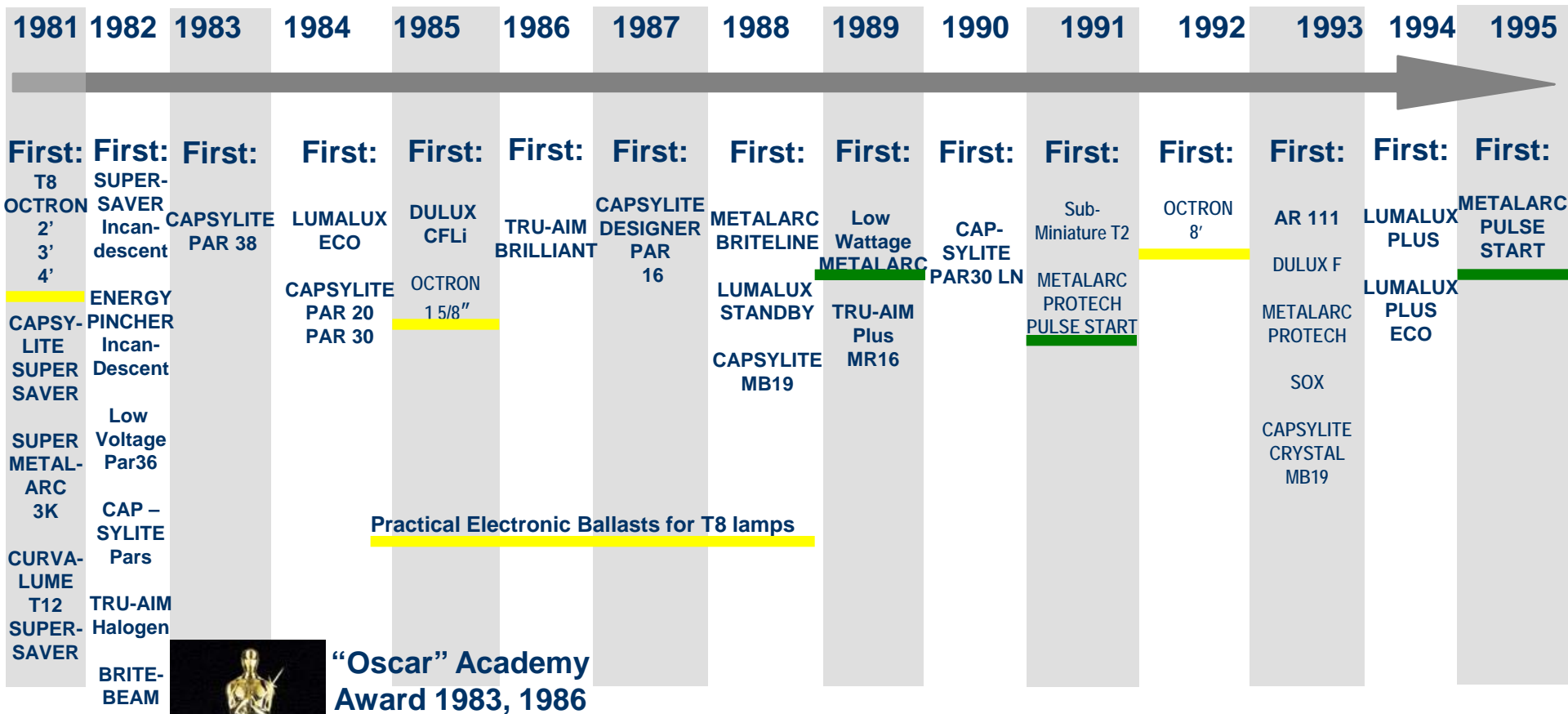
1/3  
Is  
tax

- Society's pressures have created demands that are promoted by:

- LEED
- ASHREA
- E-Star
- Green Buildings



- DOE and NRC provide framework to enforce the wishes of the community
- The Lighting industry competes for market share of innovative products – driving research globally, hoping to satisfy society, while monitored by regulators



**“Oscar” Academy  
Award 1983, 1986**



T8 Fluorescent  
 Metal Halide

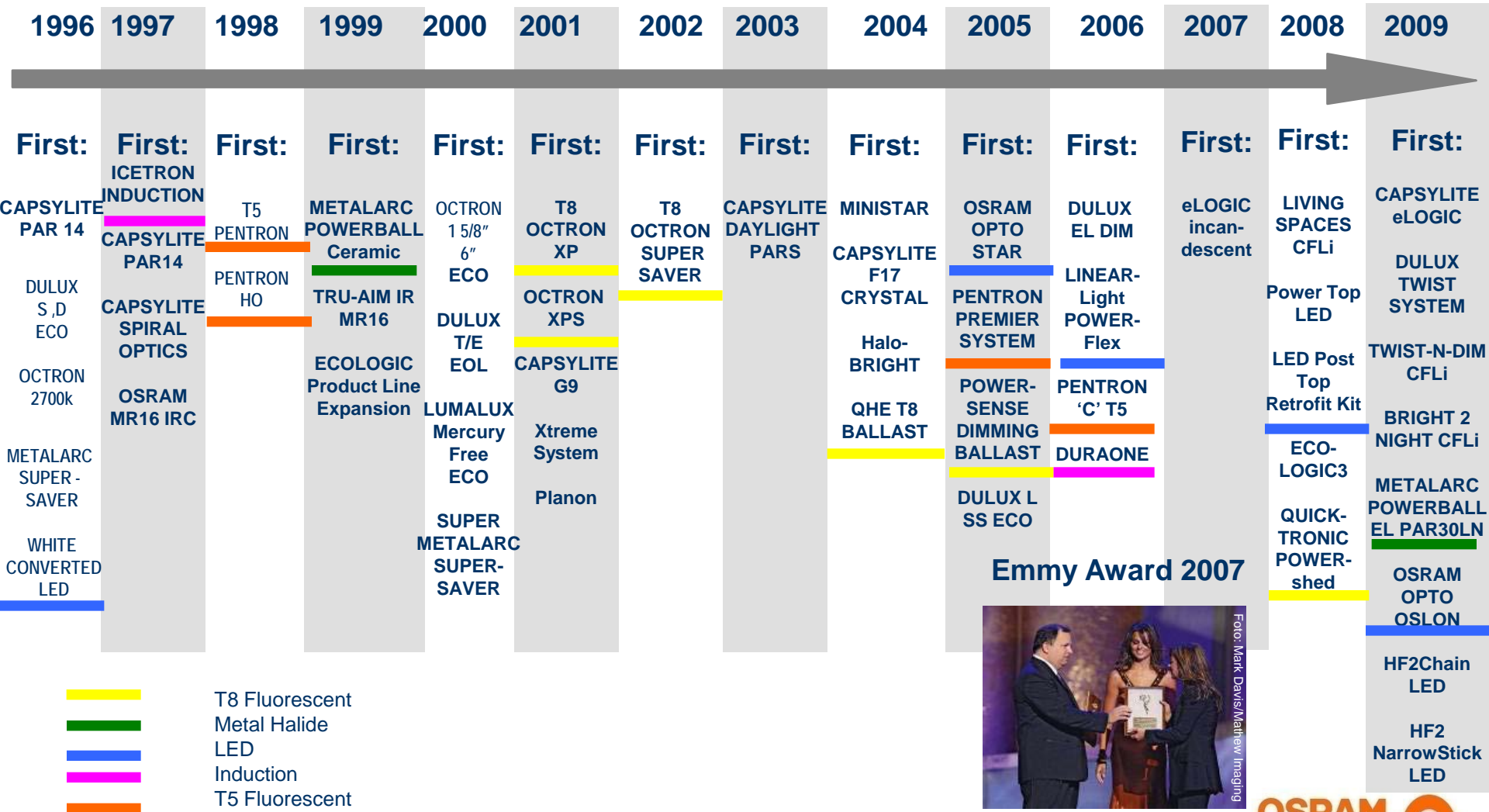


Foto: Mark Davis/Matthew Imaging

**Emmy Award 2007**

- 2005 – General lighting magnetic ballasts no longer available for new fixtures
  - T8 considered the right alternative – T5 on as needed basis
    - Multiple choices of replacement systems encourages conservation



- 2010 – GL magnetic ballasts for maintenance no longer available
- 2012 – GL T12 electronic ballasts no longer available
- 2012 – GL T12/T10 lamps no longer available, July 14
  - Laws in NAFTA (DOE, NRC) do not stop production of T12 products
  - Laws enforce minimum specifications that the OEM's find impractical to fund improvement
  - OEM's may not manufacture or import to NAFTA regulated products
    - Some high color quality T12 remain – but no ballast production ensures reduction
- OEM's forced to fund new technology... shifts work force, increases research



Lamp	Correlated color temperature	Energy conservation standard (lumens/W)
1200 mm (48 inches), medium bi-pin, $\geq 25\text{W}$	$\leq 4500\text{K}$	89
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	88
$\geq 560\text{ mm}$ (22 inches) and $\leq 635\text{ mm}$ (25 inches), U-shaped, medium bi-pin, $\geq 25\text{W}$	$\leq 4500\text{K}$	84
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	81
2400 mm (96 inches), rapid start, recessed double contact	$\leq 4500\text{K}$	92
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	88
2400 mm (96 inches), instant start, single-pin, $\geq 52\text{W}$	$\leq 4500\text{K}$	97
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	93
$\geq 1125\text{ mm}$ (45 inches) and $\leq 1200\text{ mm}$ (48 inches), miniature bi-pin, $\geq 26\text{W}$ (standard output)	$\leq 4500\text{K}$	86
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	81
$\geq 1125\text{ mm}$ (45 inches) and $\leq 1200\text{ mm}$ (48 inches), miniature bi-pin, $\geq 49\text{W}$ (high output)	$\leq 4500\text{K}$	76
	$> 4500\text{K}$ and $\leq 7,000\text{K}$	72

CW = 62, WW = 52

← 4ft T8 and T12

← 2ft T8 and T12 U-Bend

← 8ft T8 HO and T12 HO

← 8ft T8 and T12

← 4ft T5

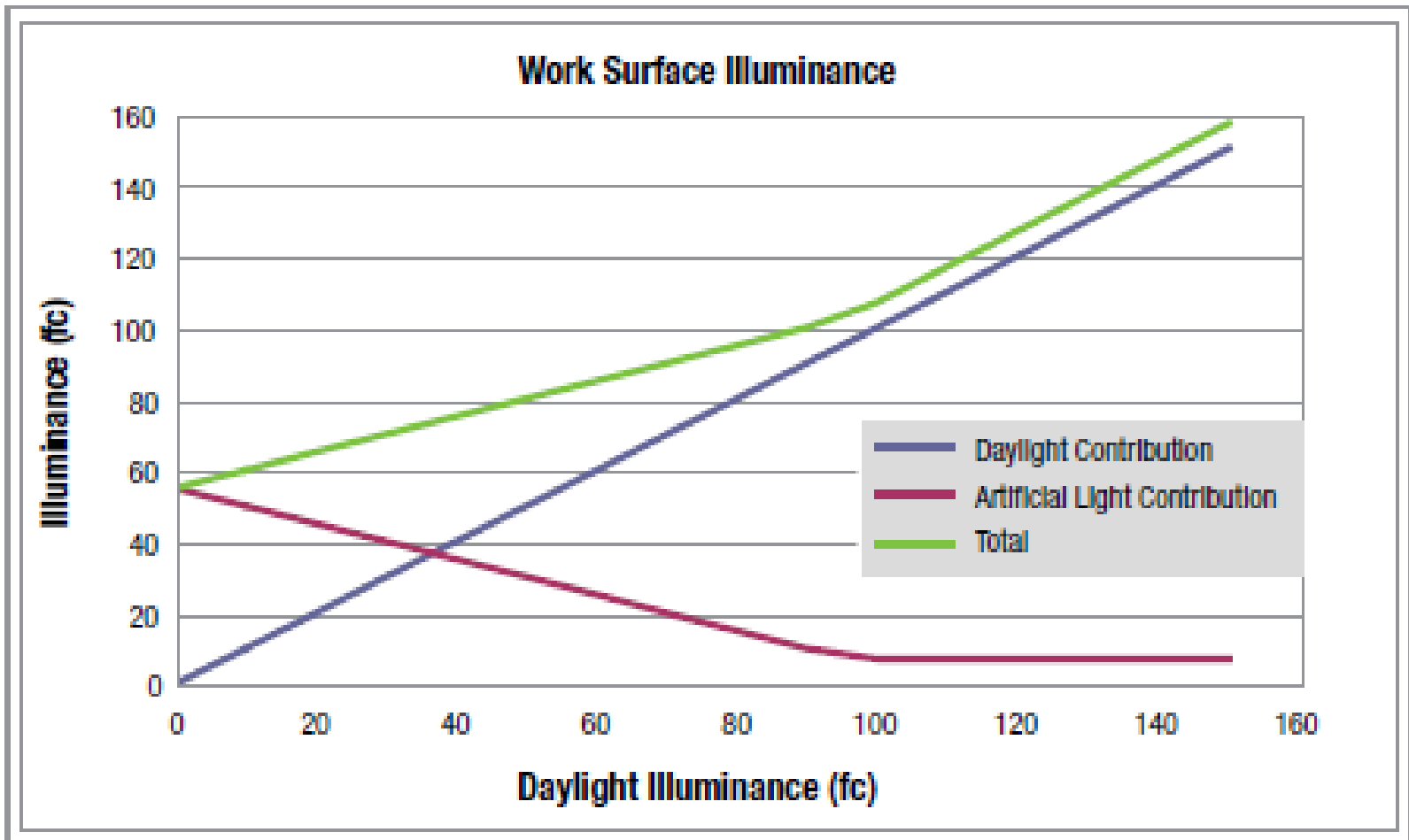
← 4ft T5 HO

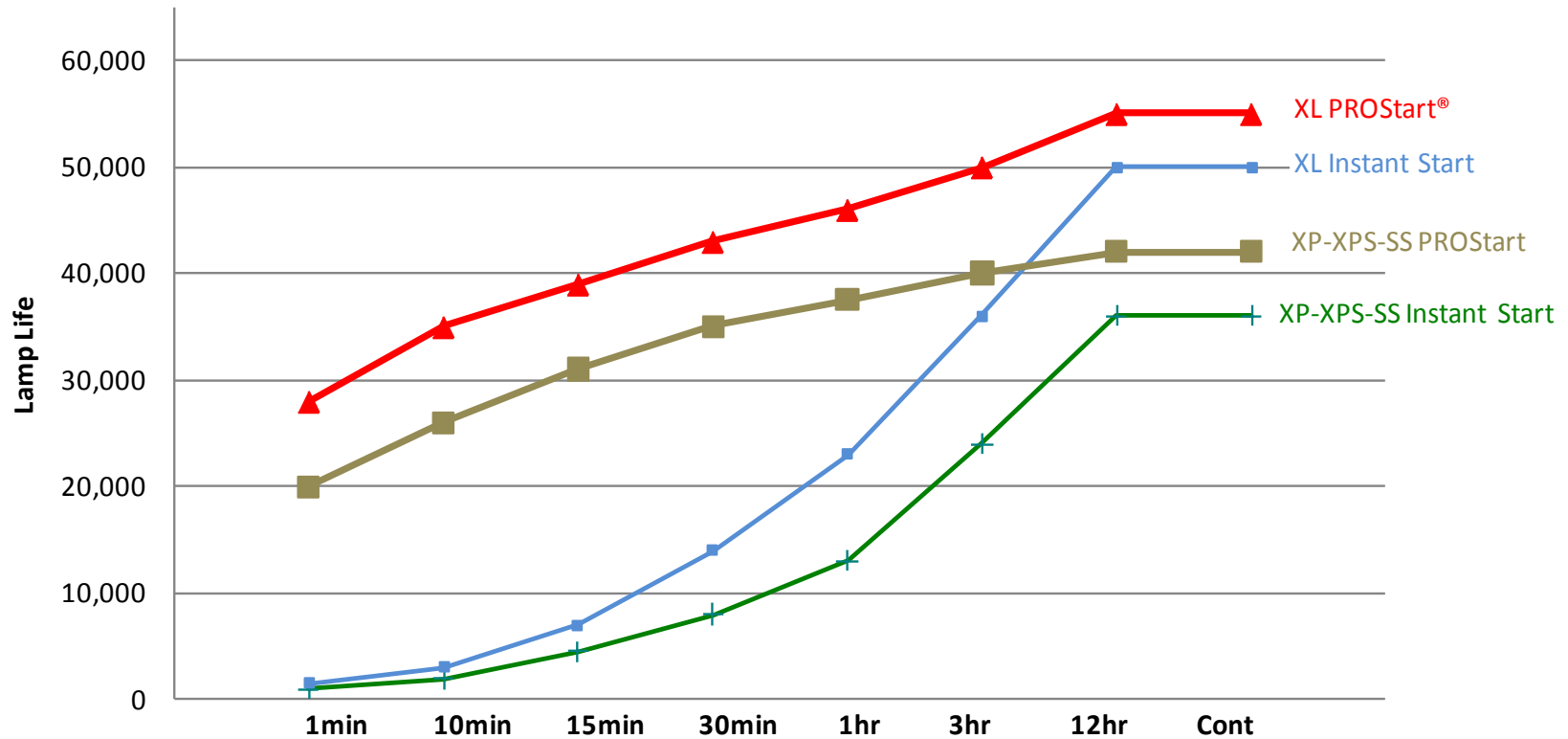


- T8 Will remain workhorse of lighting for long term – 10+ years
  - Ability and demand of new technology will be determining factor (SSL)
- Current T8 ballast and lamp system efficacy is hovering around 100 LPW
  - Practical SSL hovering around 65 LPW
- Best case efficiency should be combined with controls:
  - Occupancy or Vacancy sensing controls
  - Dimming
  - Step Level (2-7)
- Provides best choice for future color changing lamping Vs SSL fixtures
  - T8 55,000 hour lamps reduce 6%, LED 60,000 system degrades 30%

- T5 HO systems are generally driven to 100% of lumen output (Ballast Factor 1.0)
- Many installations are too bright/glaring – Highbay applications, not Lowbay
- 80% output ballast for mid height T5HO systems... not as blinding at 15-20 ft (5-6m)
  - 50watt HO SS- same output as 54 watt
  - 47watt HO SS- improved LPW from low wattages
  - 40,000 hour life (Spec grade lamp, low cost lamps in market are 20-24K hours)
- T5(28w) systems, also driven at BF 1.0 have had a 25% life rating increase (DOE- 25,000hrs)
- T5 and T5HO have multiple choices of dimming and step control ballasts to leverage savings







OCTRON four, five and eight foot ECO3 lamps  
are below LEED-EB 70 pg/lm-hr levels

# QUICKTRONIC® High Efficiency T8 and T5HO QUICKSTEP®



## High Efficiency Bi-Level Dimming Systems

Easily switch from 100% to 50%

High Efficiency, UNV (120 – 277V)

Two lamp PROStart® models

Meets energy code switching requirements for:  
California Title 24, ASHRAE and EPCACT

T8 models now operate 1 or 2 full wattage or SS lamps

Low ballast factor T8 (PSL)

- 48W @ 0.77 BF (100% power)
- 24W @ 0.25 BF (50% power)

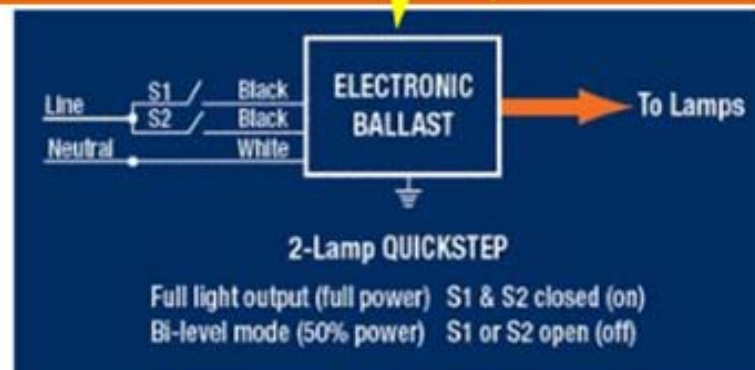
Normal ballast factor T8 (PSN)

- 55W @ 0.87 BF (100% power)
- 27W @ 0.34 BF (50% power)

ency T8

T5HO ballast operates FP54T5HO lamps

- 96W @ 0.80 BF
- 52W @ 0.40 BF



### Applications:

Bi-level control with standard wall switches, building control systems, economic daylight harvesting, offices, schools and conference rooms

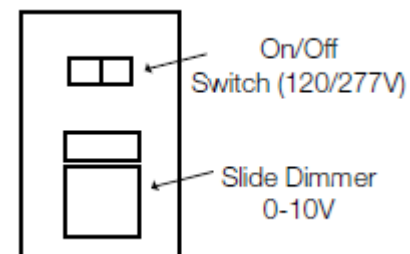


T5 28w Bi Level is Lithonia Exclusive



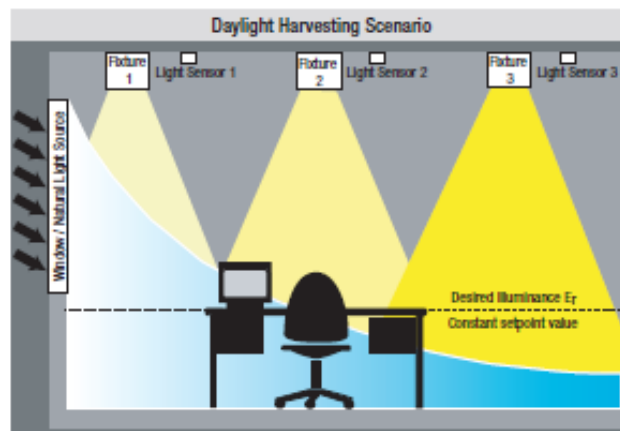


**0-10v System Control**



**120-277v User Control**

**=**



**Dual Control**



					Life on Instant Start		Life on PROStart	
Series	Watts	% Energy Saving	Lumens	CRI	3 hours per start	12 hours per start	3 hours per start	12 hours per start
700/ECO*	32	-	2800	78	24,000	28,000	30,000	35,000
700/XPI/ECO	32	-	2850	78	24,000	36,000	40,000	42,000
800/XPI/ECO3	25	22.0%	2475	85	24,000	40,000	36,000	42,000
	28	12.5%	2725				40,000	
	30	6.25%	2850					
	32	-	3000					
800/XPS/ECO3 "Super T8"	32	-	3100	85	24,000	40,000	40,000	42,000
800/XPI/XL/ECO3	25	22.0%	2400	85	36,000	40,000	40,000	46,000
	28	12.5%	2600			50,000	52,000	55,000
	32	-	2950					

New 5 yr. lamp warranty on XP/XL lamps





- You want a energy saving lighting control system
- Start with your people
- Systems are often installed, commissioned, but not fully utilized
  - “Commissioning” is a system, not an end result
  - Design with a team...
    - Consultant, Manufacturer, Installer, Maintenance, and User
    - Mock one up
    - Make sure all teams members understand targets
    - Include system and light source OEM first, not for troubleshooting
    - Inspect before walls closed
    - Education during process results in smooth turnover

	<u>Ballast</u>	<u>Lamp</u>		<u>Initial</u> <u>System Lumens</u>	<u>Mean</u> <u>System Lumens</u>	<u>System</u> <u>Wattage</u>	<u>Lumens</u> <u>per Watt</u>	<u>Lumen Loss</u> <u>Over Lamp Life</u>
1980's	Magnetic	F34CW SS	😞	4664	4011	82	57	20% @ 20,000 hr
BF.88	QTP 2x32 N	FO32 841ECO	😊	5192	4770	59	88	9% @ 24,000 hr
BF .78	QHE 2x32 L	FO28 841 XP ECO	😊👉	4251	4040	42	101	6% @ 36,000 hr
BF 1.0	QT 2x28	FP28 @25C	😊👉	5200	4880	65	80	6% @ 20,000 hr
		FP28 @ 35C		5800	5400	65	89	
BF 1.0	QT 2x54	FP54 @ 25C	😊👉	9200	8650	121	76	6% @ 36,000 hr
		FP54 @ 35C		10000	9400	121	83	

**T5 – if fixture is appealing- buy it – There is no guilt in a T8 choice**

**T5 HO – Ceilings 15-35ft (5-10m)  
Above 35ft (10m) or too cold = HID**

## ICETRON

Available only in Fixtures

100,000 hours

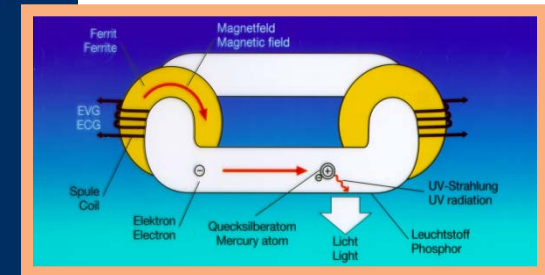
Instant on Fluorescent

-40C start temperature

Multiple wattages

Always electronic ballasts

5 year warranty



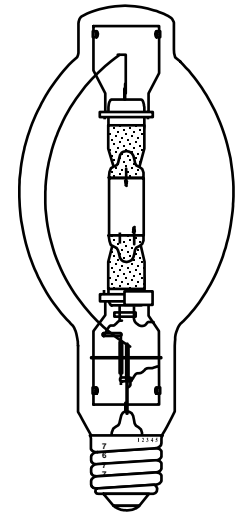
GREAT FOR HARD TO REACH LOCATIONS, PHYSICALLY OR GEOGRAPHICALLY

Competitive induction is in the marketplace – different look, same advantages

- What makes it different?
  - Ceramic arc tube, not quartz glass
    - Slows depreciation
    - Allows higher pressure
- 30% increase in lpw
- Color quality increases 65 to 94 CRI
- Less Heat and noise if on E ballast
- **RIVALS HALOGEN indoors**
- **RIVALS T5HO for open areas**
- **BEST where T5 can't go**
  - Higher ceilings - 35 Ft (10m) +
  - -30C
  - Small powerful fixture requirement



320 watt



Old School 400w



20 watt

- Ceramic adapted to self ballasting
  - 4x Efficiency of Halogen
  - 4x Life of Halogen
  - 4 Beam spreads available



## Look up Table for Performance

### GSL Standard:

Efficacy=>

$4.0357 * \ln(\text{lumen output}) - 7.1345$

### Modified Spectrum Standard:

Efficacy=>

$4.0357 * \ln(\text{lumen output}) - 8.3345$

Both must have a life that is  
 $\geq 1000$  hours and a CRI  $\geq 80$

Current  
incandescent  
LPW levels

40W  
11.75 LPW

60W  
14.5 LPW

75W  
15.86 LPW

100W  
17.1 LPW

Lumens	Minimum Lumens/Watt		Lumens	Minimum Lumens/Watt
200	14.25		1700	22.88
300	15.88		1800	23.12
400	17.05		1900	23.33
500	19.95		2000	23.54
600	18.68		2100	23.74
700	19.30		2200	23.93
800	19.84		2300	24.10
900	20.32		2400	24.28
1000	20.74		2500	24.44
1100	21.13		2600	24.60
1200	21.48		2700	24.75
1300	21.80		2800	24.90
1400	22.10		2900	25.04
1500	22.38		3000	25.18
1600	22.64			

## Key Dates and Wattages

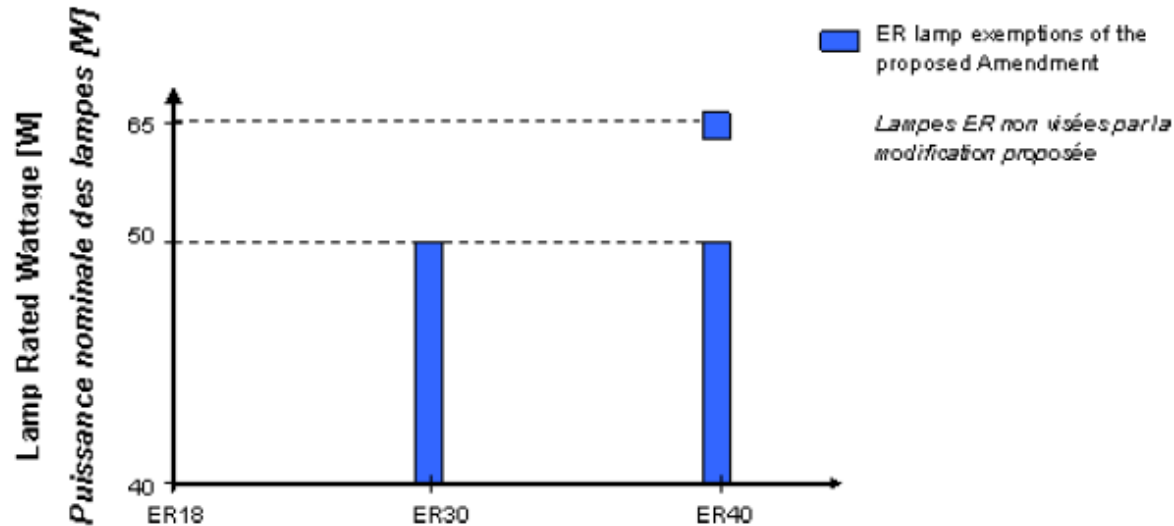
- Effective date for 75 and 100 watt lamp replacement: January 1, 2012
- Effective date for 40 and 60 watt lamp replacement: December 31, 2012
- Service life of incandescent lamps: 1 000 hours

### BC needs to be different

- Effective date for 75 and 100 watt lamp replacement: **January 1, 2011**
  - Effective date for 40 and 60 watt lamp replacement: December 31, 2012
- 
- ALSO – Decorative lamps, Globe, Tube, Chandelier... new limit is 25 watts**

Exemptions include: BR30 and BR40 lamps of 50 Watts or less and BR30 and BR40 lamps ( now available as halogens) of 65 watts (same exemptions apply to ER Lamps).

Effective date applies to product manufactured after June 1<sup>st</sup> 2009



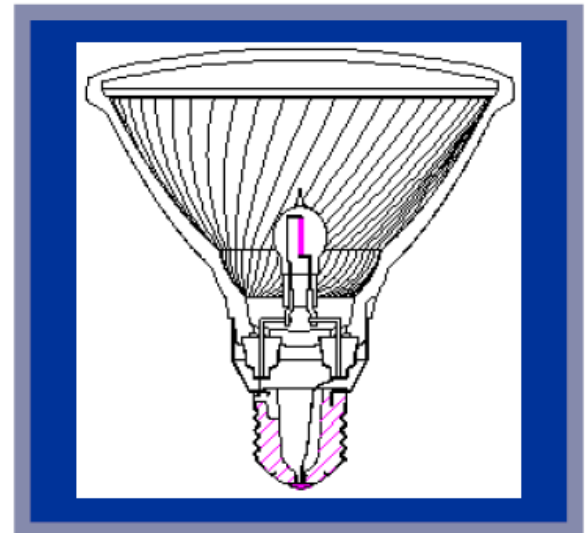


In 2012, we bid farewell to common PAR General Service lamps

IR Technology is the only type that will meet upcoming standards

## CAPSYLITE® IR™

PAR20 120V	PAR30 120V	PAR30 130V	PAR38 120V	PAR38 130V
40W NSP10	40W NSP 9		50W NSP 9	50W NSP 9
40W NFL30	40W NFL 25		50W NFL 25	50W NFL 25
40W WFL40	40W FL 40		60W NSP 9	60W NSP 9
	50W NSP 9	50W NSP 9	60W WSP 12	
	50W NFL 25	50W NFL 25	60W NFL 25	
	50W FL 40	50W FL 40	60W FL 30	60W FL 30







[Advanced Search](#)[Web](#) [Show options...](#)

Results 1 - 10 of about 259,000 for cfl bulb manufacturers.

[Advanced Search](#)[Web](#) [Show options...](#)

Results 1 - 10 of about 371,000 for Metal Halide bulb manufacturers.

[Advanced Search](#)[Web](#) [Show options...](#)

Results 1 - 10 of about 1,020,000 for LED bulb manufacturers.

# CERTIFICATION **Inform**s

An Urgent Bulletin from CSA International

Ref No: I10-064

Lighting Products No. 56

Date: April 28, 2010

**New Service available as of today**

**Apply any time to have your products evaluated**

Announcing: Publication of the CSA INTERNATIONAL Technical Information Letter No. B-79, "Requirements for Retrofitted Luminaires and LED Retrofit Kits for Installation into Previously Installed Luminaires"

See Attachment 1 for affected Class Numbers.

1.3. These requirements cover the following Retrofit kit categories:

a) **LED Retrofit Kit**

This category includes retrofit kits consisting of light-emitting-diode (LED) light sources and LED drivers intended to replace a compact fluorescent, incandescent and/or HID light sources and where it is necessary to modify the luminaire. See Appendix A for particular supplemental requirements for this product category.

b) **LED Tubular Lamp Retrofit Kit**

This category includes retrofit kits intended for replacement of linear fluorescent lamps. LED tubular lamps are either dimensionally interchangeable or non-interchangeable with ANSI standard lamps. See Appendix B for particular supplemental requirements for this product category.

**B1 LED Tubular Lamp Retrofit Kits**

B1.1 LED tubular lamp retrofit kits are intended to replace lighting system in a luminaire already installed. The luminaire is the type employing double ended (linear) fluorescent lamps.

LED tubular lamps shall not be directly connected to a branch circuit or to existing ballast, unless otherwise stated.

**B2 LED Tubular Lamp Retrofit Kits with Interchangeable LED Lamps**

B2.1 Interchangeable LED lamps shall not be directly connected to a branch circuit or to an existing ballast.

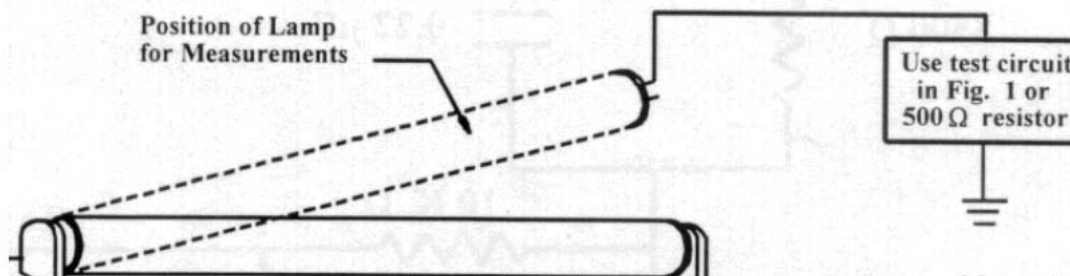
### B3 LED Tubular Lamp Retrofit Kits with Non-Interchangeable LED Lamps

B3.1 Non-interchangeable LED lamps may be directly connected to a branch circuit if:

- a) Meets requirements of Clause B1.5.2 for dry, damp or wet location after a drop test of Clause B1.5, and b) or c);
- b) LED lamps are connected to a branch circuit by wire harnesses, terminals, wire connectors and/or suitable means and do not use lampholders for electrical connection;
- c) Use custom lampholders investigated and approved for an application;
- d) Meet the Risk of Electric Shock Measurements of Clause B3.5.

B3.2 Non-interchangeable LED lamp can meet dimensional characteristics of ANSI standard lamp of Clause B1.3.2 providing that ANSI type lampholders provide only mechanical securement with no electrical connection to LED lamp.

Figure B3.5  
Risk of Electric Shock Measurements



## 4.2 Investigated Retrofitted Luminaires:

4.2.1 A following minimum markings shall be affixed to each retrofitted luminaire.

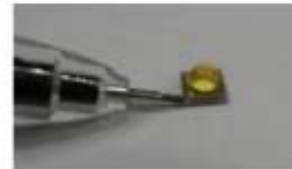
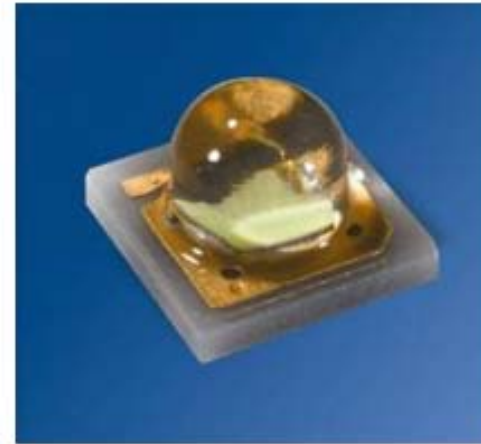
- (a) Contractor's or installer's identification (company name, trade name/trademark);
- (b) CSA File Number
- (c) Model designation or catalogue number of the Retrofitted Luminaire;
- (d) Input rating in volts and total amperes or watts, and secondary volts and amperes or Volt-amperes for a LED driver, frequency, and maximum lamp wattage.
- (e) Lamp replacement information: LED Lamp/Kit catalogue No., located where readily visible during relamping and shall have temperature rating minimum as label replaced.
- (f) Permit number, as applicable;
- (g) Other marking required by end product (retrofitted luminaire) standard and TIL B-79 may apply.

Notes: Marking shall be permanently applied to non-removable part of the luminaire (for example marking the reflector will not be acceptable). For dry location, a laser printout on labelled approved for use with a laser printers are considered acceptable; for damp and wet location the labels and printing system has to be approved by CSA.





- **Industry's smallest 1-watt power LED**
  - 3x3 square millimeters
- Symmetrical package
- 350mA operating current
- Available in color temperatures ranging from 2700K to 6500K
- High thermal and optical efficiency efficacy
  - 75 LPW at 3000K
  - 110 LPW at 5700K
  - Thermal resistance of 7K/W



**An Array of 16 LED= 1760 lumens**

**Same as a 100w incandescent light bulb**

**Rivals Best FL and CMH system today**  
**\$\$**

**6 x 16 = 10,560 lumens = 2x54 T5HO**



**CRI 85**

**6w / 58 lpw  
Dimmable  
25 & 40 deg**



**4w / 30 lpw**



**CRI 60**

**2w / 40 lpw**



**CRI 85**

**8w / 44 lpw  
Dimmable  
25 & 40 deg**



**CRI 85**

**15w / 51 lpw  
Dimmable  
25 and 40 deg**



**CRI 85**

**8w / 50 lpw  
Dimmable  
25 and 40 deg**



**CRI 85**

**8w / 54 lpw  
Dimmable**



**CRI 85**

**8w / 56lpw  
Dimmable**

**Term 'sufficient' light is current**

**If it does the job you want it to do- Buy it**

**If it does not....wait ... it will come!**



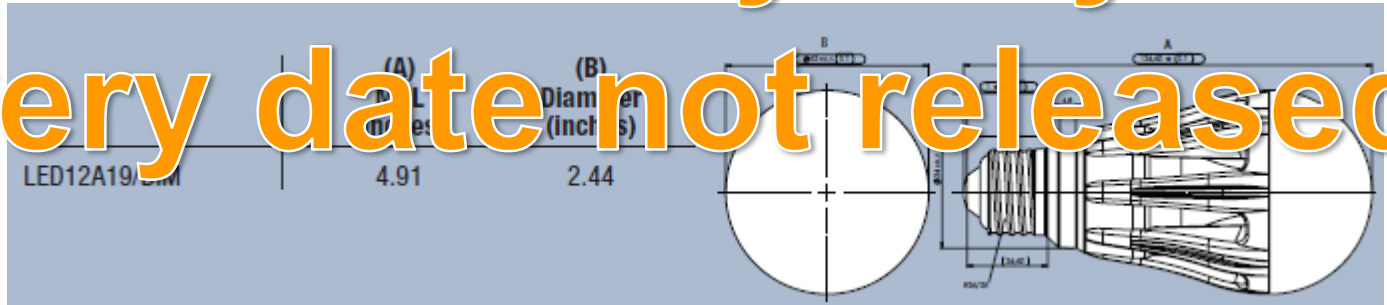
Initial ratings....25,000 hours  
E-star test takes 6000 hours to complete

Lumens equal to a 120v incand.

71+ lpw

Basic Product Description	LED Life (hrs.)	Similar Incandescent	Incandescent Life (hrs.)	Incandescent Lumens	Watts Saved	Energy Savings*	LED Life vs. Incandescent
LED12A19/DIM	25,000	60A19	1,000	855	48	\$132	25x
*Energy savings over life of lamp based on 0.1 kWh							

Pre Release info  
Product may vary  
Delivery date not released





Updated	Dec-09
CRI	CRI $\geq$ 80, R9 $>$ 0
Color Maintenance	$\leq 0.007$ ( $u^*v^*$ ) within 6000 hour test period
CCT	2700K (2725 $\pm$ 145), 3000K (3045 $\pm$ 175), 3500K (3465 $\pm$ 245), 4000K (3985 $\pm$ 275)
EMI	FCC 47 CFR Part 15
LED Op Frequency	$\geq$ 150Hz
Dimming	dim & non-dim (LPW, lumens, CCT, CRI PF confirmed at full power)
Operating Voltage	120, 240, 277 VAC, 12, 24 VAC/ VDC
Min Operating Temp	$\leq 20^{\circ}\text{C}$
Warranty	$\geq 3$ years

[illegible]



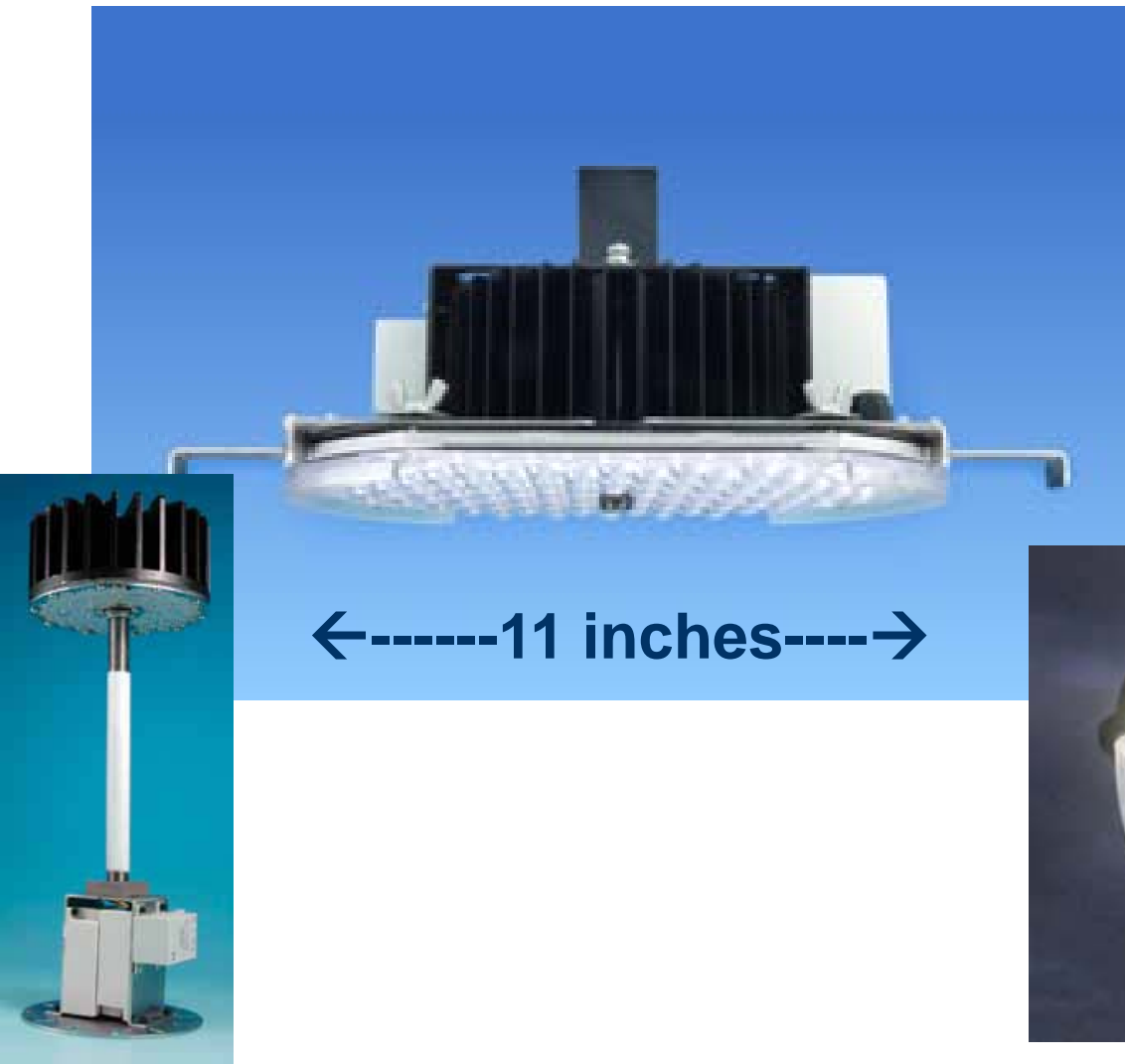
**The industry is gaining ground, er, space**





**Luminaire Testing**  
**Light Output: 4900 lumens**  
**Power: 91.0 watts**  
**Efficacy: 53.8 lm/W**  
**CCT: 4100K CRI: 65**

**Testing Laboratory: GE Consumer & Industrial (CALIPER approved)**



**Gen 1 - 35w @ 60 lpw**

**Gen 2 – 40w @ 69 lpw**

**Gen 3 - 40 watts**

**@67 - 92 lpw**

**4900K or 5700K**

-----

**60,000 hrs to L70**







175watt MH



40 watt SSL

- L70 minimum - 70% of lumens at rated point ... 15,000, 25,000, 50,000 hours
- If the seller doesn't know...
- CSA cUL – ask your insurance agent
- WATTAGE doesn't matter now ---  
– just PERFORMANCE !
- Ask for help
  - Accredited local supplier - beware
  - Local distributor – best price?
  - Local engineer
  - Local lighting designer
  - Don't be a hero – it's too expensive
- LED's get hot, but heat is almost all  
conductive, not radiant, no UV, no IR  
– Get used to ## pounds of metal
- Mock it up
- Don't discount T8 or T5, or CMH
- Don't discount Halogen of the future
- If it doesn't seem right, it may not be
- Beware internet suppliers – Check local regulations



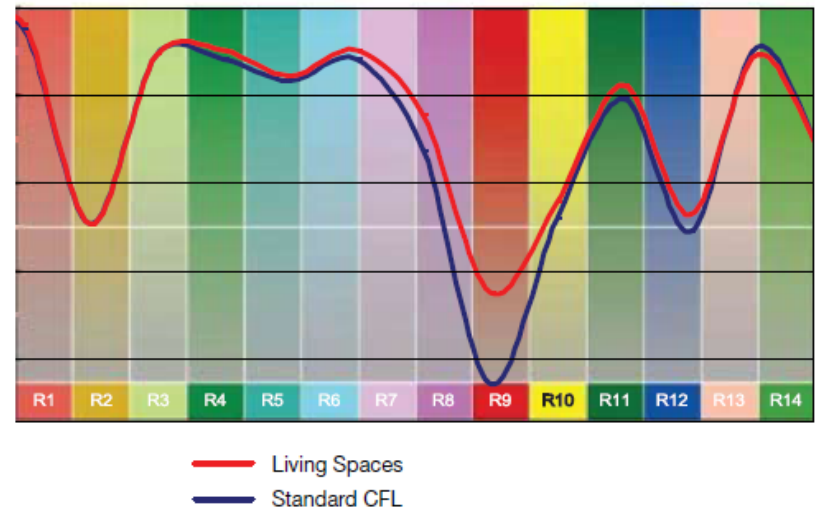
- TCLP compliant



- Sustainable packaging
- <1.5 mg of mercury  
- lowest in market
- Small form factor  
- smallest in market

- Instant On

- Long life: 12,000 hour average rated life





Health  
Canada

Santé  
Canada

*Your health and  
safety... our priority.*

*Votre santé et votre  
sécurité... notre priorité.*

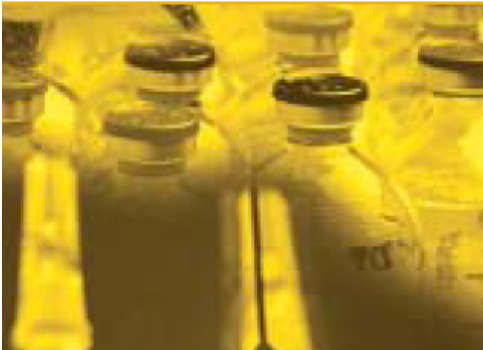
The Safety of Compact Fluorescent Lamps

Original

June 2009

# IT'S YOUR HEALTH

## The Safety of Compact Fluorescent Lamps





- 1.6 billion people throughout the world live without electricity. They use 77 billion liters of kerosene for lighting each year, emitting 190 million tons of CO<sub>2</sub> and spending about €30 billion.
- At Lake Victoria in Kenya, OSRAM launched a unique project for producing light independently from a permanent power supply.
- At a specially constructed solar station (OSRAM Energy Hub), local people can recharge batteries for energy-saving lamps, luminaires and other electrical appliances.
- Off Grid solutions are the future for developing and emerging countries that cannot afford to set up a permanent power supply network.

**Thank You for your attention.**

[Brent.hancock@sylvania.com](mailto:Brent.hancock@sylvania.com)

