



Lighting A to Z

The lighting solutions reference guide

PHILIPS

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A lifestyle in lighting

The world of lighting today has become complex and technical. New energy efficient legislation requirements and trends toward ease of use, quality of light, personalization, mood and well-being all drive new product developments. Philips innovations are based on extensive knowledge of these trends and market insights.

At Philips, we focus on what people really need to create and deliver the most innovative and meaningful solutions in the market. We can transform environments, create experiences, and shape identities through our advanced technologies and world-class partnerships and customers. We simply enhance life with light.

Sustainable Lighting

We're constantly working to improve our environmental performance and to help you make simple, informed choices about the products that you buy.



Our sustainable focus

At Philips, we're focused on improving the health and well-being of people and the communities they live in. That means striving to enhance the environmental performance of our products and driving sustainability throughout the supply chain. It's all about offering you a more sustainable choice.

Designed to deliver

For a product to be truly green, every phase of its development should be sustainable. We have a longstanding commitment to reducing the environmental impact of our products, and that includes the way they're used and what happens to them at the end of their life cycle.

Small changes. Big effects

But it's not just about making our products and processes more environmentally focused. How you choose to use them also matters. Even small things, like replacing energy-wasting incandescent bulbs with high efficiency bulbs can have an impact. Philips can help you become part of the solution.

A New Way to Look at Light

Lumens and candelas are used to measure light, but they measure different things. Lumen measurements only apply to ambient light bulbs (example: A-shape, BR, deco); while candela measurements only apply to directional light bulbs (example: PAR, MR).

A candela is a measure of the amount of light generated at a source—light emitted.

A lumen is a measure of how much total light flows away from the source—light output.

Lumens per Watt (LPW) is an expression of how many lumens we get from a light bulb compared to how much energy (wattage) we put in. The light bulb that produces the greatest number of lumens per one watt of energy is the most efficient bulb (similar to a car that can travel the furthest distance on a single gallon of gas is the most fuel efficient car).

Lumen output and wattages are based on the most common products available for each medium base light bulb. Actual lumen output and wattage may vary by product.

Lumens	Incandescent	Halogen Efficient	CFL More efficient	LED Most efficient
1600 =	100W	up to 72W	up to 26W	up to 23W
1100 =	75W	up to 53W	up to 23W	up to 17W
800 =	60W	up to 43W	up to 15W	up to 12W
450 =	40W	up to 29W	up to 11W	up to 9W



Transforming conventional light sources to LED

Philips is driving the switch to energy-efficient solutions and shaping the future with exciting new lighting applications and technologies. More than that, we care about your success. Getting it right means relying on a leader in quality product design with a solid track record.

We understand lighting

Philips is a leading authority on LEDs. Our expertise is total integration of concept and design, manufacturing, and delivery of illumination. Philips innovates with bulbs, ballasts, drivers, controls, fixtures and dynamic solutions—delivering product performance and reliability.

Creating meaningful solutions

LED lighting is changing the world and Philips is driving this transformation with a whole new world of light. At Philips, every innovation is driven by the needs of the people, to help them feel more comfortable and to improve the functionality of their surroundings. The Philips line of LED light bulbs brings all the benefits of LEDs to your current fixtures and systems.

Philips LED lighting can improve ambience, energy-efficiency and comfort in your home while delivering performance you can count on. Switching to higher efficiency LED lighting can help reduce your electric bill, preserve our environment and create the perfect lighting for your home.

- **High efficiency** uses less energy than common light sources like incandescent and halogen
- **Lower operating costs** means reduced energy bills
- **Long life** reduces the hassle of replacing bulbs so often
- **Better for the environment** because they reduce greenhouse gases and shrink your carbon footprint
- **Easy to use** because they are designed in traditional bulb shapes and fit easily into existing fixtures

A range for all needs

With bulbs available in PARs, Rs, MR16 spots and floods, A-shapes, frosted and clear candles, nightlights and landscape lighting, our family of LED light bulbs offer a wide range of solutions. Simply replace inefficient bulbs with Philips LED bulbs and see what LED lighting can do.

- Soft white light
- Directional light minimizes waste
- Utilizes advanced, solid state lighting technology
 - Instant-on with quiet operation
 - Will not fade fabrics or colors
 - Mercury free
- Many types are dimmable
- Contemporary designs fit most fixtures

Small parts of the big picture

Three leading technologies combine to make Philips LED bulbs excel: Lens optics, the LED electrical package, and the bulb body.

Optics: A global leader in lens and optics design, Philips uses precise optical engineering to create beam angles with focus and uniformity.

LED package: Diode light sources are embedded in an electrical assembly that stabilizes lumen output and extends bulb life. Our Optibin manufacturing process controls the color temperature of the LEDs. An integral driver, similar to a ballast, allows dimming and regulates bulb performance over time.

Bulb body: The thermal and mechanical features are packaged into aesthetically pleasing designs. But their primary function is to control heat, wattage and lumen output—stabilizing the sources and extending bulb life. The shape is an integral part of how it manages heat, light output, performance, and life.



Bring innovation into familiar applications, perfect for any room of the home.



Household A-Shape

- Ideal for table and floor lamps, pendant and ceiling fixtures
- Saves \$165 in energy costs when you replace a 60 watt incandescent bulb with a 12.5W LED bulb*



Incandescent			LED			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
15W	110	1500	3W	136	25,000	
40W	495	1500	8W	470	25,000	✓
60W	860	1500	12.5W	800	25,000	✓
60W	800	1500	10W	940	25,000	✓
75W	950	3000	17W	1100	25,000	✓
100W	1440	1000	22W	1780	25,000	✓

*At \$0.11/kWh, this 12.5 watt, 805 lumen LED A19 uses \$34.38 of electricity over its 25,000 hour life. This is a \$130.62 savings when compared to the \$165 required to run a 60 watt, 800 lumen incandescent A19 over the same period. Actual savings will vary depending on cost per kWh.

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

2) Life means rated average life which is based on engineering data and probability analysis.

3) Dimmable when using leading edge dimmers. Visit www.philips.com/beautifulight to find up-to-date dimmer compatibility information.

■ ENERGY STAR® qualified.

Decorative

- Ideal for wall sconces and decorative fixtures
- Saves \$99.00 in energy costs when you replace a 15 watt incandescent candle with a 4W LED F15*



Incandescent B12			LED B12			Dimmable ³
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	
25W	150	2000	3W	200	25,000	✓

Incandescent B11			LED B11			Dimmable ³
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	
25W	150	2000	3W	180	25,000	✓

Incandescent F15			LED F15 Postlight			Dimmable ³
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	
40W	300	2000	4W	320	25,000	✓

* At \$0.11/kWh, this 4 watt, 300 lumens LED F15 uses \$11.00 of electricity over its 25,000 hour life. This is a \$99.00 savings when compared to the \$110 required to run a 40 watt, 300 lumens, incandescent F15 over the same period. Actual savings will vary depending on cost per kWh and usage.

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Miniature Reflector—MR16

- Ideal for accent and general room lighting in track or open recessed fixtures
- Saves \$68.75 over the life of the bulb when you replace a 35W halogen MR16 with a 10W LED MR16*



Halogen			LED			Dimmable ³
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	
20W	1000	3000	5.5W	1250	25,000	
35W	1577	3000	10W	2050	25,000	✓

Miniature Reflector—GU10

- Ideal for track fixtures and open recessed fixtures
- Saves \$121 over the life of the bulb when you replace a 50W halogen GU10 base with a 6W LED GU10**



Halogen			LED			Dimmable ³
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	
35W	480	2000	4W	700	25,000	✓
50W	700	2000	6W	1050	25,000	✓

* At \$0.11/kWh, this 10 watt, 2050 candela (candlepower) LED MR16 uses \$27.50 of electricity over its 25,000 hour life. This is a \$68.75 savings when compared to the \$96.25 required to run a 35 watt, 1577 candela halogen MR16 over the same period. Actual savings will vary depending on cost per kWh.

** At \$0.11/kWh, this 6 watt, 1050 candela LED GU10 bulb uses \$16.50 of electricity over its 25,000 hour life. This is a \$121 savings when compared to the \$137.50 required to run a 50 watt, 700 candela, standard halogen GU10 bulb over the same period. Actual savings will vary depending on cost per kWh.

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■ ENERGY STAR® qualified.

BR30 and BR40 Reflector Floods

- Ideal for recessed cans and track lighting fixtures
- Saves \$143 in energy costs when you replace a 65 watt incandescent BR30 bulb with a 13W LED BR30 bulb*



Incandescent R20			LED R20			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
50W	500	2000	8W	530	25,000	✓

Incandescent BR30			LED BR30			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
65W	650	3000	13W	730	25,000	✓

Incandescent BR40			LED BR40			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
75W	750	3000	14.5W	800	25,000	✓

* At \$0.11/kWh, this 13 watt, 730 lumen LED BR30 uses \$35.75 of electricity over its 25,000 hour life. This is a \$143 savings when compared to the \$178.75 required to run a 65 watt, 650 lumen incandescent BR30 over the same period. Actual savings will vary depending on cost per kWh.

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- 3) Dimmable when using leading edge dimmers. Visit www.philips.com/beautifulight to find up-to-date dimmer compatibility information.

■ ENERGY STAR® qualified.

PAR20 and PAR30L (Long) Reflector Floods

- Ideal for recessed cans and track lighting fixtures
- Saves \$115 in energy costs when you replace a 50 watt halogen PAR20 bulb with a 8W LED PAR20 bulb*
- Saves \$170 in energy costs when you replace a 75 watt halogen PAR30L bulb with a 13W LED PAR30L bulb**



Halogen PAR20			LED PAR20			
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	Dimmable ³
50W	1179	3000	7W	1300	25,000	✓
50W	1179	3000	8W	2400	25,000	✓

Halogen PAR30L			LED PAR30L			
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	Dimmable ³
75W	3000	3000	13W	3200	25,000	✓

* At \$0.11/kWh, this 8 watt, 2400 candela (candlepower) LED PAR20 uses \$22.00 of electricity over its 25,000 hour life. This is a \$115.50 savings when compared to the \$137.50 required to run a 50 watt, 1179 candela (candlepower) halogen PAR20 over the same period. Actual savings will vary depending on cost per kWh.

** At \$0.11/kWh, this 13 watt, 3200 candela (candlepower) LED PAR30L uses \$35.75 of electricity over its 25,000 hour life. This is a \$170.50 savings when compared to the \$206.25 required to run a 75 watt, 3000 candela (candlepower) halogen PAR30L over the same period. Actual savings will vary depending on cost per kWh.

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- 3) Dimmable when using leading edge dimmers. Visit www.philips.com/beautifulight to find up-to-date dimmer compatibility information.

■ ENERGY STAR® qualified.

PAR38 Reflector Floods

- Ideal for accent and general room lighting in recessed fixtures
- Ideal for outdoor and security uses
- Saves \$276 in energy costs when you replace a 120 watt incandescent PAR38 bulb with a 19.5W LED PAR38 bulb*



Halogen PAR38			LED PAR38			
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	Dimmable ³
90W	3697	3000	18W	4108	25,000	✓
120W	5382	3000	19.5W	6500	25,000	✓

Halogen PAR38			Outdoor LED PAR38 (Non-Dimmable)			
Watts	Candela	Life/Hours ¹	Watts	Candela	Life/Hours ²	Dimmable ³
90W	3697	3000	18W	4100	25,000	✓

* At \$0.11/kWh, this 19.5 watt, 5900 candela LED PAR38 uses \$53.625 of electricity over its 25,000 hour life. This is a \$276.38 savings when compared to the \$330 required to run a 120 watt, 5382 candela, halogen PAR38 over the same period. Actual savings will vary depending on cost per kWh.

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 - 2) Life means rated average life which is based on engineering data and probability analysis.
 - 3) Dimmable when using leading edge dimmers. Visit www.philips.com/beautifulight to find up-to-date dimmer compatibility information.
- ENERGY STAR® qualified.

LED Application Guide

Bulb Type		A-Shape	Deco Candle	MR16	GU10	R20, BR30 & BR40	PAR20 & PAR30L	PAR38
	Table/Floor Lamp	✓						
	Outdoor Postlight		✓					
	Wall Sconce	✓	✓					
	Surface Mount	✓						
	Reading Lamp	✓						
	Recessed Fixture			✓	✓	✓	✓	✓
	Open Hanging	✓						
	Ceiling Fan	✓	✓					
	Chandelier		✓					
	Security							✓



Energy savings
that lasts

Philips EnergySaver compact fluorescent bulbs can help reduce your electricity bill and save energy, while helping you create a relaxing, inviting atmosphere. From table lamps and recessed lighting to decorative fixtures, compact fluorescents are available in the shapes and sizes you are accustomed to.

CFLs operate on low wattage and last a long time, and can be used as direct replacements for higher wattage incandescents. All Compact Fluorescent bulbs contain mercury, therefore you should be sure to properly recycle these bulbs in accordance with applicable laws and regulations.

Selecting the right type

CFL or Compact Fluorescent bulbs operate in the same fashion as regular fluorescent bulbs but are smaller or more compact as the name suggests. (See page 44 for fluorescent bulb operation). There are 2 types of CFL bulbs; one with an integrated ballast (CFLi) and one without an integrated ballast (CFLni).

The integrated CFLi bulbs are designed to install into a socket that was intended for an incandescent bulb and therefore has a screw base socket.

The non-integrated CFLni bulbs (also known as Pin-based or Plug-in) are used in fixtures designed specifically for that particular type of CFL bulb and have a special socket that will exclude the wrong types of bulbs.



CFLi (integrated)



CFLni (non-integrated)

Soft white light,
similar to standard
incandescent.



Complete a room with comfortable, soft light

Philips EnergySaver compact fluorescent bulbs can help reduce your electricity bill and save energy, while helping you create a relaxing, inviting atmosphere. From table lamps and recessed lighting to decorative fixtures, compact fluorescents are available in the shapes and sizes you are accustomed to.

- Direct replacement for incandescent bulbs
- Warm, soft white light
- Long life and energy savings
- Instant on
- Select wattages available in variety of color temperatures
- Some bulbs are dimmable

Household A-Shapes

- Ideal for table and floor lamps, and wall sconces
- Saves up to \$48 over the life of the bulb when you replace a 75W A19 incandescent bulb with a 20W energy saving soft white plus bulb*



Incandescent A15			EnergySaver CFL A15			Dimmable
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	
25W	235	3000	5W	215	8,000	
40W	365	2000	9W	450	8,000	

Incandescent A19			EnergySaver CFL A19			Dimmable
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	
40W	475	1500	9W	450	8,000	
60W	830	1500	14W	800	8,000	
75W	1060	1500	20W	1100	8,000	

* At \$ 0.11/kWh, this 20 watt EnergySaver bulb rated at 1100 lumens uses \$17.60 of electricity over its 8000 hour life. This is a \$48.40 savings when compared to the \$66 required to run a 75 watt incandescent bulb rated at 1100 lumens over the same period. Actual savings will vary depending on cost per kWh in your area.

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■ ENERGY STAR® qualified.

Twisters

- Smaller sizes available in many wattages
- Select wattages available in a variety of color temperatures
- Saves up to \$142 over the life of the bulb when you replace a 150W A-shape incandescent bulb with a 42W energy saving twister bulb*



Incandescent			EnergySaver CFL Twister			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
40W	475	1500	9W	550	12,000	
60W	830	1500	13W	840	10,000	
60W	830	1500	13W	900	12,000	
60W	830	1500	13W	810	10,000	
60W	830	1500	15W	950	10,000	✓
75W	1060	1500	18W	1300	12,000	
75W	1060	1500	20W	1250	10,000	✓
100W	1140	1500	23W	1600	12,000	
150W	2310	2000	42W	2800	12,000	

Incandescent 3-Way		EnergySaver CFL 3-Way Twister		
Watts	Life/Hours ¹	Watts	Life/Hours ²	Dimmable
50W/100W/150W	1750	11W/23W/34W	10,000	

Incandescent			EnergySaver CFL GU24 Twister			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
60W	830	1500	13W	900	10,000	
75W	1060	1500	18W	1250	10,000	
100W	1140	1500	23W	1600	10,000	

* At \$ 0.11/kWh, this 42 watt EnergySaver bulb rated at 2800 lumens uses \$55.44 of electricity over its 12,000 hour life. This is a \$142.56 savings when compared to the \$198 required to run a 150 watt incandescent bulb rated at 2600 lumens over the same period. Actual savings will vary depending on cost per kWh in your area.

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■ ENERGY STAR® qualified.

Reflector Floods

- Ideal for recessed cans and track lighting and outdoor fixtures
- Saves up to \$85 over the life of the bulb when you replace a 120W R40 incandescent reflector with a 23W energy saver R40 reflector*



Incandescent R20			EnergySaver CFL R20			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
75W	570	2500	14W	500	8,000	

Incandescent BR30			EnergySaver CFL R30			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
75W	750	2000	15W	750	8,000	
65W	635	2000	16W	630	8,000	✓

Incandescent BR40			EnergySaver CFL R40			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable ³
120W	1300	2000	23W	1300	8,000	
85W	925	2000	20W	900	8,000	✓

Incandescent PAR38			EnergySaver CFL PAR38			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
90W	1280	2000	23W	1250	8,000	

Incandescent PAR38			EnergySaver CFL PAR38 2-Piece			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
90W	1280	2000	23W	1300	10,000	

* At \$ 0.11/kWh, this 23 watt EnergySaver bulb rated at 1250 lumens uses \$20.24 of electricity over its 8000 hour life. This is a \$85.36 savings when compared to the \$105.60 required to run a 120 watt incandescent bulb rated at 1150 lumens over the same period. Actual savings will vary depending on cost per kWh in your area.

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■ ENERGY STAR® qualified.

Decorative

- Globes are perfect for bathroom vanity strips
- Candles are ideal for decorative fixtures and are offered in candelabra and medium base
- Saves up to \$67 over the life of the bulb when you replace a 100W G40 incandescent globe with a 23W EnergySaver G40 Globe*



Incandescent Candle			EnergySaver CFL Candle			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
25W	150	2000	5W	215	8,000	■
40W	300	2000	9W	410	8,000	■
40W	300	2000	9W	410	8,000	■



Incandescent G25			EnergySaver CFL G25 Globe			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
40W	370	1500	9W	500	8,000	■
Incandescent G30			EnergySaver CFL G30 Globe			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
60W	580	3000	16W	900	8,000	■
Incandescent G40			EnergySaver CFL G40 Globe			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
100W	985	1500	23W	1400	8,000	■

* At \$ 0.11/kWh, this 23 watt EnergySaver bulb rated at 1400 lumens uses \$20.24 of electricity over its 8000 hour life. This is a \$67.76 savings when compared to the \$88 required to run a 100 watt incandescent bulb rated at 985 lumens over the same period. Actual savings will vary depending on cost per kWh in your area.

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■ ENERGY STAR® qualified.

Specialty

- **Bug-A-Way** Does not attract insects. Use near patios and decks
- **Postlight** Perfect for use in weather protected outdoor fixtures
- **Dusk to Dawn** Built-In daylight sensor enables bulb to automatically turn on at night and turn off in the morning



Incandescent Bug-A-Way		EnergySaver CFL Bug-A-Way		
Watts	Watts	Lumens	Life/Hours ²	Dimmable
60W	14W	600	8,000	■

Incandescent Postlight		EnergySaver CFL Outdoor Postlight		
Watts	Watts	Lumens	Life/Hours ²	Dimmable
60W	14W	840	8,000	■
75W	18W	1100	15,000	■

Incandescent		EnergySaver CFL Dusk to Dawn		
Watts	Watts	Lumens	Life/Hours ²	Dimmable
60W	14W	900	8,000	■

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■ ENERGY STAR® qualified.

Silicone featuring TuffGuard protection

- Silicone covered bulb is soft to the touch and shatter resistant
- If the bulb accidentally breaks inside, the silicone cover provides a safety barrier that contains broken glass, providing peace of mind by keeping your family safe and allows for a no-hassle clean up
- Smaller size bulb looks like an incandescent and fits in most fixtures
- Soft white light, similar to incandescent light, creating a relaxing and comfortable atmosphere



Incandescent			EnergySaver CFL Twister			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Dimmable
60W	475	1500	14W	800	8,000	■
40W	830	1500	9W	450	8,000	■

Incandescent Candle			EnergySaver CFL Candle			
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ²	Base
25W	150	2000	5W	215	8,000	Candelabra ■
25W	150	2000	5W	215	8,000	Medium ■
40W	300	2000	9W	410	8,000	Candelabra ■
40W	300	2000	9W	410	8,000	Medium ■

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

2) Life means rated average life which is based on engineering data and probability analysis.

■ ENERGY STAR® qualified.

CFL Application Guide

Bulb Type		Twister	GU24	Soft White	Reflector Flood	Deco Globe	Deco Candle	Outdoor
	Table/Floor Lamp	✓	✓	✓				
	Outdoor Postlight	✓		✓		✓	✓	✓
	Wall Sconce	✓	✓	✓			✓	
	Surface Mount	✓	✓					
	Reading Lamp	✓	✓	✓			✓	
	Border Lights			✓				✓
	Recessed Fixture		✓		✓	✓		
	Open Hanging	✓	✓	✓	✓	✓		✓
	Vanity Strip					✓		
	Ceiling Fan		✓	✓		✓	✓	
	Chandelier						✓	
	Security							✓

PL-S Short

- For use with magnetic ballasts
- Available in variable color temperatures 2700K, 3000K, 3500K, 4100K & 5000K, with 82 CRI
- Choice of warm, neutral or cool white light



Watts	Lumens	CRI	PL-S (Short) Life/Hours ¹	Color Temp	Base
5	250	80	10,000	2700K	G23
5	250	82	10,000	4100K	G23
7	400	80	10,000	2700K	G23
7	400	82	10,000	3500K	G23
7	400	82	10,000	4100K	G23
9	600	80	10,000	2700K	G23
9	600	82	10,000	3500K	G23
9	600	82	10,000	4100K	G23
13	800	80	10,000	2700K	GX23
13	825	82	10,000	3500K	GX23
13	800	80	10,000	4100K	GX23
13	800	82	10,000	5000K	GX23

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

PL-L Long

- Direct replacement for a PL-L 40W
No new ballast required
- Available in 3000K, 3500K and 4100K, with 82 CRI



Watts	Lumens	CRI	PL-L (Long) Life/Hours ¹	Color Temp	Base
18W	1250	82	15,000	3000K	2G11
18W	1250	82	15,000	3500K	2G11
18W	1250	82	15,000	4100K	2G11
24W	1800	82	15,000	3000K	2G11
24W	2900	82	15,000	3500K	2G11
24W	2900	82	15,000	4100K	2G11
36W	2900	82	15,000	3000K	2G11
36W	2900	82	15,000	3500K	2G11
36W	2900	82	15,000	4100K	2G11
40W	2600	82	24,000	3500K	2G11
40W	2600	82	24,000	4100K	2G11
40W	3300	82	20,000	3000K	2G11
40W	3300	82	20,000	3500K	2G11
40W	3300	82	20,000	4100K	2G11
50W	4300	82	20,000	3000K	2G11
50W	4300	82	20,000	3500K	2G11
50W	4300	82	20,000	4100K	2G11
55W	3650	91	20,000	5000K	2G11
80W	6000	82	20,000	3500K	2G11
80W	6000	82	20,000	4100K	2G11

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

■ Econ-o-watt / Extra Long Life.

PL-C Cluster

- For use with electronic or magnetic ballasts
- Available in 2700K, 3000, 3500K and 4100K, with 82 CRI



PL-C (Cluster)

Watts	Lumens	CRI	Life/Hours ¹	Color Temp	Base
13W	860	80	10,000	2700K	GX23-2
13W	780	80	10,000	2700K	G24q-1
13W	900	82	10,000	2700K	G24q-1
13W	900	82	12,000	2700K	G24q-1
13W	860	82	10,000	3500K	GX23-2
13W	900	82	12,000	3500K	G24q-1
13W	860	82	10,000	4100K	GX23-2
13W	780	80	10,000	4100K	G24q-1
13W	900	82	12,000	4100K	G24q-1
18W	1100	82	12,000	2700K	G24q-2
18W	1100	82	12,000	3500K	G24q-2
18W	1100	82	12,000	4100K	G24q-2
18W	1150	80	10,000	2700K	G24q-2
18W	1250	82	10,000	2700K	G24d-2
18W	1250	82	10,000	3500K	G24d-2
18W	1250	82	10,000	4100K	G24d-2
18W	1250	82	10,000	2700K	G24q-2
18W	1250	82	10,000	3500K	G24q-2
18W	1250	82	10,000	4100K	G24q-2
22W	1600	82	10,000	2700K	G24d-3
26W	1800	82	10,000	2700K	G24d-3
26W	1800	82	10,000	3500K	G24d-3
26W	1800	82	10,000	4100K	G24d-3
26W	1525	82	12,000	2700K	G24q-3
26W	1525	82	12,000	3000K	G24q-3
26W	1525	82	12,000	3500K	G24q-3
26W	1525	82	12,000	4100K	G24q-3
26W	1710	80	10,000	2700K	G24q-3
26W	1800	82	12,000	2700K	G24q-3
26W	1710	80	10,000	3500K	G24q-3
26W	1800	82	12,000	3000K	G24q-3
26W	1800	82	12,000	3500K	G24q-3
26W	1800	82	12,000	4100K	G24q-3
26W	1600	82	10,000	2700K	G24d-3

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

■ Econ-o-watt / Extra Long Life.

PL-T Triple

- Direct replacement for a PL-L 40W. No new ballast required
- Available in 3000K, 3500K and 4100K, with 82 CRI



PL-C (Cluster)

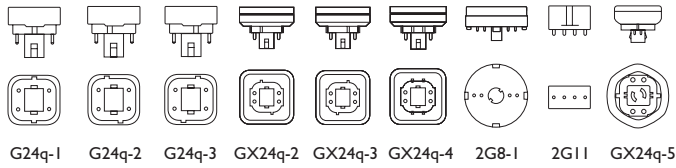
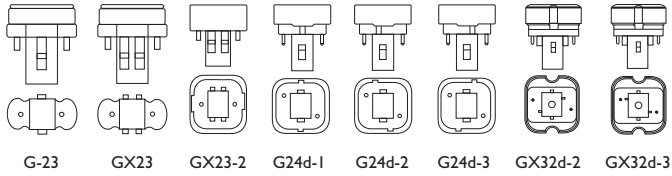
Watts	Lumens	CRI	Life/Hours ¹	Color Temp	Base
13W	900	82	16,000	4100K	GX24q-1
18W	1200	82	16,000	2700K	GX24q-2
18W	1200	80	12,000	2700K	GX24q-2
18W	1200	82	16,000	2700K	GX24q-2
18W	1200	82	16,000	3500K	GX24q-2
18W	1200	82	16,000	4100K	GX24q-2
18W	1200	82	16,000	4100K	GX24q-2
26W	1800	82	16,000	2700K	GX24q-3
26W	1800	80	12,000	2700K	GX24q-3
26W	1800	82	16,000	2700K	GX24q-3
26W	1800	82	16,000	3000K	GX24q-3
26W	1800	82	16,000	3000K	GX24q-3
26W	1400	82	16,000	3500K	GX24q-3
26W	1800	82	16,000	4100K	GX24q-3
26W	1800	82	16,000	4100K	GX24q-3
26W	1800	82	16,000	4100K	GX24q-3
32W	2400	82	16,000	2700K	GX24q-3
32W	1875	82	16,000	3000K	GX24q-3
32W	2400	82	16,000	3000K	GX24q-3
32W	1875	82	16,000	3500K	GX24q-3
32W	2400	82	16,000	3500K	GX24q-3
32W	1875	82	16,000	4100K	GX24q-3
32W	2400	82	16,000	4100K	GX24q-3
42W	3200	82	16,000	2700K	GX24q-4
42W	2615	82	16,000	3000K	GX24q-4
42W	3200	82	16,000	3000K	GX24q-4
42W	2615	82	16,000	3500K	GX24q-4
42W	3200	82	16,000	3500K	GX24q-4
42W	2615	82	16,000	4100K	GX24q-4
42W	3200	82	16,000	4100K	GX24q-4
42W	3200	82	16,000	4100K	GX24q-4
57W	4300	82	16,000	3500K	GX24q-5
57W	4300	82	16,000	4100K	GX24q-5

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

■ Econ-o-watt / Extra Long Life.

● Instant-on.

CFLni Base Shapes



CFLni Color Temperature Guide

	2700K	3000K	3500K	4100K	5000K
PL-S 2-Pin					
5W	✓		✓	✓	✓
7W	✓		✓	✓	✓
9W	✓		✓	✓	✓
13W	✓	✓		✓	
PL-C 2-Pin					
13W	✓	✓	✓	✓	
18W	✓	✓	✓	✓	
XEW 14W	✓		✓	✓	
26W	✓	✓	✓	✓	
XEW 21W	✓		✓	✓	
15mm 20W*	✓	✓	✓		
15mm 27W*	✓	✓	✓		
PL-C 4-Pin					
13W	✓	✓	✓	✓	
18W	✓	✓	✓	✓	
26W	✓	✓	✓	✓	
PL-T 4-Pin					
18W	✓	✓	✓	✓	
26W	✓	✓	✓	✓	
32W	✓	✓	✓	✓	
XEW 21W		✓	✓		
XEW 27W		✓	✓	✓	
42W	✓	✓	✓	✓	
XEW 33W		✓	✓	✓	
57W*		✓	✓	✓	
PL-L 4-Pin					
18W		✓	✓	✓	
24W		✓	✓	✓	
36W		✓	✓	✓	
40W		✓	✓	✓	
XEW 25W		✓	✓	✓	
50W		✓	✓	✓	
55W					✓
80W		✓	✓	✓	

* Non-ALTO Bulbs

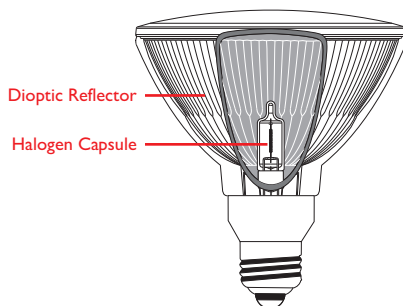


Energy savings
without sacrifice

Philips Halogen bulbs provide bright, white light and help save on energy and maintenance costs.

Halogen bulbs are technically incandescent bulbs, but with three features that make them superior to standard incandescent—brightness, white light output, and lifetime. A Halogen bulb has a thin filament, which produces more light than its thicker counterpart. This makes Halogen brighter and whiter. Halogen bulbs are available for low-voltage (12V) operation (for which a transformer is needed) or for 120 volt as direct replacements for incandescent bulbs.

Screw bases are made of aluminum, brass or nickel-plated brass. Aluminum is the most economical material. Brass and nickel-plated brass bases are corrosion resistant and are used on bulbs designed for outdoor use, very long life, or in corrosive environments. Brass bases or nickel-plated brass bases should be used in applications where corrosion might cause a bulb to seize in the socket and make replacement difficult.



Halogen Types

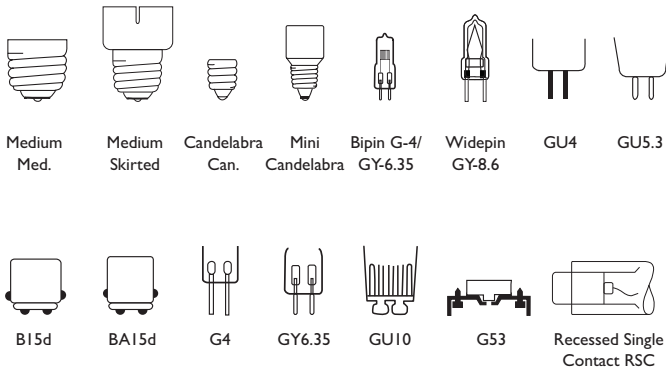
EcoVantage Halogen bulbs produce high quality light more efficiently. They work with dimmer switches and are available in the familiar A-shape and reflector designs you are accustomed to. Use them in existing fixtures just as you would standard incandescents and your home will look great while you save energy.

Halogen Specialty Double-Ended (Linear) 100–500 watt bulbs are 120 volt and must be used in an enclosed fixture. Care must be exercised when using these types due to the heat created by 300–500 watts. Typical applications include torchieres, outdoor flood lighting, portable lighting and general lighting.

Halogen Specialty Capsules produce a sparkling white light. Halogen capsules must always be used in an enclosed fixture. Common applications include task lighting and under cabinet lighting. Low voltage types require a fixture with a 12 volt transformer. 120 volt types require a fixture specifically designed for 120 volt operation. Never interchange 12 and 120 volt types.

Halogen MR16 low voltage (12 volt) bulbs require a fixture with a transformer. They produce brilliant white light with excellent beam control. If the fixture does not have a cover glass over the face of the bulb, a covered MR16 must be used. MR16s are often used in track lighting and down lighting.

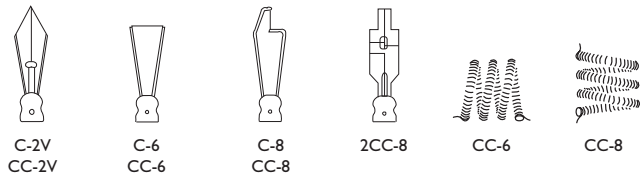
Halogen Base Shapes



Halogen Filaments

Halogen Filaments

Filament designations consist of a letter or letters to indicate how the wire is coiled and an arbitrary number sometimes followed by a letter to indicate the arrangement of the filament on the supports. Prefix letters include C (coil)—wire is wound into a helical coil or it may be deeply fluted; CC (coiled coil)—wire is wound into a helical coil and this coiled wire again wound into a helical coil. Some of the more commonly used types of filament arrangements are illustrated.



Your home will look great while you save energy.



EcoVantage

Savings without sacrifice

EcoVantage bulbs produce high quality light more efficiently. They work with dimmer switches and are available in the familiar A-shape and reflector designs you are accustomed to. Use them in existing fixtures just as you would standard incandescents and your home will look great while you save energy.

- Fully Dimmable
- Instant-on
- Rated average life of 1000–4200 hours
- Legislation compliant
- Contains no mercury

EcoVantage A-Shapes

- Available in Soft White, Natural White or Clear
- Up to 28% energy savings*
- Fully dimmable and instant on



Incandescent A19			EcoVantage A19				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Finish
40	505	1500	29	400	1000	✓	Clear
60	900	1500	43	750	1000	✓	Clear
100	1440	1500	72	1490	1000	✓	Clear
40	475	1500	29	400	1000	✓	White
60	830	1500	43	750	1000	✓	White
100	1140	1500	72	1490	1000	✓	White
60	680	1000	43	600	1250	✓	Nat. Light
75	950	750	53	790	1250	✓	Nat. Light
100	1350	750	72	1170	1250	✓	Nat. Light

* Compared to a 40 watt A19 bulb with 475 lumens, the 29 watt A19 EcoVantage with 380 lumens saves 28% energy. (Existing wattage – New wattage) ÷ Existing wattage = % of energy cost savings.
 1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

EcoVantage Indoor Reflectors

- Up to 47% energy savings*
- Fully dimmable and instant on
- For indoor recessed and track fixtures



Incandescent R20			EcoVantage R20				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
75	570	2500	40	570	3000	✓	Flood

Incandescent BR30			EcoVantage BR30				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
65	595	2500	40	590	3000	✓	Flood
85	855	2500	50	730	3000	✓	Flood

Incandescent BR40			EcoVantage BR40				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
65	630	2500	40	605	3000	✓	Flood
120	1285	2500	70	1225	3000	✓	Flood

* Compared to a 75 watt incandescent R20 rated at 570 lumens, this 40 watt EcoVantage R20 provides 570 lumens and saves 47% energy. (Existing wattage – New wattage) ÷ Existing wattage = % of energy cost savings.

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

EcoVantage Reflectors

- Up to 35% energy savings*
- Fully dimmable and instant on



Incandescent PAR20			EcoVantage PAR20				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
50	530	3000	39	500	1100	✓	Flood
50	530	3000	39	500	1100	✓	Spot

Incandescent PAR30L			EcoVantage PAR30L				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
50	570	3000	39	520	1100	✓	Flood
50	570	3000	39	520	1100	✓	Spot
75	975	3000	50	960	4400	✓	Flood
75	975	3000	53	920	1100	✓	Flood
75	975	3000	53	920	1100	✓	Spot

Incandescent PAR30S			EcoVantage PAR30S				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
60	785	3000	39	520	1100	✓	Flood
75	1020	3000	53	920	1100	✓	Flood
75	1020	3000	53	920	1100	✓	Spot

Incandescent PAR38			EcoVantage PAR38				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Flood/Spot
45	540	3000	39	720	4400	✓	Flood
45	540	3000	39	570	1100	✓	Spot
60	800	3000	53	920	1100	✓	Flood
60	800	3000	53	920	1100	✓	Spot
90	1340	3000	70	1415	4400	✓	Flood
90	1340	3000	70	1415	4400	✓	Spot
90	1340	3000	72	1350	1100	✓	Flood
90	1340	3000	72	1350	1100	✓	Spot

* Compared to a 60 watt Halogen PAR38 rated at 800 lumens, this 39 watt PAR38 EcoVantage provides 720 lumens and saves 35% energy. (Existing wattage – New wattage) ÷ Existing wattage = % of energy cost savings.

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

EcoVantage Decoratives

- Up to 38% energy savings*
- Fully dimmable and instant on



Incandescent B10.5			EcoVantage B11				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Base/Finish
40	300	2000	25	280	2750	✓	Cand/Clear
60	550	2000	40	540	2750	✓	Cand/Clear
40	300	2000	25	280	2200	✓	Med/Clear
60	550	2000	40	540	2200	✓	Med/Clear

Incandescent BA9			EcoVantage BA11				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Base/Finish
40	300	2000	25	280	2750	✓	Cand/Clear
60	550	2000	40	540	2750	✓	Cand/Clear
40	300	2000	25	280	2200	✓	Med/Clear
40	300	2000	25	280	2200	✓	Cand/Frost
60	550	2000	40	540	2200	✓	Med/Clear
60	550	2000	40	540	2200	✓	Cand/Frost

Incandescent G16.5			EcoVantage G16.5				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Base/Finish
40	300	2000	25	270	1000	✓	Cand/Clear
40	245	2000	25	245	1000	✓	Cand/White

Incandescent G25			EcoVantage G25				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Base/Finish
60	665	2000	40	500	2500	✓	Med/White
60	705	2000	40	550	2500	✓	Med/Clear
40	415	2000	25	255	2200	✓	Med/White
40	460	2000	25	280	2200	✓	Med/Clear

Incandescent F20			EcoVantage F15				
Watts	Lumens	Life/Hours ¹	Watts	Lumens	Life/Hours ¹	Dimmable	Base/Finish
100	1250	4000	72	1490	1000	✓	Med/Clear

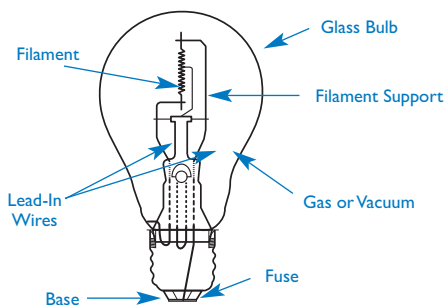
* Compared to a 40 watt G16.5 bulb with 270 lumens, this 25 watt G16.5 EcoVantage with 245 lumens saves 38% energy. (Existing wattage – New wattage) ÷ Existing wattage = % of energy cost savings.

1) Life means rated average life which is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.



General service incandescent

In an incandescent bulb, a tungsten filament is heated by an electric current until the filament becomes incandescent or gives off light. The intense heat causes the tungsten filament to slowly evaporate. This filament evaporation causes two things to happen. First, it causes the bulb to get blackened over time. The blackening of the bulb causes the bulb to become slightly dimmer over time. Second, as the filament evaporates, it gets thinner and thinner until finally it gets so thin, it breaks and the bulb fails. This is the normal end of life for an incandescent bulb. The life of a bulb depends on the thickness of the tungsten filament, a thick filament will last longer than a thin one. But a thick filament does not get as hot so it produces less light. That's the trade-off—if you want more life, you get less light and vice versa. A standard bulb's life is 750–1000 hours and longer life bulbs last 1000–1500 hours.



Incandescent Types

General service bulbs includes, A, C, S, and T-shape bulbs. Used mainly for general illumination.

Reflector types provide directional illumination. Reflector bulbs (R) and (BR) are often used in recessed down lights and track lighting. They have a soft, smooth beam and are available in spot and flood. They cannot be used outside in open fixtures.

Decorative bulbs come in a myriad of shapes, sizes, and finishes. They are most often used when the bulb is in direct view. Decorative bulbs meet a variety of decorative needs including chandeliers, wall sconces, vanity strips, and surface mounted decorative fixtures.

Industrial grade and contractors choice are also referred to as I30 volt bulbs. These bulbs are designed to last 2 times as long as a standard incandescent. I30 volt bulbs have an extra thick filament and are ideal for hard to reach applications and areas that have a lot of surges and spikes on the power line. Because of the thick filaments, they produce less light than a standard bulb, and have a warmer color appearance than standard bulbs.

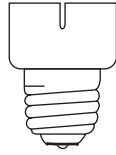
Incandescent Base Shapes



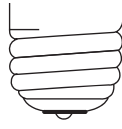
Medium
Med.



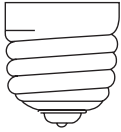
Three Contact
Med. 3C Med.



Medium Skirted
Med-Skt.



Mogul



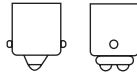
Three Contact
Mogul 3C Med



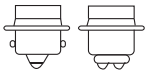
Miniature
Candelabra



Candelabra
Can.



Candelabra
Bayonet Style (S.C. Bay.)
or Double Contact
(D.C. Bay.)



Intermediate
Prefocus
S.C.Pf., D.C.Pf.
(D.C. Bay.)



Inter.

Incandescent Bulb Finishes



Clear: Provides sparkle, especially in fixtures that are made of chrome, have mirrored surfaces, multiple sockets or have cut glass parts. If glare is a problem, use a dimmer or a lower wattage bulb to reduce brightness. Clear bulbs are also used in fixtures with reflectors.



Soft White: Provides the ultimate in soft, uniform, diffused illumination with reduced glare.



Inside Frost: Offers reduced glare.



Natural Light: Features a distinctive blue coating that reduces dull light effects to provide light that is more vibrant and natural. Philips Natural Light bulbs can help you to see things as they should be. Their light is more like natural daylight.



Colored: Creates a festive party atmosphere or a special effect.



Agro: Promotes plant growth by producing the appropriate light spectrum for plants to thrive.



Linear fluorescents for home and office

Philips long life bulbs create a brighter standard.

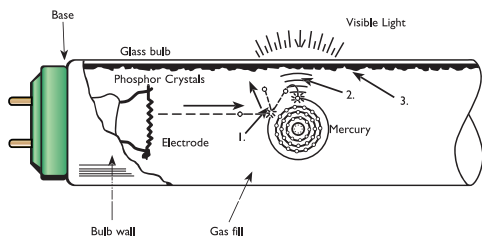
Operation

When started, the electrodes at each end of the bulb emit electrons.

1. The electrons travel through the tube in the form of an electrical current. The electrons collide with the mercury atoms contained in the glass bulb.
2. After the collision, the mercury atom releases invisible ultraviolet energy.
3. The ultraviolet energy strikes the phosphor coating and the phosphor converts the ultraviolet to visible light.

Ballast

All fluorescent bulbs need a ballast to operate properly. The ballast provides the proper starting voltage and limits the current through the bulb. It is important to have the correct ballast for proper operation. The ballast label has important information such as which bulbs the ballast will operate and a wiring diagram.



Fluorescent Bulb Parts

Bulb wall: A glass tube or bulb coated with phosphors.

Gas fill: Usually an electrically conductive mixture of neon and argon gas is used. Krypton/Argon blend is used in Econ-o-watt bulbs.

Mercury: All fluorescent bulbs contain a small amount of liquid mercury which vaporizes during operation. Philips ALTO bulbs contain less mercury than standard bulbs.

Base: The base is cemented to each end of the bulb to connect the bulb to the electrical circuit.

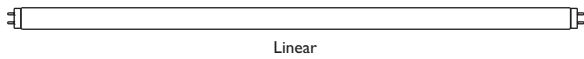
Electrode: The electrodes are a coiled tungsten wire that conducts electricity to the gas fill. The electrodes are sputtered away as the bulb starts and is vaporized as it operates. When the electrodes are used up, the bulb can no longer start. Philips bulbs contain an exclusive electrode guard that minimizes end blackening.

Phosphor Coating: Phosphor coating on the bulb wall converts ultraviolet energy to visible light in a process called fluorescence. Newer, more expensive phosphor coatings are used on bulbs to provide high color rendering, higher lumen maintenance, and higher light output.

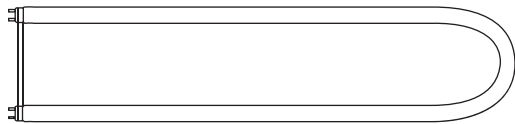
Fluorescent Bulb Shapes

The letter indicates the shape of the bulb and the number indicates the diameter in eighths of an inch.

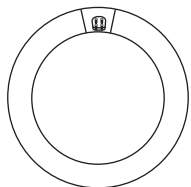
- Example: A T8 Bulb is a tubular shape that is 8 eighths or one inch in diameter.



Linear



U-bent



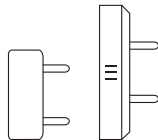
Circline

Fluorescent Base Shapes

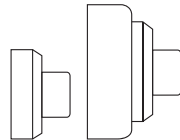
The green color base indicates the bulb is made with Philips ALTO low mercury technology.



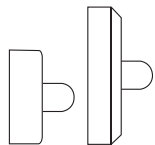
Miniature Bipin T5
Min. Bipin



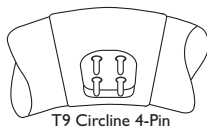
Medium Bipin T8/T12
Med. Bipin



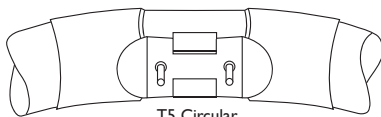
Recessed Double Contact T8/T12
Recessed D.C.



Slimline Single Pin
T8/T12



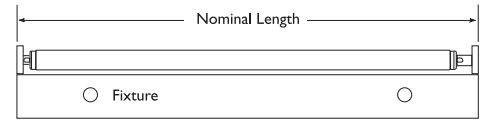
T9 Circline 4-Pin



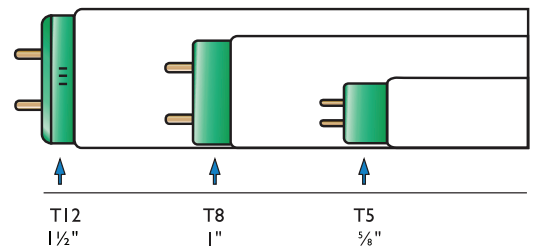
T5 Circular

Fluorescent Sizes

To determine the length of a fluorescent bulb, you do not measure the bulb. The Nominal Length of the bulb is the measurement from back of socket to back of socket on the fixture.



To determine the size (or diameter) of the bulb you need, measure the endcap and use the illustration below as a guide.



Fluorescent Types

Preheat: The first type of fluorescent bulbs was preheat. These bulbs require a starter or preheat switch. Several seconds of warm-up time is required before starting. They are usually 30 watts or less and equipped with a Bipin base.



Slimline (Instant Start): The ballast provides sufficient voltage to start these bulbs instantly. Only a single pin on each end of the bulb is required.



Rapid Start: Rapid start are the most popular type, usually 32 watts or more. Continuously heated electrodes provide smooth, fast starting (~1 second) without a starter. Rapid start bulbs are available with Bipin and Recessed Double Contact bases.



Fluorescent Color Selection

Color is a personal preference. Select a bulb that creates the environment you desire for the application.

Soft White	Neutral	Cool White	Natural Light	Daylight Deluxe
Atmosphere Created				
Comfortable, pleasant light	Balanced, general purpose light	Efficient task lighting	Simulates natural, outdoor light	Creates a cool, refreshing environment
Application				
Kitchen, bathroom or any room	Offices, task areas	Garage, basement	Any room in the home	Garage, workshop, laundry
Color Scale: 3000K = Soft light to 6500K= Coolest white light ¹				
3000K	3500K	4100K	5000K	6500K
CRI on a scale of 0 to 100, the bulb's ability to show colors accurately ²				
86	85	85	88	85
Also known as...				
Warm Deluxe, Kitchen & Bath, Warm White	Neutral	Cool, Cool White	Full Spectrum, Sunshine, Bright White	Daylight, Daybright, Arctic White

1) Color Temperature: The measure of the light bulb's color when illuminated, and is measured in degrees Kelvin. The higher the number, the whiter, and then bluer, or cooler. The lower the number, the more yellow or warmer the color.

2) Color Rendering Index (CRI): the ability of a light bulb to show the colors of objects accurately on a scale of 9 to 100—usually “the higher the better”. A higher number can make a big difference.



Philips Advance electronic ballasts provide proven performance and payback.

Purpose of a Ballast

- Incandescent Bulbs
 - Designed to start at 120V
 - Size of filament regulates current
- Fluorescent Bulbs
 - Starting voltage dictated by bulb length and diameter
 - Bulb itself will not regulate current

Size of a Ballast

- Ranges from:
 - ½ lbs. choke ballast to 25 lbs. sign ballast
- Generally:
 - the larger the bulb, the larger the ballast

Ballast Function

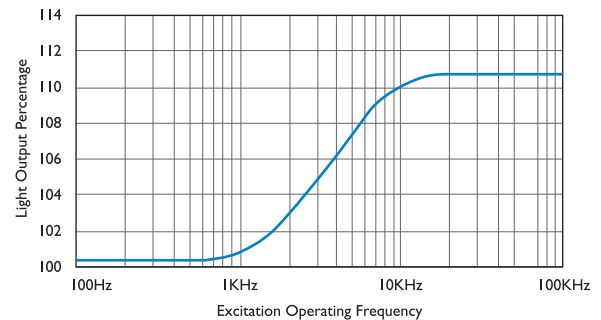
- Provides starting voltage to the bulb
- Limits current through the bulb

In Preheat and Rapid Start Bulbs:

- Provides proper cathode heating

Operating Frequency

- Why >40,000 Hz?
 - Bulbs more efficient at high frequency
 - Higher light output for same watts as 60 Hz
 - Same light output as 60 Hz for fewer watts
 - Helps avoid interference with other high frequency electronic equipment
- Input Frequency—power line frequency
 - 50 Hz or 60 Hz (cycles per second)
- Output Frequency—bulb operating frequency
 - 50 Hz or 60 Hz for Magnetic & Hybrid
 - >40,000 Hz for Electronic ballasts



Ballast Types

Electronic Ballasts

Lighter, quieter, and more energy efficient—they are the smart replacement for magnetic ballasts.

- Energy savings
- Extends the life of the bulb
- Instant-on technology
- Operates bulbs at “High Frequency” >40,000 Hz
- Operate same bulbs as Magnetic
- Use more components
- Smaller size—(SC)—same mounting dimensions
- Lightweight, less stress on ceiling and easier to install
- Quiet operation—reduces or eliminates ballast humming



Magnetic Ballasts

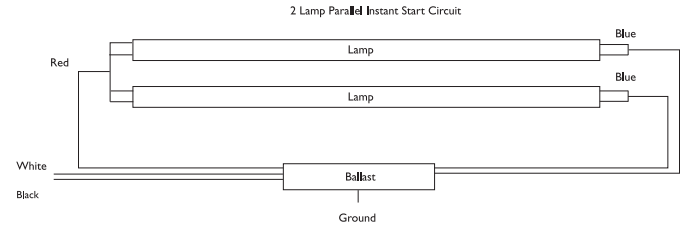
- Low frequency operation—eliminates interference concerns
- 4 ft and 8 ft T12 ballasts are no longer available due to the Energy Policy Act of 2005 Legislation (EPACT)
- Easy replacement



Ballast Types

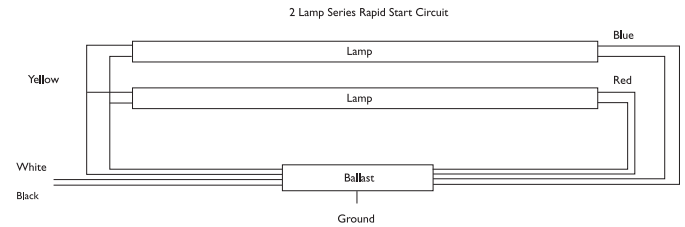
Parallel Instant Start Circuit

- Parallel
 - Instant Start
 - Independent Bulb Operation—one bulb out the others remain lit

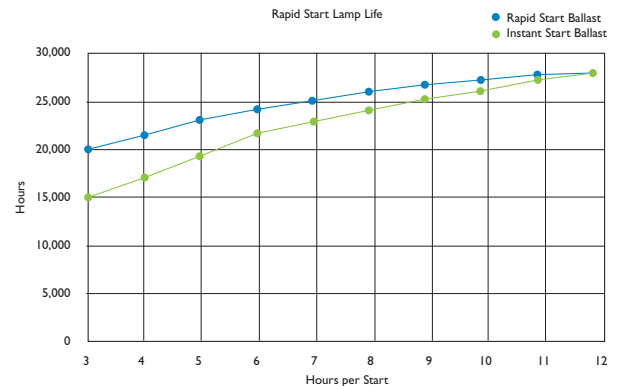


Series Rapid Start Circuit

- Series
 - Rapid Start
 - One bulb out, all bulbs out
 - Industry standard for T12 Bulbs



Bulb Life Instant Start vs. Rapid Start



Qualifying Questions to Ask the Customer

When qualifying customers to determine their specific need for a ballast, be sure to consider the following:

- Type and length of bulb in the customer's fixture. The description etched on the end of the bulb is the best way to determine this piece of information.
- The number of bulbs in the fixture being operated by the ballast and the number of ballasts in the fixture.
- Energy efficiency—Can the customer use an electronic ballast to replace a magnetic ballast in their application?
- Catalog number and manufacturer of the ballast the customer is looking to replace. Utilize cross reference chart to determine correct replacement if existing unit is not Advance.

Frequently Asked Questions

Question: Why do ballasts hum?

Answer: Magnetic components in the ballast create noise due to their movement when regulating voltage and current. Potting material helps dampen this sound but it is still audible at 24–36 decibels.

Question: What is the black smoke that comes from a ballast at its end of life?

Answer: That is potting material being burned due to the ballast overheating. This could be caused by a bad bulb being left in the fixture for too long or the ballast overheating due to component failure.

Question: Can fluorescent bulbs be dimmed?

Answer: Yes, but you must use a specific dimming ballast for the bulb type and use a fluorescent dimmer not a standard incandescent dimmer.

Question: How do I determine the correct ballast to use?

Answer: You must know the bulb description/bulb type in the fixture. This may be found etched on the end of the fluorescent bulb. You must also know the number of bulbs the ballast needs to operate. This may be found on the ballast label. You must also know the operating voltage of the ballast needed. This may also be found on the ballast label. In addition, there are upgrade opportunities with electronic ballasts to reduce energy costs.

Question: What are the benefits of electronic ballasts?

Answer: Lower electric bill, lighter weight, cooler and quieter operation, longer life and more environmentally friendly.



Upgrade to an enhanced white light

Philips High Intensity Discharge Lighting combines high efficacy with excellent quality light and long life for many commercial applications.

High Intensity Discharge HID bulbs are the group of bulbs containing Metal Halide High Pressure Sodium and Mercury Vapor bulbs. In HID bulbs, light is produced by passing an electric current between two electrodes. The electric current passes through a gas or metal vapor at high pressure inside an arc tube. The arc tube may be made of either quartz or ceramic material. The electric current produces a high intensity arc or discharge of light that is very efficient and has a long life.

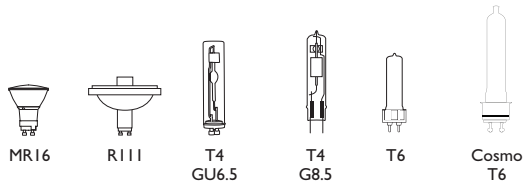
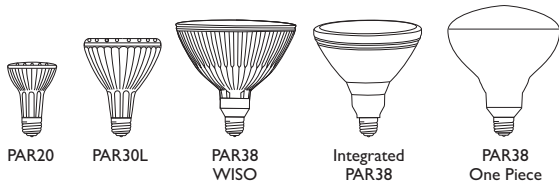
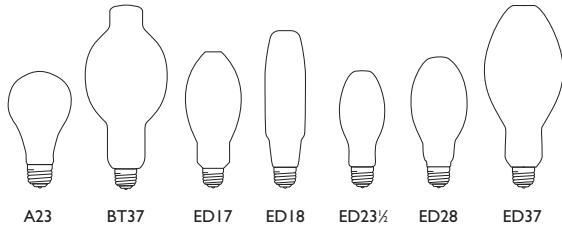
They differ from Fluorescent bulbs in that they produce light directly from the arc itself instead of relying on phosphors to convert ultraviolet energy into visible light. (Note: Some HID bulbs do have phosphor coatings to enhance CRI and diffuse the light.) They operate at higher pressures and temperatures than Fluorescent bulbs in order to produce light via the arc.

Common Characteristics of HID bulbs

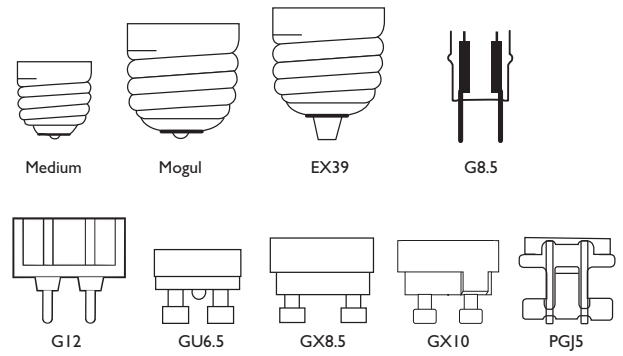
- All HID bulbs have a warm-up period that lasts from 3–10 minutes (depending on the type and wattage) before it produces full light output.
- All HID bulbs require a ballast. It is very important that an HID bulb has the correct ballast to operate as a system (compare the ANSI code on Ballast and bulb package to match).
- HID bulbs have a restrike time which ranges from 1–15 minutes depending on bulb type and wattage. The restrike time is the period of time from when power is removed and reapplied (to a fully warmed up bulb) until the time it resumes producing light.

HID Bulb Shapes

All Philips HID bulbs feature a corrosion resistant brass base and have been lubricated with a black spot of graphite to ensure easy bulb removal at end of life.



HID Base Shapes



New efficiency standards for light bulbs nationwide

Understanding light bulb efficiency standards

New minimum energy efficiency standards for lighting are being phased-in. This will impact many incandescent household, reflector, and linear fluorescent bulbs. Over the course of the next few years, some of these bulbs will be discontinued and will be replaced by more efficient versions. You will still be able to purchase the same type of bulbs you are accustomed to, but with lower wattages and without compromising brightness.

Use the following comparison guides to see the products affected by the Energy Independence and Security Act and to see Philips energy efficient replacement options. All replacement bulbs are recommended based on the closest lumen output.

When does this legislation take effect?

It will be phased-in 2012 through 2014 (California will begin one year earlier starting January, 2011).

What light bulbs will be affected?

- General Service (Household) Incandescent and Halogen Bulbs
- Incandescent and Halogen Reflectors
- General Service Linear Fluorescents

See the complete listing of exempted bulbs in the *Light Bulb Exemptions Section* (page 72–73).

Federal DOE Legislation

The Department of Energy (DOE) issued new energy efficiency standards for fluorescent and incandescent bulbs. In 2007 the Energy Independence and Security Act (EISA) was signed into law. It is intended to reduce energy usage and greenhouse gas emissions, and established new energy efficiency standards for buildings, vehicles, and products—including light bulbs. This Federal legislation requires manufacturers to produce certain reflector bulbs and other household light bulbs that meet or exceed the new energy efficiency standards as stated in EISA.

The new standards are based on efficacy, and bulbs must meet new minimum Lumen per Watt (LPW) requirements.

1/1/2011

EISA (CA ONLY):

Effective date

Affects 95W
A-Shape Bulbs

1/1/2012

EISA (All States):

Effective date

Affects 100W A-Shape Bulbs, Medium
Base Globes and Decorative Bulbs

Decorative Bulbs with Candelabra
Bases rated >60W

Decorative Bulbs with Intermediate
Bases rated >40W

EISA (CA Only):

Affects 71W A-Shape Bulbs

7/14/2012

EISA:

Effective date

Affects Reflector Flood/Spot PAR30L,
PAR30S, PAR20, PAR38, BR30, BR40
and R20 ranging from 40W to 205W

**DOE General Service
Fluorescent Bulb (GSFL):**

Effective date

Affects some 4' and 8' T5, T8 and
T12 Linear Fluorescents, and
2 U-Shape Fluorescents

1/1/2013

EISA:

Effective date

Affects 75W
A-Shape Bulbs,
Medium Base
Globes and
Decorative Bulbs

EISA (CA Only):

Affects 38W
and 57W
A-Shape Bulbs

1/1/2014

EISA:

Effective date

Affects 60W
and 40W
A-Shape Bulbs
>40W Medium
Base Candles
and Globes

Incandescent household bulbs

Affected Incandescent Light Bulbs

Philips Recommended Replacement Light Bulbs

Bulb Shape	Current Wattage	Effective Date ¹	Energy Saving Halogen/Incandescent	Compact Fluorescent	LED
Household					
A-Shape					
A19 Medium Base	100W	Jan 2012	EcoVantage 72W A19	EnergySaver 23W Twister	Philips LED 23W A21 ³
A19 Medium Base	75W	Jan 2013	53W A19 ²	20W Twister Dimmable 20W Covered/ 18W Twister	17W A21
A19 Medium Base	60W	Jan 2014	43W A19	14W Covered/13W Twister 15W Twister Dimmable	12W A19
A19 Medium Base	40W	Jan 2014	29W A19	9W Covered/ 9W Twister	8W A19
Decorative					
Decorative Candles					
Shape: B, F, BA Base: Medium	100W	Jan 2012	EcoVantage 72W F15 Flame	EnergySaver 9W Candle	Philips LED 3W Candle Bent Tip or Blunt Tip
Shape: B, F, BA Base: Medium	60W	Jan 2014	40W BA11 Candle ⁴	5W Candle	3W Candle Blunt Tip
Shape: B, F, BA Base: Candelabra	>60W	Jan 2012	40W B11 Candle ⁴ 40W F10.5 Candle	9W Candle	2W Candle Bent Tip or Blunt Tip
Shape: B, F, BA Base: Intermediate	>40W	Jan 2012			
Globes					
Shape: G16.5, G25, G30 Base: Candelabra	60W	Jan 2012	EcoVantage	EnergySaver	Philips LED
Shape: G25, G30 Base: Medium	100W	Jan 2012			
Shape: G25, G30 Base: Medium	75W	Jan 2013		9W Globe G25 Medium Base	
Shape: G25, G30 Base: Medium	60W	Jan 2014	40W G25 Globe		
Post Light					
Post Light F20 Base: Medium	100W	Jan 2012	EcoVantage 40W F10.5 Candle 72W F15 Candle	EnergySaver 14W Covered Post Light	Philips LED 3W Candle Bent Tip 4W F15 Postlight

1) California will ban these products 1 year earlier.

2) Natural Light only.

3) Available October 2012.

4) Future product.

Incandescent and Halogen Reflector Bulbs

Affected Reflector Light Bulbs

Philips Recommended Replacement Light Bulbs

Bulb Shape	Current Wattage	Effective Date ¹	Energy Saving Halogen/Incandescent	Compact Fluorescent	LED
Small Diameter 2.25"-2.5"					
R20/PAR20			EcoVantage	EnergySaver	Philips LED
R20	45W	2015	40W R20 Flood	14W R20 Flood	8W R20 Flood ²
R20	75W	July 2012			
PAR20	50W	July 2012	39W PAR20 Flood		8W PAR20 Flood
Large Diameter 2.50" or more					
PAR38			EcoVantage	EnergySaver	Philips LED
PAR38	45W	July 2012	39W PAR38	23W PAR38 Indoor Flood	19.5W PAR38 Flood
PAR38	60W	July 2012	53W PAR38		
PAR38	90W	July 2012	72W PAR38		
PAR30			EcoVantage	EnergySaver	Philips LED
PAR30L	50W	July 2012	39W PAR30L		13W PAR30L Flood
PAR30L	75W	July 2012	50W PAR30L 53W PAR30L		
PAR30S	45W	July 2012	39W PAR30S		
PAR30S	60W	July 2012	53W PAR30S		
BR30/40			EcoVantage	EnergySaver	Philips LED
	65W	2015 ³	40W BR30	15W R30 16W R30 Dimmable	13W BR30 Flood
BR30, BR40	85W	2008	50W BR30		14W BR40 Flood
	120W	2008	70W BR40		15W 6" Recessed Downlight

1) California will ban these products 1 year earlier.

2) Future product.

3) All exceptions are expected to expire, dependent on future legislation.

General Service Linear Fluorescents

Affected Fluorescent Light Bulbs		Legislation Requirements	Philips Recommended Replacement Bulbs
Bulb Shape	Color Temp. (Kelvin)	Minimum Lumens per Watt (LPW) Requirement	Fluorescent
4 Foot Linear			
T12 Medium Bi-Pin Base, 25W or more	≤4500K	89 LPW	32W T8 Cool White with 2950 lumens (92LPW) and 85 CRI ¹ 40W T12 Neutral Deluxe with 2200 lumens (55 LPW) and 88 CRI ² 40W T12 Cool White Supreme with 2600 lumens (65 LPW) and 90 CRI ²
	4500K–7000K	88 LPW	32W T8 Natural Light with 2850 lumens (89 LPW) and 82 CRI ² 40W T12 Daylight Deluxe with 2325 lumens (58 LPW) and 90 CRI ² 40W T12 Natural Light C50 Supreme with 2250 lumens (56 LPW) and 92 CRI ²
8 Foot Linear			
T12 Single-Pin Base, 52W or more	≤4500K	97 LPW	59W T8 Cool White Plus with 5700 lumens (97 LPW) and 85 CRI ¹ 75W T12 Natural Light C50 Supreme with 5000 lumens (66 LPW) and 90 CRI ² 75W T12 Daylight Deluxe with 4500 lumens (60 LPW) and 90 CRI ²
	4500K–7000K	93 LPW	
T12 High Output (HO), all watts	≤4500K	92 LPW	110W T12 Cool White Deluxe HO-O with 8800 lumens (80 LPW) and 59 CRI ²
	4500K–7000K	88 LPW	110W T12 Daylight Deluxe HO-O with 7800 lumens (71LPW) and 73 CRI ²
2 Foot U-Shape			
T12, Medium Bi-Pin Base, 25W or more	≤4500K	84 LPW	40W T12 Cool White Supreme with 2300 lumens (58 LPW) and 90 CRI ² 40W T12 Daylight Deluxe with 2250 lumens (56 LPW) and 90 CRI ²
	4500K–7000K	81 LPW	

1) T8 Ballast change required.

2) Cool White Supreme, Daylight Deluxe, C50 Colortone Supreme, Neutral Deluxe, and HO-O bulbs are exempt.

Product Comparisons

Incandescent	Life ¹ (HOURS)	Lumens	EcoVantage Halogen	Life ¹ (HOURS)	Lumens	Energy Savings ²	EnergySaver CFL	Life ¹ (HOURS)	Lumens	Energy Savings ²	Philips LED	Life ¹ (HOURS)	Lumens	Energy Savings ²
15W A15	1500	110									3W A15	20,000	136	\$26.40
25W A19	1500	220									7W A19	25,000	240	\$49.50
40W A19	1500	475	29W A19 Soft White	1000	400	\$1.21	9W Mini Twist.	12,000	500	\$40.00	8W A19	25,000	450	\$88.00
60W A19	1500	830	43W A19 Soft White	1000	750	\$1.87	13W Mini Twist.	12,000	840	\$62.00	12.5W A19	25,000	800	\$130.63
75W A19	1500	1060	53W A19 Nat. Light	1250	790	\$3.03	18W Mini Twist.	12,000	1250	\$75.00				
100W A19	1500	1440	72W A19 Soft White	1000	1490	\$3.08	23W Mini Twist.	12,000	1600	\$101.00				
15W Candle	2000	150									2W Candle	15,000	86	\$21.45
40W Candle	2000	300	25W Candle	2200	280	\$3.63								
60W Candle	1500	550	40W Candle	2200	540	\$4.84								
75W R20	2000	500	40W R20	3000	570	\$4.24								
65W BR30	2000	630	40W BR30	3000	590	\$8.25	16W R30	8000	750	\$43.00	13W BR30	25,000	650	\$143.25
85W BR30	2000	855	50W BR30	3000	730	\$11.55								
65W BR40	2000	630	40W BR40	3000	605	\$8.25	20W R40	8000	900	\$102.00				
Halogen	Life ¹ (HOURS)	Lumens (candela)	EcoVantage Halogen	Life ¹ (HOURS)	Lumens	Energy Savings	EnergySaver CFL	Life ¹ (HOURS)	Lumens	Energy Savings	Philips LED	Life ¹ (HOURS)	Lumens (candela)	Energy Savings
40W R20	3000	415	40W R20	3000	570						8W R20 FL	25,000	500	\$102.00
20W MR16	3000	240 (550 candela)									3W MR16	25,000	(650 candela)	\$46.75
35W GU10	3000	265 (480 candela)									3W GU10	20,000	(650 candela)	\$70.40
60W PAR30L	3000	1140 (2500 candela)	50W PAR30L	4400	960	\$4.84	16W R30	8000	750	Save \$43.00	12W PAR30L	25,000	(2610 candela)	\$132.00
45W PAR38	3000	530 (2000 candela)	39W PAR38	1100	570	\$0.73								
90W PAR38	3000	1310 (4500 candela)	72W PAR38	1100	1350	\$2.18	23W PAR38	10,000	1300	Save \$73.00	16W PAR38	25,000	(4000 candela)	\$203.50

1) Rated Average Life (RAL) is the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

2) Savings based on \$.11 per kWh for the average rated life of the bulb. Actual savings will vary depending on cost per kWh.

Labeling Laws for Lighting

To help consumers understand light bulb efficiency, the EISA legislation directed the Federal Trade Commission (FTC) to change its current labeling requirements for all medium based general service incandescent, halogen, LED and compact fluorescent bulbs. Manufacturers are required to provide brightness (lumens) and energy-cost information on packaging within a detailed “Lighting Facts” label.

This new label will help consumers base their purchase decision on the brightness (lumens) of the bulb and cost of operation, instead of wattage.* As more energy efficient light bulbs become available and less efficient, higher wattage light bulbs are phased-out, consumers will have this new source of information to help make their purchase decisions.

* <http://www.ftc.gov/opa/2010/06/lightbulbs.shtm>

Effective date:

2011 (Exact date pending FTC final ruling)

Affected Light Bulbs:

- General Service Incandescent and Halogen Household bulbs
- Incandescent and Halogen Reflectors
- Compact Fluorescent Household bulbs
- General Service LED bulbs

But there are a few exceptions to this rule:

- Shatter-Resistant bulbs
- Vibration-Resistant bulbs
- Globes and Candles of 40W or less
- Intermediate, Candelabra and Non-Screw Base bulbs

See the complete listing of exempted bulbs in the *Light Bulb Exemptions Section* (page 72–73).



How will the Federal Trade Commission (FTC) Labeling Laws affect me?

A new, consumer friendly energy usage label will be required on most light bulb packages. These new labels will help you choose the right energy-efficient bulbs for your needs.

Understanding the new FTC label

Package Front

Brightness: Measured in lumens.

Estimated Yearly Energy Cost: Based on 3 hrs/day. 1 l¢ per kWh (kilowatt hour). Cost depends on rates and use.

Brightness/Brillo	Estimated Energy Cost/ Costo Estimado de Energía
535 lumens/lúmenes	\$5.42 per year/por año

Package Back

Brightness: Measured in lumens.

Estimated Yearly Energy Cost: Based on 3 hrs/day. 1 l¢ per kWh (kilowatt hour). Cost depends on rates and use.

Life: Based on 3 hours per day.

Light Appearance: Example, whether the bulb provides warm or cool light.

Energy Used: Watts—the amount of energy the bulb uses.

Lighting Facts/Datos de Iluminación	
Per Bulb/Por Bombilla	
Brightness/Brillo	535 lumens/lúmenes
Estimated Yearly Energy Cost/ Costo Estimado Anual de Energía	\$5.42
Based on 3 hrs/day, 11¢/kWh. Cost depends on rates and use./Basado en 3 hrs/día, 11¢/kWh. Costo depende de la tarifa y el uso.	
Life/Duración	2.7 years/años
Based on 3 hrs/day/Basado en 3 hrs/día	
Light Appearance/Apariencia de Iluminación	
Warm/Calida Cool/Fría	
Energy Used/Usó de Energía	45 watts/vatios

Light Bulb Exemptions

The following light bulb types are exempt from legislation

Incandescent Household Bulbs—EISA 2007:

- 3-Way bulbs, Appliance bulbs (Maximum 40W), Colored Party bulbs, Black Light bulbs, Infrared bulbs, Plant Light bulbs, Sign Service bulbs, Silver Bowl bulbs, Bug-A-Way, and Rough Service bulbs
- Post lights 40W or less and Nightlights
- Specialty Incandescent, Marine bulbs, Marine Signal Service bulbs, Mine Service bulbs, and Traffic Signal bulbs
- Decorative Globes G40 bulbs (all wattages)

The following bulbs if less than or equal to 60 watts are exempt:

- Decorative Candles (B, BA, CA) with Candelabra base
- Decorative Globes (G16½, G25, G30) with Candelabra base
- Vibration Service bulbs

The following bulbs if less than or equal to 40 watts are exempt:

- Specialty Tubular (T8)
- Decorative Candles (B, BA, CA) with medium and intermediate bases
- Decorative Globes (G16½, G25, G30) with medium and intermediate bases
- M14

Incandescent Reflector Bulbs—EISA 2007:

- Colored PARs, Rough Service, and Vibration Service bulbs

Exemptions are expected to expire in 2014

- 45W or Less: R20 and BR19
- 50W or Less: BR30, ER30, BR40, and ER40
- 65W BR30, BR40, and ER40

General Service Fluorescent Bulbs (GSFL)—DOE 2009 Rulemaking:

- All bulbs with a CRI \geq 87
- Outdoor use: Cool White High Output (F96T12/CW/HO-O) and Daylight/High Output (D/HO-O)
- Shatter Resistant bulbs: TuffGuard
- Cool White Deluxe/Daylight Deluxe; Colortone50
- Other length bulbs not specifically mentioned (such as 2', 3', and 5' bulbs)
- Bulbs > 7000 Kelvin, Plant Growth, Cold Temperature, Colored, Reflector, Aperture, Reprographic, and UV bulbs

The following light bulb types are exempt from FTC labeling requirements:

All Non-General Service Bulbs:

- Party bulbs
- Rough Service bulbs
- Appliance bulbs
- Black Light bulbs
- Bug-A-Way bulbs
- Colored Party bulbs
- Infrared bulbs
- Left-Hand Thread bulbs
- Marine bulbs
- Marine Signal Service bulbs
- Mine Service bulbs
- Plant Light bulbs
- Certain Reflector bulbs
- Shatter-Resistant bulbs (including a Shatter-Proof bulb and a Shatter-Protected bulb)
- Sign Service bulbs
- Silver Bowl bulbs
- Showcase bulbs
- Traffic Signal bulbs
- Vibration Service bulbs

Notes:

Incandescent reflector light bulbs \geq 125V (including those rated at 130V) are subject to 15% higher LPW efficacy standards than products rated at <125V. 130V incandescent reflector bulbs will no longer be available after July 2012.

California will make A-Shape (EISA Section 321) laws effective one year before all other states.

Lighting Formulas

Energy Savings Calculator

To calculate energy dollars saved over the life of a bulb, use this formula. All you need is your Present Bulb Wattage and the Replacement Bulb Wattage and Bulb Life.

Present Bulb Wattage	<input style="width: 80%;" type="text"/>	Watts
Subtract		
Replacement Bulb Wattage	<input style="width: 80%;" type="text"/>	Watts
Equals Wattage Saved	<input style="width: 80%;" type="text"/>	Watts
Multiply		
By Replacement Bulb Life	<input style="width: 80%;" type="text"/>	Hrs Life
Equals Energy Saved	<input style="width: 80%;" type="text"/>	Watt-Hrs
To Convert to Kilowatt Hours		
Divide by 1000	÷ 1000	
Equals Energy Saved	<input style="width: 80%;" type="text"/>	Kilowatt Hrs
Multiply		
By Your Kilowatt Hour Rate	<input style="width: 80%;" type="text"/>	
Equals Energy Dollars Saved by Each Bulb	<input style="width: 80%;" type="text"/>	\$
Multiply		
By Number of Bulbs in Your Facility	<input style="width: 80%;" type="text"/>	
TOTAL DOLLARS SAVED	<input style="width: 100%; height: 20px;" type="text"/>	
Over the Rated Average Life of the Bulbs		

Use this formula to determine the diameter of the beam of a reflector or PAR bulb at a specific distance. You will need a scientific calculator and the beam diameter in degrees.

Formula: $(\text{Beam Spread} \div 2) \tan \times \text{Distance} \times 2 = \text{Beam Diameter}$

On scientific calculator: Enter beam spread, divide by two, hit equal, hit tangent button (TAN), multiply by distance, multiply by two—this equals the diameter of the beam.

Example: 90PAR 38 HAL/FL28° at 12 feet distance, what will the diameter of the beam be?

On scientific calculator:	
Enter beam spread 28°	28
Divide by 2	2
Hit equal button	14
Hit tangent button	0.2493
Multiply by distance	12 ft
Multiply by 2	2
Equals diameter of beam	5.98 ft or about 6 ft

Use this formula to determine the illuminance in footcandles (FC) hitting a target from a reflector or PAR bulb at a specific distance. You will need the Maximum Beam Candlepower (MBCP) for the specific bulb and the distance from the bulb to the target. You can get the MBCP from the Philips Lamp Specification and Application Guide.

Formula: $FC = \text{MBCP} / D^2$

Take the MBCP and divide by the distance squared (distance x distance)

Example: 90PAR 38 HAL/FL28° at 12 feet distance, what will the illuminance in footcandles be?

The MBCP is 4500 candlepower

The distance squared is 12 feet x 12 feet or 144 square feet
 $4500 / 144 = 31.25$ footcandles or about 30FC

How to Use our Lighting Catalog (SG-100)

Bulb: Bulb designations indicate approximate shape and size.

Volts: For bulbs listed with voltage ranges.

Base: Full base names and configuration drawings are shown in the back of each bulb section.

Package Qty.: Number of bulbs packaged in a shipping container. (Quantity shown is minimum shipping container.)

Ordering Code: Must be used when placing orders.

Watt	Type	Base	Product Symbol Number	Footnote	Ordering Code	Volts	Description	Rated Avg. Life (hrs)	Case Life (hrs)	Approx. Price	Energy Cost (¢/hr)	Color
11	PAR30S	PAR30	4060A-4		2PAR30SND3022000DPM	120	PAR30S Flood 22" Dia*	4,000	2,000	\$1.40	\$1.31	2700K
			4060A-4		2PAR30SND3022000DPM	120	PAR30S Flood 22" Dia*	4,000	2,000	\$1.40	\$1.31	3000K
			4060A-4		2PAR30SND3022000DPM	120	PAR30S Flood 22" Dia*	4,000	2,000	\$1.40	\$1.31	4000K
			4060A-4		2PAR30SND3022000DPM	120	PAR30S Flood 22" Dia*	4,000	2,000	\$1.40	\$1.31	5000K

Product Number: Both Product Number and complete ordering code should be used when placing orders.

Pyramid Symbol: Footnote, explanation is listed at the back of each bulb type section.

Rated Average Life: the length of operation (in hours) at which point an average of 50% of the bulbs will still be operational and 50% will not.

M.O.L.: Maximum Overall Length in inches.

How to Use our Ballast Catalog (ATLAS)

Volts: For bulbs listed with voltage ranges.

Ballast Factor: Measure of light output from bulb operated by commercial ballast, as compared to a laboratory standard reference ballast.

Line Current: A measure of electrical current.

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Input Power (ANSI)	Ballast Factor	Max. THD %	Line Current (Amps)	Min. Starting Temp. (°F/C)	Dim.	Wiring Dia.
2	120	Instant Start	EL	F25T8-FB024T8 (25W - 36")	81	0.99	120	0.61	50/30	1/2	6"

Input Power: Total power input to the ballast that includes bulb watts and ballast losses.

Min. Starting Temp.: The minimum ambient temperature at which the bulb will start. Light output may be affected due to bulb characteristics.

How to Read the Ballast Catalog Number

Catalog Number Examples

- R-2S40-TP V-2S40-TP REL-2P32-SC
- R=120 Volt V=277 Volt I=120-277V
- H=347/480V G=347 Volt JC=277-480V

- EL = Electronic Ballast
- 2 = # of Bulbs operated by the Ballast
- S = Circuit Type-Series • P = Circuit Type-Parallel
- 32 = Bulb Wattage • 40 = Bulb Wattage
- TP = Thermal Protection

Glossary

Absorption Conversion of light to heat by interaction with matter.

Accent Lighting Concentrated light on a subject which highlights it and causes it to stand out from its surrounding. Depending on degree of drama desired, accent light should minimally be 10x the general light or ambient light.

Alternating Current (AC) Flow of electricity which cycles of alternates direction many times per second. The number of cycles per second is referred to as frequency. The most common frequency used in this country is 60 Hertz (cycles per second).

Amalgam A mixture of mercury and other metals used in Compact Fluorescent bulbs to allow the bulbs to have a stable light output over a wide range of temperatures and burning positions. The amalgam causes the bulb to have a 60 second warm-up time.

Ambient Lighting General lighting, or lighting of the surrounding area.

American National Standards Institute (ANSI)

A consensus organization which coordinates voluntary standards for the physical, electrical, and performance characteristics of bulbs, ballasts, luminaires, and other lighting and electrical equipment.

Amperes (amps or A) The unit of measurement of electric current. The is current related to voltage and power as follows:
Current (amps) = Power (watts) / Voltage (volts).

Arc Discharge (in gas or vapor) Electric discharge that produces light without a filament.

Average Illuminance (E_{av}) Over a surface. Illuminance averaged over the specified surface.

Ballast The ballast is an electrical device that performs two basic functions: 1) provides the starting voltage and 2) limits the current to sustain bulb operation.

Ballast types for fluorescent bulbs:

Instant Start: Instant start electronic ballasts are the most popular type of electronic ballast today because they provide maximum energy savings and they start bulbs without delay or flashing. Since they do not provide bulb electrode heating, instant start ballasts consume less energy than comparable rapid start, program rapid start or programmed start ballasts. As a result, they provide the most energy efficient solution to fluorescent bulb ballasting. The instant start ballast uses 1.5 to 2 watts less energy per bulb than the rapid start alternative.

Instant-start electronic ballasts provide a high initial voltage (typically 600V for F32T8 bulbs) to start the bulb. This high voltage is required to initiate discharge between the unheated electrodes of the bulb. However,

the cold electrodes of bulbs operated by an instant start ballast may deteriorate more quickly than the warmed electrodes of bulbs operated by a rapid start, program rapid start or programmed start ballast. Bulbs operated by instant start ballasts will typically withstand 10–15K switch cycles. Instant start ballasts are typically wired in parallel. This means that if one bulb fails, the other bulbs in the circuit will remain lit.

Rapid Start: Rapid start ballasts have a separate set of windings which provide a low voltage (approx. 3.5 volts) to the electrodes for one second prior to bulb ignition. A starting voltage somewhat lower than that of instant ballast (typically 450–550V for F32T8 bulbs) is applied, striking an electrical arc inside the bulb. Most rapid start electronic ballasts continue to heat the electrode even after the bulb has started, which results in a power loss of 1.5 to 2 watts per bulb. Bulbs operated by a rapid start electronic ballast will typically withstand 15–20K switch cycles. Rapid start ballasts are typically wired in series. This means that if one bulb fails, all other bulbs in the circuit will extinguish.

Programmed Start: Programmed start (PS) electronic ballasts provide maximum bulb life in frequent starting conditions (up to 50,000 starts). PS ballasts use a custom integrated circuit (IC) which monitors bulb and ballast conditions to ensure optimal system lighting performance. Life Program rapid start ballasts, PS ballasts also precisely heat the bulb cathodes. However, PS ballasts heat the bulb cathodes to 700°C prior to bulb ignition. This puts the least amount of stress on the bulb electrodes, resulting in maximum bulb life regardless of the number of bulb starts. Programmed start ballasts are typically wired in series.

Ballast types for HID bulbs:

Reactor: Single coil, very efficient, but poor voltage regulation to the bulb.

Constant Wattage Autotransformer (CWA): Employing two coils, the ballast is less efficient than reactor types, but have better voltage regulation. Most popular type in use.

Magnetically Regulated (Mag Reg) or Regulated Lag (Reg Lag): Three coils make for very effective voltage regulation but also not very efficient.

Electronic: Allows for both high efficiency and the best voltage regulation.

Base The end of the bulb that inserts into bulb socket.

Beam Spread The angle over which the intensity of the beam drops to 50% of its peak intensity. Measured in degrees.

Brightness A visual sensation that describes how much light an area appears to emit. There are no units of measure for brightness; its measurement is relative. In other words, more or less bright.

British Thermal Units (BTUs) Measurement of heat produced Unit BTU, BTUs per hour = watts x 3.413.

Bulb The glass outer or envelope of a bulb. Also, a bulb is commonly referred to as a bulb.

Burning Position The position in which a bulb is designed to be operated.

Canadian Standards Association (CSA) An organization that writes standards and tests lighting equipment for performance as well as electrical and fire safety. Canadian provincial laws generally require that all products sold for consumer use in Canada must have CSA or equivalent approval.

Candela (cd) (Luminous Intensity) The intensity base unit for light. Intensity is the luminous flux emitted from a point per unit solid angle into a particular direction, regardless of distance.

Candlepower (cp) Luminous intensity expressed in candelas.

Chromaticity See color temperature.

Class "P" Ballast contains a thermal protective device, which deactivates the ballast when the case reaches a certain critical temperature. The device resets automatically when the case temperature drops to a lower temperature.

Color Appearance The color impression when looking directly at a light source.

Color Rendering Expression for the effect that the light has on the color appearance of objects.

Color Rendering Index (CRI) A method for describing the effect of a light source on the color appearance of objects, compared to a reference source of the same color temperature (CCT). The highest CRI attainable is 100. Originally based on an eight standardized color comparisons, it was later extended to fourteen colors.

Color Temperature or Correlated Color Temperature (CCT) The color temperature of a light emitter refers to the temperature to which one would have to heat a "blackbody" source (Planckian radiator) to produce light of similar overall appearance or chromaticity. A low color temperature implies warmer color (more yellow/red) light while high color temperature implies a cooler light (more blue). The standard unit for color temperature measurement is expressed in Kelvin (K).

Compact Fluorescent Bulb (CFL) The general term applied to families of smaller diameter fluorescent bulbs, some of which have built-in ballasts and medium screw bases for easy replacement of incandescent bulbs.

Cone Photoreceptors in the retina containing light-sensitive pigments responsible for seeing color.

Contrast The difference between the object and its background.

Cornice Lighting Lighting system comprising light sources shielded by a panel parallel to the wall and attached to the ceiling, distributing light over the wall.

Correlated Color Temperature The temperature of a piece of metal whose perceived color most closely resembles that of a compared light source at the same brightness. Unit Kelvin, K.

Cosine Law of Incidence The law that states that illuminance at a point on a plane is proportional to the cosine of the angle of light incidence (the angle between the direction of the incident light and the normal to the plane). $E = I/d^2 \cos$

Cove Lighting Lighting system comprising light sources shielded by a ledge or recess, and distributing light over the ceiling and upper wall.

Diffuse Reflection Diffusion by reflection in which, on the macroscopic scale, there is no regular reflection.

Diffused Lighting Lighting in which the light is not coming mainly from one particular direction.

Diffuser Device used to alter the distribution of light and depending essentially on the phenomenon of diffusion.

Diffusion (scattering) Change of the distribution of a beam of light when it is deviated in many directions by a surface or by a material.

Dimmer A device in the electrical circuit for varying the light output from bulbs in a lighting installation. Dimming an incandescent bulb extends its life.

DiOptic Reflector A segmented, dual parabolic reflector that increases the reflector efficiency up to 20%.

Direct Current (DC) Flow of electricity continuously in one direction.

Direct Glare Glare resulting from high luminances or insufficiently shielded light sources in the field of view.

Direct Lighting Lighting by means of fixtures or luminaires that have 90 to 100 percent of the light reaching the working plane directly.

Directional Lighting Lighting in which the light on the working plane or on an object is coming predominately from one particular direction.

Discharge Lamp Lamp in which the light is produced, directly or indirectly, by an electric discharge through a gas, a metal vapor, or a mixture or several gases and vapors.

Discomfort Glare Glare that causes discomfort without necessarily impairing the vision of objects.

Dispersion To split light into the colors of the rainbow.

Distance (D) The distance from the light source to the working plane.

Downlight (Can, High Hat) Small luminaire, which distributes the light downward, usually recessed in the ceiling.

Efficacy Of a source. Efficacy is the rate at which bulb is able to convert electrical power (watts) into light (lumens), expressed as lumens per watt. Divide light produced (lumens) by the power consumed (watts). Lumens/watts = LPW. Units lumen per watt, LPW, lm/W.

Efficiency Often misused term in lighting, to describe lumens per watt; the correct term is efficacy. See efficacy.

Electric Discharge The passage of an electric current through gases and vapors. This results in the emission of electromagnetic radiation (light).

Electromagnetic Spectrum A continuum of electric and magnetic radiation that can be characterized by wavelength or frequency. Visible light encompasses a small part of the electromagnetic spectrum in the region from about 380 nanometers (violet) to 770 nanometers (red) by wavelength.

Electronic Ballast A short name for a fluorescent high frequency electronic ballast. Electronic ballasts use solid state electronic components and typically operate fluorescent bulbs at frequencies in the range of 25–35 kHz. The benefits are: increased bulb efficacy, reduced ballast losses, and lighter, smaller ballasts compared to electromagnetic ballasts.

Emergency Lighting Lighting provided for use when the supply to the normal lighting fails.

Energy Policy Act (EPACT) Comprehensive energy legislation passed by the US Congress in 1992. The lighting portion includes bulb labeling and minimum energy efficacy (lumens/watt) requirements for many commonly used incandescent and fluorescent bulb types. Similar legislation is being proposed in Canada.

Escape Lighting That part of the emergency lighting provided to ensure that an escape route can be effectively identified and used in case of failure of the normal lighting system.

Federal Communications Commission A US Federal Agency which is charged with regulating emissions in the radio frequency portion of the electromagnetic spectrum. For example, a regulation entitled, “Part 18” deals with electromagnetic interference (EMI) from all lighting devices operating at frequencies higher than 9 kilohertz (kHz). Typical electronically-ballasted compact fluorescent bulbs operate in the range of 24–100 kHz.

Flicker Impression of fluctuating brightness or color.

Floodlight 1) A fixture designed for floodlighting, usually capable of being pointed in any direction and of weatherproof construction. 2) A bulb with a wide beam of light usually greater than 20° beam spread.

Fluorescent Lamp Discharge lamp of the low-pressure mercury type in which most of the light is emitted by a layer of fluorescent material excited by the ultraviolet radiation from the discharge. For example: F40T12.

Footcandle The unit of measure for the density of light on a surface unique to the USA. One footcandle is equal to one lumen per foot (lm/ft²). One footcandle = 10.674 lux.

Full Spectrum Lighting There is no official definition of the term “full spectrum” but most agree that it is a source that has a cool temperature and a high color rendering that mimics natural daylight. Philips Colortone 50 or C50 is described as a full spectrum light source.

Fuse Safety device to prevent excess current flow.

General Lighting (Ambient Lighting) Lighting designed to deliver a predominately uniform level of light throughout an area.

Glare Glare is an interference with visual perception caused by an uncomfortably bright light source or reflection within one’s field of view; a form of visual noise. In its simplest form, glare (unwanted light) is a consequence of the human eye to adapt to different light levels. In the case of glare, the eye adapts to the high level of the glare source, which makes it difficult to perceive details in the now too dark work area.

Direct Glare: Glare resulting from high luminances in the visual environment that are directly visible from a viewer’s position; such as an insufficiently shielded luminaire.

Reflected Glare or Veiling Reflection: A reflection of incident light that partially or totally obscures the details to be seen on a surface by reducing the contrast.

Discomfort Glare: Glare which is distracting or uncomfortable (subjective), which interferes with the perception of visual information, but which does not significantly reduce visual performance.

Disability Glare: The effect of light which significantly reduces visual performance and perception; such as car high beams in your face on a dark country road.

Group Relamping An economical method to predict bulb life and replace all bulbs at one time. Saves time and money.

Halogen Lamp Gas-filled bulb containing a tungsten filament and a proportion of halogen gas. The halogen gas recycles evaporated particles of tungsten back onto the filament surface.

Heat Measured in British Thermal Units (BTUs). Unit BTUs per hour = watts × 3.413.

High Intensity Discharge Lamps (HID) HID lamps include groups of lamps known as Mercury Vapor, Metal Halide, and High Pressure Sodium.

High Pressure Mercury (Vapor) Lamp A long life bulb, with or without a coating of phosphor, in which an arc flowing through mercury vapor produces a bluish-white light. Deluxe phosphor coated bulbs have a higher CRI.

High Pressure Sodium Lamps (HPS) A high efficiency and long life bulb in which an arc flowing through sodium vapor produces a yellow light.

Hot Re-Strike Time In HID lamps, the amount of time after a momentary power interruption to return of full light output. Ranges from 1–15 minutes or more, depending on bulb type and fixture.

Illuminance The total density of visible light—from all directions—illuminating, falling on or incident to, a surface. Standard unit of measure for illuminance is LUX (lx) which is lumens per square meter (lm/m²). See **Footcandle**.

Illumination Application of light to a scene, objects or their surroundings so that they may be seen.

Incandescent (electric) Lamp Lamp in which light is produced by heating a filament to incandescence by the passage of an electric current.

Indirect Light On a surface. The light received by the surface from a lighting installation after reflection from other surfaces.

Indirect Lighting Lighting by means of fixtures or luminaires that have 90–100 percent of the light reaching the working plane indirectly or reflected from the ceiling or walls.

Infrared Radiation Long wavelengths of energy, that heat objects instantly.

Instant-start Lamp Fluorescent lamp designed to start without reheating of the electrodes. Usually has a single pin and starts instantly.

Intensity (I) Of a source in a given direction. Used mainly in directional light sources; the strength of the beam. Unit candela, cd.

Inverse Square Law This law says that the measured flux density from a light source decreases along any line from the source. It falls off in proportion to the square of the relative distance traversed. Thus the illuminance measurement 2 feet from the light source will be ¼ of the measurement 1 foot from the source—not ½.

Kilowatt (Kw) A measure of electrical power equal to 1000 watts.

Kilowatt Hour (kWh) The measure of electrical energy from which electricity billing is determined. For example, at the rate of \$0.10 per kWh, a 100 watt lamp operating for 2000 hours will cost \$20.00 (100 x 2000/1000 = 200 kWh x .10 = \$20.00)

Lamp An artificial source of light commonly referred to as a bulb. Also portable luminaire equipped with a cord and a plug.

Lamp Mortality See Mortality Rate.

Light Radiant energy that stimulates the sense of sight. The “visible” part of the electromagnetic spectrum from 380–770 nm. Light is the energy which allows us to see.

Light Output Amount of light produced by a light source such as a lamp. Measured in lumens or candlepower.

Lighting (or illumination) Application of light to a scene, objects, or their surroundings so that they may be seen.

Louvre Shield made of translucent or opaque material and positioned to prevent bulbs from being directly visible over a given angle.

Low Pressure Sodium Lamp (LPS) The most efficient man made light source. LPS only produces yellow light therefore it has a 0 CRI. Example: A SOX lamp.

Lumen (lm) SI unit of luminous flux. Photometrically, it is the luminous flux emitted within a unit solid angle (lsr) by a point source having a uniform luminous intensity of 1 cd.—or—The SI unit for measuring the flux of light being produced by a light source or received by a surface.

Luminaire (light fixture) A complete lighting unit which consists of lamp(s), ballast(s)—if applicable—as well as mechanism for light distribution, lamp protection and alignment and connection to power.

Luminance (L) In a given direction, the amount of light coming off of the surface. Unit candela per square foot, cd/ft².

Lux (FC) The metric unit of illuminance. The amount of lumens falling on an area measured in square meters. One lumen falling on one square meter is equal to one lux.

Maximum Beam Candlepower (MBCP) The maximum intensity of the beam in a given direction. Usually in the center of the beam. Unit candela, cd.

Mercury Vapor Lamp A high-pressure mercury bulb in which the light is produced by the mercury vapor and sometimes by a layer of fluorescent material on the inner surface of the outer bulb excited by the ultraviolet radiation of the discharge.

Metal Halide Lamp Discharge bulb that produces a white light with good color rendering and high efficiency.

Maximum Overall Length (MOL) Maximum Overall Length is measured from the top of the bulb to bottom of the base.

Mortality Rate The number of operating hours elapsed before a certain percentage of the bulbs fail.

Mounting Height The distance between fixtures and the working plane.

Operating Current Current in amps consumed by a bulb at rated watts.

Operating Voltage Voltage at rated watts after a bulb fully warms.

PAR Lamps Parabolic Aluminized Reflector bulbs which offer excellent beam control, come in a variety of beam patterns from spot to flood, and can be used outdoors unprotected because they are made of “hard” glass that can withstand adverse weather.

Parabolic A concave mirror, the reflecting surface of which has the shape of a paraboloid, capable of focusing rays parallel to its axis to a point.

Peak intensity The luminous intensity of a luminaire or bulb in the direction of the beam axis.

Pendant (Pendant) Luminaire Luminaire provided with a cord, chain, tube, etc. which enables it to be suspended from a ceiling or other support.

Point Source A source of light in which the dimensions are small, compared with the distance between the source and the working surface. Produces sharp shadows.

Power Factor Power factor in lighting is primarily applicable to ballasts. It is the ration of watts over volts multiplied by amperes. Since volts and watts are fixed, amperes (the current) will go up as the power factor goes down. This necessitates the use of larger wire sizes to carry the increased amount of current needed with low power factor ballasts as compared to high power factor ballasts.

Preheat Fluorescent Lamp A fluorescent bulb designed for operation on a circuit requiring a manual starting switch or a starter to preheat the electrodes in order to start the arc.

QL Induction Lamp (System) A super long life bulb (system), based on the low-pressure mercury discharge principle, but without electrodes, in which the ionization of the gas within a discharge vessel is brought about by the induction of a high-frequency electromagnetic field. Philips QL System file = 100,000 hours.

R lamps Reflectorized bulbs available in spot (clear face) and flood (frosted face).

Radiation Emission or transfer of energy in the form of electromagnetic waves or particles.

Rapid Start Fluorescent Lamp A fluorescent bulb designed for operation with a ballast that provides a low-voltage winding for preheating the electrodes and initiating the arc without a starter or the application of high voltage. Takes about one second to start.

Recessed Luminaire Luminaire mounted above the ceiling or behind a wall or other surface so that any visible projection is insignificant.

Reflectance Ration of the reflected light to the incident light on a surface.

Reflected Glare Glare resulting from reflections of high brightness sources in polished or glossy surfaces in the field of view.

Reflection Light striking a surface is either absorbed, transmitted, or reflected. Reflected light is that which bounces off the surface, and it can be classified as specular or diffuse reflection. Specular reflection is characterized by light rays which strike and leave a surface at equal angles. Diffuse reflection leaves a surface in all directions.

Reflector Device in which the phenomenon of reflection is used to alter the distribution of the light source.

Reflector Lamp Lamp in which part of the bulb is coated with a reflecting material, either diffuse or specular, so as to control the light. Example: R, BR, PAR bulbs.

Re-strike Time The time it takes for a bulb to re-strike after a power interruption. In most HID bulbs, if the bulb is at full brightness and the power is removed for even a split second, the bulb will extinguish and will have to cool down before it restrikes, which can take between 1–15 minutes depending on bulb type, wattage and fixture variables.

Retina Membrane at the back of the eye which is sensitive to light stimuli and containing photoreceptors (cones and rods) and nerve cells that transmit the stimulation to the optic nerve.

Rod Photoreceptors in the retina containing light-sensitive pigments. Rods probably play no part in color discrimination.

Rough Service Lamps Incandescent bulbs designed with extra filament supports to withstand bumps, shocks, and vibrations.

SAD Seasonal Affective Disorder is a type of depression, a feeling of lethargy, that may be related to the reduction of sunlight as days grow shorter. Also known as “Winter Time Blues” or “Cabin Fever”. It is sometimes treated with “Full Spectrum” lighting.

Shielding An arrangement of light-controlling material to prevent direct view of the light source.

Spacing The distance between the centers of two successive luminaires in an installation.

Spacing to Mounting Height Ratio (S/M) The ratio of the distance between luminaire centers to the height above the work plane. Gives the maximum spacing of luminaires at which even illumination will be provided.

Speed of Light Approximately 186,000 miles per second.

Spill Light The scattered light of a floodlight falling outside the beam that is usually considered wasted light.

Spotlight A (small) projector giving concentrated light usually not more than 20° beam spread.

Stand-by Lighting That part of emergency lighting that enables normal activities to continue substantially unchanged.

Starter Device for starting a fluorescent bulb that provides for the necessary preheating of the electrodes and/or causes a voltage surge in combination with the series ballast.

Task Lighting Lighting designed for a specific visible operation which requires higher light levels; most often characterized by proximity to that task.

TCLP Toxic Characteristic Leaching Procedure. A US Environmental Protection Agency test for non-hazardous waste, a test designed to measure substances that might dissolve into the ecosystem. Philips ALTO bulbs pass this test.

Transformer Device used to raise or lower voltage to a bulb.

Transmission Passage of light through a material.

Troffer A long, recessed luminaire usually installed with the opening flush with the ceiling.

Notes

Customer Information Hotline

Telephone 1-800-555-0050

Monday–Friday, 8:30am–5:00pm (EST)

- Detailed product specifications
- New products
- Lamp specifications
- Material safety and data sheets

[Philips Customer Service](#)

Telephone 1-800-933-3768 or 1-800-795-2114

Customer service representatives are available to assist you Monday–Friday, 8:30am–5:00pm (EST)

[Philips Lighting on the Web](#) www.philips.com



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