



**Eco-Smart, Inc.**

TOLL FREE: (888)329-2705 FAX: (941)377-9460 [info@eco-smart.com](mailto:info@eco-smart.com)

## Lamp Specification

<b>Section</b>	<b>Page</b>
● Lamp Bases	2 - 6
■ Screw-in Bases	2
■ Other Incandescent Bases	3
■ PL-T Base	4,5
■ Pin Bases	6
● Lamp Envelope Shapes	7
● Lamp & Light Terminology	8 - 11
■ Ballast Terminology	8
■ Electrical & Safety Terminology	9
■ Fabrication Processing Terminology	9
■ Finishing Terminology	9
■ Fixture Parts Terminology	10
■ Label Terminology	10
■ Lamp & Socket Terminology	10
■ Materials Terminology	11

## LAMP BASES

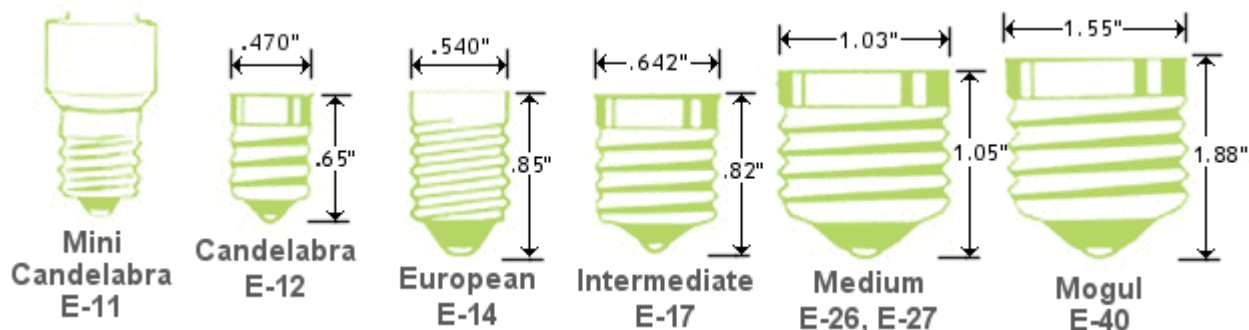
### Standard fittings

Most domestic and industrial light bulbs have a metal fitting (lamp base) compatible with standard sockets. General Electric introduced standard fitting sizes for tungsten incandescent lamps under the Mazda trademark in 1909. This standard was soon adopted across the United States, and the Mazda name was used by many manufacturers under license through 1945.

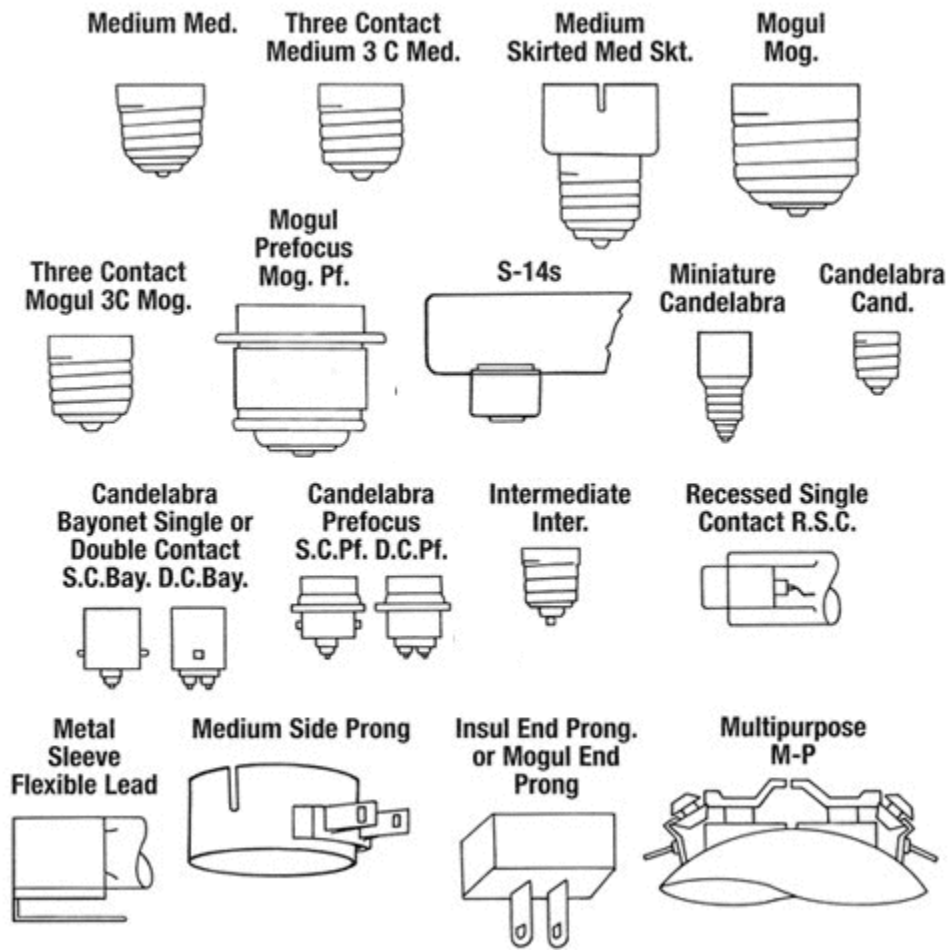
### Screw-in threaded base

In each designation, the E stands for Edison, who created the screw-base lamp, and the number is the diameter of the screw base in millimeters. (This is even true in North America, where designations for the actual bulb glass diameter are in eighths of an inch.)

N. America	Europe	
E12	E10 / E11	<b>Miniature:</b> (Rare) Generally used only for low-voltage applications such as with a battery. Some large flashlights use the E5 bulb.
E17	E14 (Small ES)	<b>Intermediate:</b> Large outdoor Christmas lights use an intermediate base, as do some desk lamps and many microwave ovens. Formerly Emergency exit signs also tended to use the intermediate base (but modern exit signs must use LEDs).
E26 (MES)	E27 (ES)	<b>Medium or standard:</b> The standard light bulb base used in the majority of household bulb applications. A medium screw base should not carry more than 25 amperes current; this may limit the practical rating of low-voltage lamps. There is also a rare "admedium" size (E29), incompatible with standard and used to frustrate thieves of bulbs used in public places
E39	E40 (GoliathES)	<b>Mogul:</b> The largest size E39 is usually used in large street lights, although a few high-wattage household lamps (such as a 100/200/300-watt three-way) use it as do 300, 500, 750, 1000 and 1500 watt light bulbs.

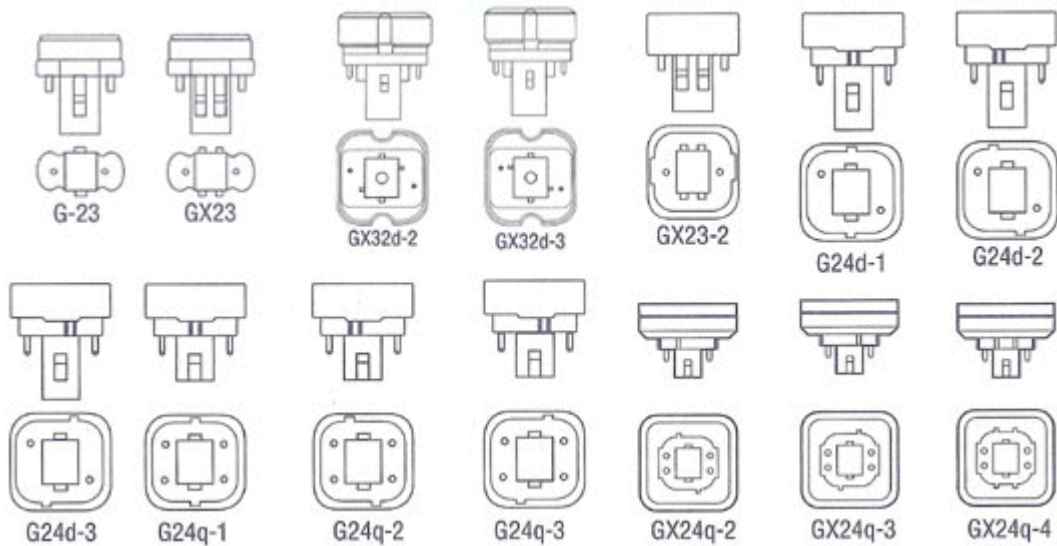


Other Incandescent Base Types

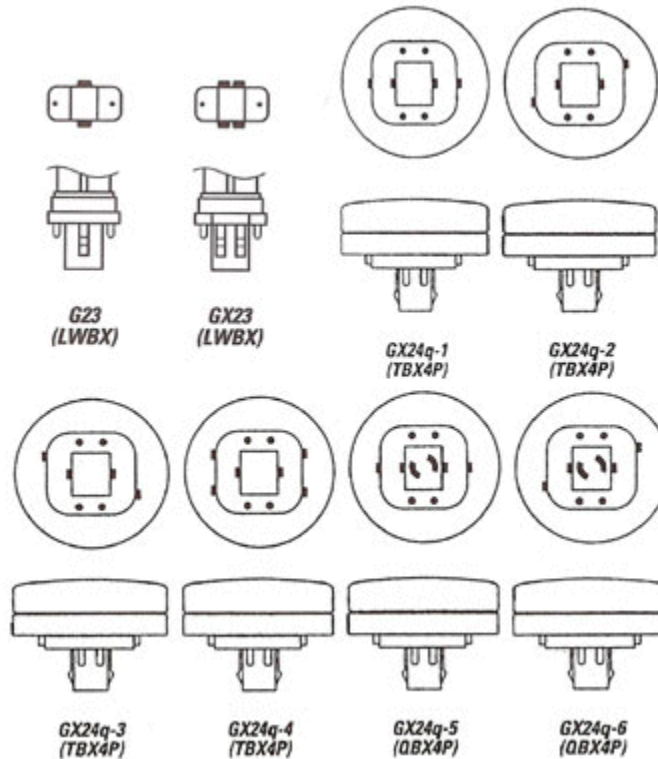


# Eco-Smart, Inc. Lamp Specification - Lamp Bases

## Phillips Compact Fluorescent PL-T Base Diagrams

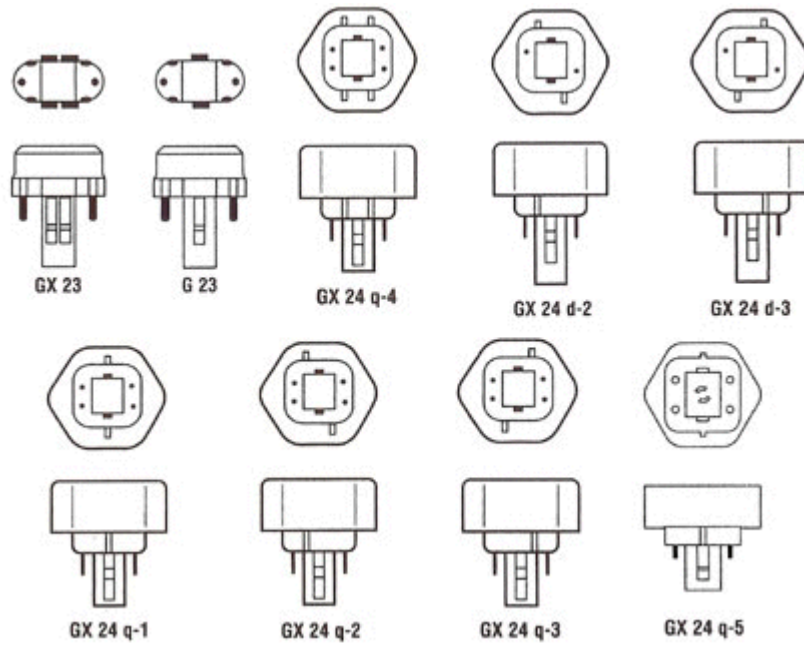


## GE Compact Fluorescent PL-T Base Diagram

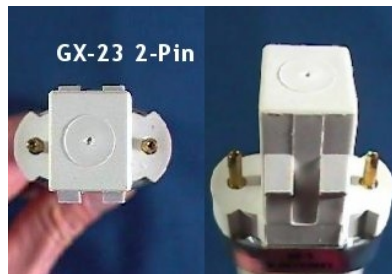


# Eco-Smart, Inc. Lamp Specification - Lamp Bases

## SLI Compact Fluorescent PL-T Base Diagram



## Standard P-Type Base Photos

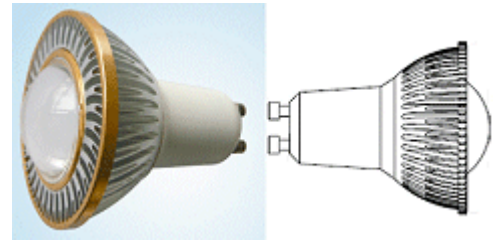




# Eco-Smart, Inc. Lamp Specification - Lamp Bases

## Pin Bases

Some Plug-in Types are Pin Only with a plug-in match depending on dimensions and spacing of the pins alone. In the chart below, the suffix after the G indicates the distance of the pins from center. GU indicates that each pin has two diameters, being larger near the ends, in order to twist-lock into position in the socket.

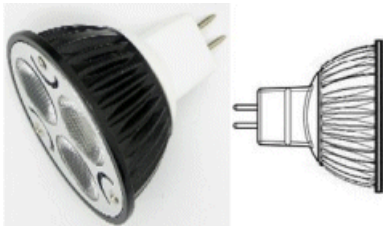


**GU10 Pin Base**

Type	Pin Centering	Pin Dimension	Type	Pin Centering	Pin Dimension
G4	4.0 mm	0.65-0.75 mm	G6.35	6.35 mm	0.95-1.05 mm
GU4	4.0 mm	0.95-1.05 mm	GY6.35	6.35 mm	1.2-1.3 mm
GY4	4.0 mm	0.65-0.75 mm	GZ6.35	6.35 mm	0.95-1.05 mm
GZ4	4.0 mm	0.95-1.05 mm	G9	9.0 mm	
G5.3	5.33 mm	1.47-1.65 mm	GU10	10 mm	
GU5.3	5.33 mm	1.45-1.6 mm	G13	12.7 mm (½ in.)	
GX5.3	5.33 mm	1.45-1.6 mm			

Reference: International Electrotechnical Commission

## MR-\* Pin Base



“MR” stands for “miniature reflector” lamp. MR-8, MR-11, MR-16, MR-20 sizes are bi-pin based and specified for many standard fixtures.

## T5 Tube Lamp



Standard for small fluorescent tube fixtures. Bi-pin base at both ends installs into a twist lock fixture base.

## T8 Tube Lamp



Standard for nearly all fluorescent fixtures. Bi-pins are set 1/4” from center at both ends and install into a twist lock fixture base.

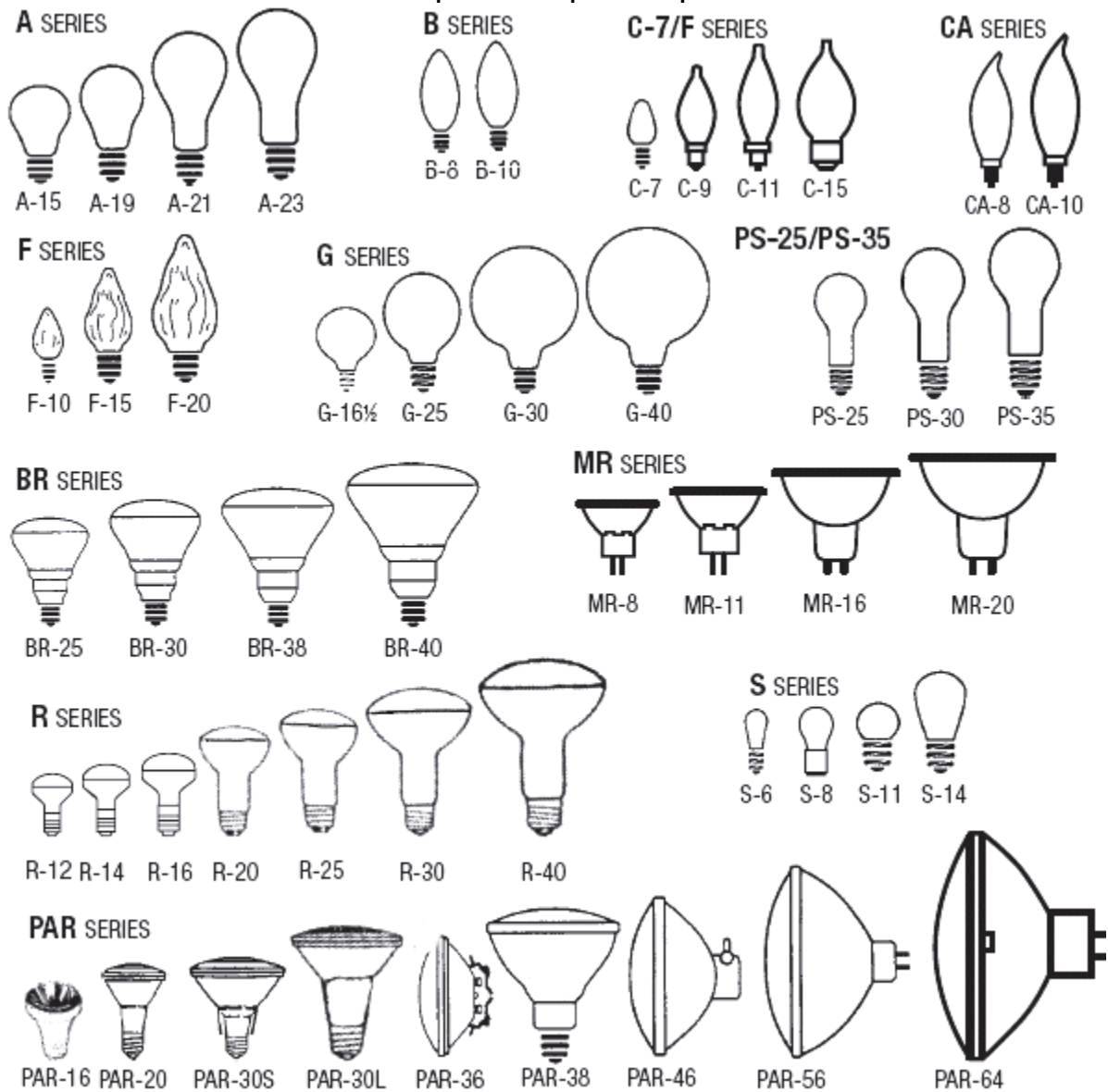


## Halogen R7S

Standard for many flood and projection lights specified for high watt halogen lamps. A direct LED replacement lamp is available.

# Eco-Smart, Inc. Lamp Specification

## Lamp Envelope Shapes



## Bulb Shapes

A - Standard House-hold Bulbs

B - Decorative lamps

C - Candelabra (F for flame)

G - Globe lamps

R - Reflector lamps - Spot Lamps

PAR - Parabolic Aluminized Reflector. This is a type of sealed-beam lamp with built-in reflector and often a fresnel lens pressed into the glass. The number after the "PAR" gives the diameter of the lamp envelope in units of 1/8 of an inch. Thus a PAR38 has a diameter of 4 3/4".

# Eco-Smart, Inc. Lamp Specification

## Lamp & Light Terminology

### ● BALLAST TERMINOLOGY

**120V 60Hz AC** 120-Volt Alternating Current is the standard voltage used in many of the residential and light commercial buildings in the United States. Most lighting fixtures and ballasts are designed to run on at this voltage level. Hertz (Hz), or cycles per second, is a unit of frequency of electric current. 60 Hertz is the common U.S. rating.

**277V 60Hz AC** 277-Volt Alternating Current is a common voltage standard used in many commercial fixture applications in the United States. The higher voltage makes it easier to wire many fixtures together on fewer circuits, making installations easier and simpler. Specially designed ballasts are required for operation at this voltage.

**Ballast** Used in gaseous discharge systems (fluorescent and high-intensity discharge), the ballast starts the lamps and then regulates the flow of current during normal operation.

**CBM Certified** Certified Ballast Manufacturers Association certification identifies ballasts that are produced to conform to American National Standard Institute (ANSI) standards.

**Class P-Rated** A standard created by UL indicating an internal thermal protection device that protects against overheating, excessive voltage supply, internal ballast short circuiting, inadequate lamp maintenance and improper fixture application.

**Electronic Ballast** Generally consisting of a printed circuit board with semi-conductor technology that electronically regulates the voltage to start and run lamps instead of physically changing the voltage like the magnetic ballast. Operating at a higher current frequency range the electronic ballast can send a more precise and efficient flow of voltage through the lamp creating a brighter, more efficient lamp operation.

**Federal Ballast Energy Law** The Federal Ballast Energy Law (Public Law 100-357) was enacted in 1988 as part of the National Appliance Energy Conservation Amendments (NAECA '88). The law set minimum ballast efficacy standards for four major fluorescent lamp types. As of 1991, ballasts submitted for testing by the U.S. Department of Energy and complying with NAECA '88 provisions carry an E symbol on their labels. Ballasts exempt from NAECA included dimming ballasts and ballasts used in areas where ambient temperatures reached 0F or lower.

**Magnetic Ballast** (Electromagnetic ballast) These are the most basic and oldest type of fluorescent ballasts. Consisting of a core of stacked steel plates wrapped with a coil of copper or aluminum wire (a basic electro-magnet), potted in an insulating material such as asphalt to conduct the heat of the ballast outward. The entire assembly is then put into a metal housing to prevent breakdown and shock hazard. Usually a separate starter is incorporated into this housing to provide the additional voltage needed when initially starting a fluorescent lamp. Some HID ballasts require an external ignitor.

**THD Rating** Referring to Total Harmonic Distortion which is the distortion that sometimes occurs when the need for current is not in equilibrium with the supply of this current, for example, when turning on a ballast. THD can present a significant problem and if not pre-calculated and controlled can possibly overload the normal flow of current in the system. Low THD ballasts can be compared to surge protectors because they act to protect themselves and other electronic components by preventing power surges. The lower the THD rating of the ballast, therefore, the better (below 20 percent is preferred).



# Eco-Smart, Inc. Lamp Specification Lamp & Light Terminology

## ● ELECTRICAL & SAFETY TERMINOLOGY

**#12AWG 90C Conductor** No. 12 size American Wire Gauge electrical wire. It is equal to 0.095 in. diameter with an insulation that can withstand up to a 90°C (194°F) temperature.

**AWM/THHN** Appliance Wiring Material (AWM) is common internal fixture wiring. THHN wire is rated at 90°C and can carry up to 600 volts. It is a heavier nylon jacketed wire for use in dry locations and can be used in building wiring connections.

**Damp Location/Wet Location** Damp location fixtures can be used in areas where a certain level of humidity is present but the fixture itself does not come into contact with water, such as an exterior building soffit. Wet location fixtures allow some contact of water with the exterior of the fixture. Vaportight fixtures allow the fixtures to operate in a very high humidity application like a shower stall.

**Power Whips** Modular wiring whips are factory installed cabling systems that allow electricians to easily connect an entire series of lighting fixtures using a modular connector plug.

**UL 1570** Underwriters Laboratories Inc. requirements for fluorescent fixtures.

**UL 935** Underwriters Laboratories Inc. requirements for fluorescent ballasts.

## ● FABRICATION PROCESSING TERMINOLOGY

**Die-Formed** Die-forming to ensure highly accurate mass-produced parts at low cost. Die-forming uses large, high-tonnage presses with precision-formed and hard-stamping dies to pierce and bend the metal material. These large automated presses rapidly and economically produce complicated sheet metal parts with a high quality of fit.

**Hydro-Formed** This forming process allows the precision production of non-round asymmetric difficult-to-form reflector shapes. It allows designers to optimize reflector performance for non-centered lamps or fixtures that produce specific directional photometric properties.

**Die-Cast** A process that usually involves the high-pressure injection of zinc or aluminum into a hardened mold to produce a highly accurate part with high strength and detail.

## ● FINISHING TERMINOLOGY

**Baked White Enamel** A common paint finish that is applied in a "wet" form and applied with a gun or automated sprayer. The paint is usually attracted to the metal part electro-statically to prevent excessive paint over-spray. The paint is finally baked on for maximum adhesion. The final paint thickness is usually 0.7 to 1.1 mm when dry.

**Five-Stage Iron Phosphate Pretreatment** The standard process to best prepare sheet steel for painting. The steel is washed and rinsed with chemicals that clean and etch the metal and then force all moisture from the service to prevent it from combining with and threatening the integrity of the final paint service.

**Powder-Coated Finish** Used when a tougher, more durable paint coating is required with a final paint thickness up to 2.25 to 2.5 mm when dry. A special spray applicator applies an electro-statically charged dry resin powder that bonds to the charged metal surface being painted. Similar to baked enamel finished, it is used on parts that see more wear and tear or need better weather resistance.

## Eco-Smart, Inc. Lamp Specification Lamp & Light Terminology

### • FIXTURE PARTS TERMINOLOGY

**Louver** A series of baffles arranged in a geometric pattern used to shield a light source from an unwanted viewing angle and to redirect the remaining light to a more usable location.

**Luminaire** A complete lighting fixture.

**Protective Dust Guard** A plastic film placed on the decorative faces of reflectors and louvers (unfortunately, many end-users forget to take it off upon installation, impairing reflector performance).

**Wireway Cover** A cover of a fluorescent fixture that encloses access to the splice compartment and the ballast location.

### • LABEL TERMINOLOGY

**CSA** Canadian Standards Association is the testing authority for ballasts and electrical products used in Canada.

**CUL** UL certification of testing to Canadian UL standards.

**IBEW** Union Made International Brotherhood of Electrical Workers. This label represents that the fixture it is attached to is union-made. It is useful on larger construction jobs where the use of union-made products is encouraged. Job sites in certain larger cities strongly encourage the use of fixtures made by specific local unions.

**IC Fixture** Insulated Ceiling Fixtures are allowed to be placed against and surrounded by building insulating material commonly found in areas such as residential attics.

**NOM** The Mexican standards testing agency.

**UL** Underwriters Laboratories, an independent non-profit organization that tests products for public safety. Through use of study, experimentation and testing, their mission is to prevent the loss of life and property from the hazards of fire, casualty and crime.

### • LAMP & SOCKET TERMINOLOGY

**G24q2** The designation for a socket base for a compact fluorescent lamp and LED or Induction Replacement Lamps. Since there are very many compact fluorescent lamp types and an equal number of socket types, a numbering system was developed to identify the different variations. "G" is for sockets that accept two or more lamp pins. "24" is the spacing in millimeters between the lamp pins in the base of the lamp. The "q" indicates that this socket accepts 4 (or quad) pins and the "2" indicates that this variation on this socket only accepts an 18W lamp to prevent users from mis-lamping the socket used in the fixture.

**T8 or T-8** This is the American lamp designation for a tubular lamp. Linear fluorescent lamps commonly use this lamp designation. The "8" refers to the tube diameter as a number of 1/8 inches (8 "eighths") or one inch in diameter. The European description is T26 (26 mm in diameter). Similarly, a T12 is tubular and 12/8 in. or 1.5 in. in diameter. The European description is T38 (38 mm in diameter).

**CFL Compact Fluorescent Lamp** These lamps still go by many names and specifications: PL (Philips), Biax (GE), Dulux (Osram Sylvania) and other trade names. A TC (tubular compact) followed by letter(s) is the European system of CFL lamp classification.

### • MATERIALS TERMINOLOGY

**20Ga CRS 20-Gauge Cold Rolled Steel** The most common type of steel used in the lighting industry. Cold rolling indicates that the steel is not heat-treated or hardened, which allows easy forming and piercing in the making of a lighting fixture. About 0.036 in. in thickness.

**16Ga. Galvanized Steel** A steel commonly used in internal or unseen functional parts of a fixture. This metal is used because it doesn't require finishing or painting. Steel is galvanized by applying a layer of zinc to the raw metal sheets. This process helps preserve the material and prevent it from rusting. About 0.060 in. thickness.

**Clear Specular Alzak Reflector** A proprietary anodizing process that allows maximum light reflection from the reflective surface with low brightness and glare. Alzak is a registered trademark, originally of Alcoa.

**Code Gauge** This is a catch-all term used by many people to refer to the gauge of metal used in a fixture -- acceptable to the certain prevailing national electrical or local code requirements for fixture construction.

**Pre-Anodized Aluminum Anodizing** One of the most common finishing processes done to aluminum in the lighting industry. Anodizing is a controlled oxidation produced by exposing aluminum to an electrically charged chemical bath. The end result is a hardened surface that resists abrasion and corrosion with an added protective transparent layer to preserve the natural aluminum finish. Anodizing can also produce colored or dyed finishes that are locked into the aluminum surface. Pre-anodizing is usually performed on the raw coil of aluminum before it is fabricated into a louver or reflector.

**Semi-Specular** Referring to the image one would see in a reflective surface. A true specular reflector would act similar to a mirror where one could clearly see the reflective image. A semi-specular image would produce a more diffuse, less clear and a less glaring image, which is a desirable type of reflector used in a lighting fixture.