

SECTION 120
OUTDOOR LIGHTING REGULATIONS

A. INCORPORATION BY REFERENCE

A.R.S., Title 49, Chapter 7, Light Pollution, § 49-1101 et seq., is hereby incorporated by reference.

B. MISSION STATEMENT

To afford every citizen of Camp Verde the flexibility to engage in the pursuit of safe, inexpensive lighting practices for the purpose of commerce and private use without being impeded upon or impeding upon other citizens desiring a more pristine night time environment free from light pollution, waste, trespass, or clutter while providing night-time safety, security and productivity.

C. PURPOSE AND INTENT

1. The use of outdoor lighting is often necessary for adequate nighttime safety and utility, but common lighting practices can also interfere with other legitimate public concerns. Principle among these concerns are 1) the degradation of the nighttime visual environment by production of unsightly and dangerous glare, 2) unnecessary waste of energy and resources in the production of too much light or wasted light, 3) interference in the use or enjoyment of property which is not intended to be illuminated at night, and 4) the loss of the often-neglected scenic view of the heavens due to increased urban sky-glow. It is hereby recognized that these different interests, those of safety and utility and those of aesthetic appearance, need not compete. Good modern lighting practices can provide adequate light for safety and utility without excessive glare or light pollution. In nearly all cases, careful attention to questions of when and where and how much nighttime lighting is needed, will lead to better lighting practice from all viewpoints.
2. It is also recognized that the topography and atmospheric conditions in northern Arizona are uniquely suited for government, military, commercial, and private astronomical observation in the area, and that unnecessary or excessive uses of outdoor nighttime lighting have an adverse impact on astronomical observation, even at relatively distant observatories.
3. Accordingly, it is the intent of this Code to encourage lighting practices and systems which will minimize light pollution, glare, light trespass, and conserve energy while maintaining nighttime safety, utility, security and productivity.

D. CONFLICTING REGULATIONS

In the event of conflict between the regulations set forth in this Code and any other regulations applicable to the same area, the more stringent limitation or requirement shall govern.

E. APPROVED MATERIALS AND METHODS OF CONSTRUCTION OR INSTALLATION/OPERATION

1. The provisions of this Code are not intended to prevent the use of any design, material or method of installation or operation not specifically prescribed by this

Code, provided any such alternate has been approved by the Community Development Director.

2. The Community Development Director may approve any such proposed alternate provided that such alternate:
 - a. provides at least equivalence to the applicable specific requirements of this Code; and
 - b. is otherwise satisfactory and complies with the intent of this Code.

F. DEFINITIONS

As used in this Code, unless the context clearly indicates otherwise, certain words and phrases shall mean the following:

1. *Abandonment* means the discontinuation of use for a period of one year.
2. *Class 1 Lighting* means all outdoor lighting used for but not limited to outdoor sales or eating areas, assembly or repair areas, advertising and other signs, recreational facilities and other similar applications where true color rendition is important.
3. *Class 2 Lighting* means all outdoor lighting used for but not limited to illumination for walkways, roadways, equipment yards, parking lots and outdoor security where general illumination of the grounds is the primary concern.
4. *Class 3 Lighting* means any outdoor lighting used for decorative effects, including but not limited to architectural illumination, flag monument lighting, and illumination of trees, bushes, etc.
5. *Community Development Director* means the Director of Community Development for the Town of Camp Verde or his or her designated representative.
6. *Development Project* means any residential, commercial, industrial or mixed use subdivision plan or individual building development or remodeling plan which is submitted to the Town for approval.
7. *Direct Illumination* means illumination resulting from light emitted directly from a lamp, luminary or reflector, not light diffused through translucent signs or reflected from other surfaces such as the ground or building faces.
8. *Fully Shielded Fixture* means that fixtures are shielded in such a manner that light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected below a horizontal plane running through the lowest point on the fixture where light is emitted.
9. *Installed* means attached, or fixed in place, whether or not connected to a power source.
10. *Light Trespass* is spill light falling over property lines that illuminates adjacent grounds or buildings in an objectionable manner.
11. *Lumen* is the unit used to measure the actual amount of visible light, which is produced by a lamp as defined by the manufacturer.
12. *Luminary* means the complete lighting assembly, less the support assembly.

13. *Multi-class Lighting* means any outdoor lighting used for more than one purpose, such as security and decoration, when those purposes fall under the definitions for two or more lighting classes as defined for Class 1, 2 and 3 Lighting above.
14. *Motion Sensing Security Lighting* means a fixture designed, and properly adjusted, to illuminate an area around a residence or other building by means of switching on a lamp when motion is detected inside the area or perimeter, and switching the lamp off when the detected motion ceases.
15. *Neon Lighting* means lighting using luminous gas filled tubes often formed into text, symbols or decorative elements. Neon Lighting includes tubes with typical diameters of 10 to 20 millimeters filled with neon, argon, xenon, or other gasses and producing various colors of light. Not included are replaceable T-8 (1 inch diameter) and T-12 (1.5 inch diameter) or PL ("compact") fluorescent tubes.
16. *Net Acreage* means the remaining ground area of a parcel after deleting all portions for proposed and existing public rights-of-way and undeveloped area.
17. *Opaque* means only that the material must not transmit light from the internal illumination source: the color of such opaque backgrounds is not restricted.
18. *Outdoor Light Fixtures* means all outdoor illuminating devices, reflective surfaces, lamps and other devices, either permanently installed or portable, which are used for illumination or advertisement. Such devices shall include, but are not limited to, search, spot and floodlights for:
 - a. buildings and structures
 - b. recreational areas
 - c. parking lot lighting
 - d. landscape and architectural lighting
 - e. billboards and other signs (advertising or other)
 - f. street lighting
 - g. product display area lighting
 - h. building overhangs and open canopies
 - i. security lighting
19. *Outdoor Recreation Facility* means an area designed for active recreation, whether publicly or privately owned, including but not limited to parks, baseball diamonds, soccer and football fields, golf courses, tennis courts and swimming pools.
20. *Person* includes a corporation, company, partnership, firm, association or society, as well as a natural person.
21. *Security Lighting* is lighting designed to illuminate a property or grounds for the purpose of visual security. This includes fully shielded lighting designed to be left on during night time hours as well as motion sensing lighting fixtures.
22. *Temporary Lighting* means lighting that does not conform to the provisions of this Code and is intended for uses, which by their nature are of limited duration.
23. *Total Outdoor Light Output* means the maximum total amount of light, measured in lumens, from all outdoor light fixtures on a property. For lamp types that vary in their output as they age (such as high pressure sodium and metal halide), the initial output, as defined by the manufacturer, is the value to be considered.
24. *Translucent* means light is transmitted from the internal illumination source.

25. *Unshielded Fixture* means a fixture that allows light to be emitted above the horizontal directly from the lamp or indirectly from the fixture or a reflector.
26. *Watt* is the unit used to measure the electrical power consumption (not the light output) of a lamp.

G. PREFERRED SOURCE

Due to their high-energy efficiency, long life and spectral characteristics, low-pressure sodium (LPS) lamps are the preferred illumination source throughout the town. Their use is encouraged for outdoor illumination whenever possible.

H. LIGHTING REQUIREMENTS

1. Outdoor floodlighting by flood light projection above the horizontal is prohibited except for lamps specifically exempted under sections H.11 and H.18 and properly adjusted motion sensing security lighting fixtures as defined in subsection F.14.
2. All light fixtures which are required to be shielded shall be installed in such a manner that the shielding complies with the definition of fully shielded fixtures.
3. All light fixtures, including security lighting, except street lamps, shall be aimed or shielded so that the direct illumination shall be confined to the property boundaries of the source. Particular care is to be taken to assure that the direct illumination does not fall onto or across any public or private street or road. Motion sensing lighting fixtures shall be properly adjusted, according to the manufacturer's instructions, to turn off when detected motion ceases.
4. No new mercury vapor light fixtures nor replacement equipment other than bulbs shall be sold or installed for use as outdoor lighting within the Town of Camp Verde after the effective date of this Code, and the use of mercury vapor light fixtures for outdoor lighting is prohibited after January 1, 2005. The provisions of this section shall not apply to outdoor light systems erected prior to 1950.
5. Search lights, laser source lights, strobe or flashing lights, motion or illusion lights or any similar high-intensity light shall not be permitted, except in emergencies by police and fire personnel at their direction or as permitted in subsection K-1.
6. Class 1 lighting, including but not limited to, sales, service, commercial, assembly, repair, maintenance, and industrial areas, may only continue in operation until 10:00 p.m., or for as long as the area is in active use. This provision is not applicable to fixtures lawfully installed or implemented prior to the adoption of the Code.
7. Class 2 lighting used for areas intended for all night use (e.g. apartment parking lots and walkways), shall have no time restrictions.
8. Class 3 lighting, except for flagpole lighting, must be extinguished after 10:00 p.m. or when the business closes, whichever is later, except that low-wattage holiday decorations may remain on all night.
9. Multi-class lighting, except for security lights, must conform to the time limitations of the most-strict class.
10. Except as permitted in subsections H.11, H.12 and H.13, total outdoor light output, excluding streetlights used for illumination of public rights-of-way, of any

development project shall not exceed 100,000 lumens per net acre, averaged over the entire property. No more than 5,500 lumens per net acre may be accounted for by lamps in unshielded fixtures as permitted in subsection H.18.

11. Lighting, in all cases, for all outdoor athletic fields, courts, tracks or ranges shall be considered Class 1 (Color Rendition). Lighting allowed in this subsection shall be subject to approval of staff. When the proposed lumens per acre exceeds the limits of subsection H.10, the installation shall be designed to achieve no greater than the minimum illuminance levels for the activity as recommended by the Illuminating Engineering Society of North America (IESNA). The installation shall also limit off-site spill (off the parcel containing the sports facility) to a maximum of 0.5 fc at any location on any non-residential property, and 0.05 fc at any location on any residential property, as measurable from any orientation of the measuring device. Every such lighting system design shall be certified by an Arizona registered engineer as conforming to all applicable restrictions of this Code.

All events shall be scheduled so as to complete all activity by 10:00 p.m. Illumination of the playing field, court, track or range shall be permitted after 10:00 p.m. only to conclude a scheduled event that was unable to conclude before 10:00 p.m. due to unusual circumstances. Fully shielded lighting shall be required for fields designed for amateur, recreational or non-professional sports activity. For professional level sports facilities where fully shielded fixtures are not utilized, acceptable luminaries shall include those which:

- a. Are provided with internal or external glare control louvers, or both, and installed so as to minimize up-light and offsite light trespass as required in subsection F.10 above, and;
- b. Are installed and maintained with aiming angles that permit no greater than two percent (2%) of the light emitted by each fixture to project above the horizontal.

12. Lighting for Outdoor Display Lots shall be considered Class 1 (Color Rendition), and shall conform to the lumens per acre limits of subsection H.10 except as follows:

- a. All such lighting shall utilize fully shielded luminaries that are installed in a fashion that maintains the fully-shielded characteristics. When the proposed lumens per acre exceed the limits of subsection H.10 the installation shall be designed to achieve no greater than the minimum illuminance levels for the activity as recommended by the Illuminating Engineering Society of North America (IESNA). The installation shall also limit off-site spill (off the parcel containing the display lot) to a maximum of 0.5 fc at any location on any non-residential property, and 0.05 fc at any location on any residential property, as measurable from any orientation of the measuring device. Every such lighting system design shall be certified by an Arizona registered engineer as conforming to all applicable restrictions of this Code. Outdoor Display Lot lighting exceeding the lumens per acre cap of Section H.10 shall be turned off at 10:00 p.m. or within thirty minutes after closing of the business or activity whichever is later. Lighting in the Outdoor Display Lot after this time shall be limited to Class 2 lighting, and shall conform to all restrictions of this Code applicable for this class, including the lumens per acre caps in Section H.10.
- b. Lighting allowed in this subsection shall be subject to approval of the Community Development Director.

13. Lighting for Service Station or similar canopies shall be considered Class 1 lighting. All luminaries shall be flush with the lower surface of canopies and utilize flat glass or plastic covers. The total light output used for illuminating service station canopies, defined as the sum of under-canopy initial bare-lamp outputs in lumens, shall not exceed forty (40) lumens per square foot of canopy. All lighting mounted under the canopy, except internally illuminated signs, shall be included in the total. Fifty percent (50%) of the lumen output of all lamps mounted within or under a canopy, except internally illuminated signs, is included in the lumen caps in subsection H.10.
14. Lighting used for all externally illuminated signs shall conform to all restrictions of this Code, shall be fully shielded, and shall be turned off at 10:00 p.m. or when the business closes, whichever is later.
15. All site lighting not directly associated with the special uses as permitted in subsections F.14, H.11, H.12, and H.13 shall conform to all lighting standards described in this Code.
16. When outdoor internally illuminated advertising signs are constructed with a translucent background, the background shall not be white, cream, off-white, yellow, or other light color. Lamps used for internal illumination of such signs shall not be included in the lumens per net acre limit set in subsection H.10. All illuminated signs shall be turned off at 10:00 p.m. or when the business closes, whichever is later.
17. All outdoor neon lighting shall be fully shielded and shall be turned off at 10:00 p.m. or when the business closes, whichever is later.
18. The requirements for lamp source and shielding of light emissions for outdoor light fixtures are as follows:

Shielding/Use Code:

A = allowed, unshielded
F = allowed, fully shielded

<u>LAMP TYPE</u>	<u>SHIELDING</u>
Class 1, 2 and 3 lighting:	
All lamp types above 2050 lumens	F (See Note 1)
All types below 2050 lumens	A (See Note 2)
All neon tube lighting	F
Lamps in Motion Sensing Security Lights (F.14)	A (See H.3)

Note 1. Examples of lamp types of 2050 lumens and below (the acceptability of a particular light is decided by its lumen output, not wattage. Check manufacturer's specifications):

- a. 100 Watt Standard Incandescent and less
- b. 100 Watt Midbreak Tungsten-Halogen (quartz) and less

- c. 25 Watt T-12 Cool White Fluorescent and less
- d. 18 Watt Low Pressure Sodium and less

Note 2. Lights shall be shielded whenever feasible to minimize light spilled into the night sky or adjacent properties. Unshielded lights (all types) are limited to a maximum of 5,500 lumens per net acre (see subsection H.10). Residential parcels and Development Projects containing one net acre or less are allowed 5,500 lumens of unshielded light (all Classes).

I. PARKING LOT LIGHTING STANDARDS

Lighting Standards (poles) shall be sized in such a manner that the top of any luminary does not exceed twenty-four (24) feet above adjacent grade, unless otherwise approved by the Community Development Director for new projects.

J. AIRPORT LIGHTING

Airport lighting, which is required for the safe and efficient movement of aircraft during flight, take-off, landing and taxiing is exempt from the provisions of this Code. Lighting used for illumination of aircraft loading, unloading, and servicing areas is exempt from the lumens per net acre limits of subsection H.10, although it must conform to all other requirements of this Code. All other outdoor lighting at airport facilities shall comply with the provisions of this Code.

K. TEMPORARY LIGHTING PERMITS

1. The Community Development Director may grant a permit for temporary lighting if he or she finds all of the following:
 - a. The purpose for which the lighting is proposed is not intended to extend beyond thirty (30) days;
 - b. The proposed lighting is designed in such a manner as to minimize light pollution as much as is feasible;
 - c. The proposed lighting will comply with the general intent of this Code; and
 - d. The permit will be in the public interest.
2. The Community Development Director shall rule on the application within five (5) business days from the date of submission of the request and notify the applicant in writing of his or her decision. The Community Development Director may grant one (1) renewal of the permit for an additional thirty (30) days if he or she finds that, because of an unanticipated change in circumstances, a renewal would be in the public interest. The Community Development Director is not authorized to grant more than one temporary permit and one renewal for the same property within one calendar year.

L. NONCONFORMING USES.

1. Mercury vapor light fixtures in use for outdoor lighting on the effective date of this Code shall be prohibited after January 1, 2005. The provision of this section shall not apply to outdoor light systems erected prior to 1950.

2. All nonconforming uses to be extinguished between 12:00 a.m. and sunrise by an automatic shutoff device.
3. No outdoor lighting fixture or use which was lawfully installed or implemented prior to the enactment of this Code shall be required to be removed or modified except as expressly provided herein; however, no modification or replacement shall be made to a non-conforming fixture unless the fixture thereafter conforms to the provisions of this Code, except that identical bulb replacement is allowed.
4. In the event that an outdoor lighting fixture is abandoned or is damaged to the point of requiring repairs for safe operation, the repaired or replacement fixture shall comply with the provisions of this Code.

M. VARIANCES

Any person desiring to install an outdoor lighting fixture in violation of this Code may apply to the Board of Adjustment for a variance from the regulation in question. Such variances shall be allowed only as provided by Section 105 of the Town of Camp Verde Zoning Ordinance.

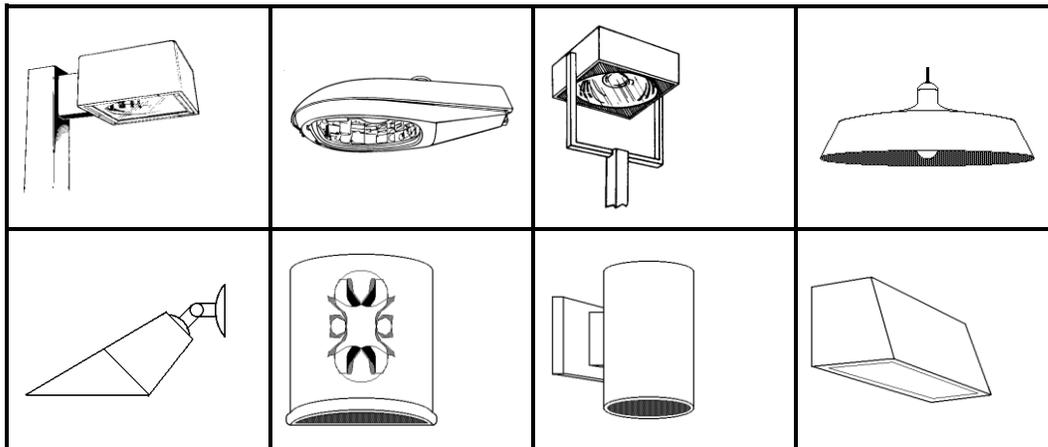
N. PERMITS AND DEVELOPMENT PLAN REVIEWS

1. Whenever a person is required to obtain a building or electrical permit for outdoor lighting or signage, a Conditional Use Permit, subdivision approval or any development plan approval by the town, including all town projects, or whenever a person requests annexation or rezoning, the applicant shall, as a part of said application, submit sufficient information to enable the Community Development Director to determine whether the proposed lighting will comply with this Code. All applications may be subject to review and action by the Community Development Director.
2. All applications, except those for single family residences, shall include the following:
 - a. A site plan indicating the proposed location of all outdoor lighting fixtures;
 - b. A description of each illuminating device, fixture, lamp, support and shield. This description may include, but is not limited to, manufacturer's catalog cuts and drawings (including sections where required), lamp types and lumen outputs; and
 - c. Such other information as the Community Development Director may determine is necessary to ensure compliance with this Code.
3. If the Community Development Director determines that the proposed lighting does not comply with this Code, the permit shall not be issued or the plan approved.

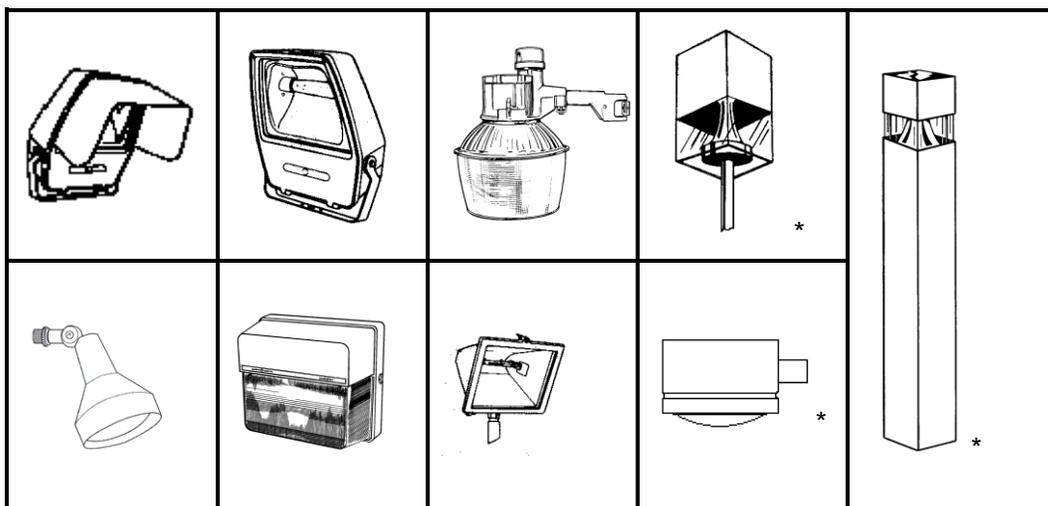
O. Addendums/Additional Information:

1. Shielding:
A practical working way to determine if a fixture or tube is fully shielded: if the lamp or tube, any reflective surface, or lens cover (clear or prismatic) is visible when viewed from above or directly from the side, or from any angle around the fixture or tube, the fixture or tube *is not* fully shielded.

Examples of fixtures that are Fully Shielded (Note: to be fully shielded these fixtures must be closed on top and mounted such that the bottom opening is horizontal):



Examples of fixtures that are NOT Fully Shielded:



* Note: even though the lamp in these fixtures is shielded from direct view when viewed from the side or above, reflective surfaces and/or lens covers are directly visible from the side.

Note for luminous (neon) tubes: when such lighting is installed under or behind a roof overhang, if the roof-line or eave is not horizontal the tubing may be visible from above when viewed from the side and therefore be unshielded.

2. Typical Lumen Outputs and Energy Costs for Outdoor Lighting

Per year costs based on 4000 hours operation (all night every night) and \$0.10/kwh energy cost. Power costs are for lamps only; they do not include ballast losses used with HID lamps (LPS, HPS, MH and fluorescent). Ballast losses have typically been somewhat larger for LPS lamps than for other types, though not enough to offset the increased luminous efficiencies of these lamps. This effect has been decreasing with the newer ballasts.

Lamp Type	Lumen Output (Initial)	Power Cost (Per Year)	Cost per 100 Lumens (Per Year)
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Low Pressure Sodium (LPS):

18 Watt	1800	\$7.20	\$0.40
35 Watt	4800	\$14.00	\$0.29
55 Watt	8000	\$22.00	\$0.28
90 Watt	13500	\$36.00	\$0.27
135 Watt	22500	\$54.00	\$0.24
180 Watt	33000	\$72.00	\$0.22

**High Pressure Sodium
(HPS):**

35 Watt Clear	2250	\$14.00	\$0.62
50 Watt Clear	4000	\$20.00	\$0.50
70 Watt Clear	6300	\$28.00	\$0.44
100 Watt Clear	9500	\$40.00	\$0.42
150 Watt Clear	16000	\$60.00	\$0.38
200 Watt Clear	22000	\$80.00	\$0.36
250 Watt Clear	29000	\$100.00	\$0.34
400 Watt Clear	50000	\$160.00	\$0.32
1000 Watt Clear	140000	\$400.00	\$0.29

**Metal Halide (MH) (Example
Sylvania 'Metalarc' series):**

100 Watt	8000	\$40.00	\$0.50
175 Watt	14000	\$70.00	\$0.50
250 Watt	16000	\$100.00	\$0.63
400 Watt	36000	\$160.00	\$0.44
1000 Watt	84000	\$400.00	\$0.48

**Fluorescent (Standard Cool-
White, 1.5-inch tubes):**

21 Watt F24T12/CW	1190	\$8.40	\$0.71
30 Watt F36T12/CW	2050	\$12.00	\$0.59
36 Watt F42T12/CW	2450	\$14.40	\$0.59
39 Watt F48T12/CW	3000	\$15.60	\$0.52
50 Watt F60T12/CW	3700	\$20.00	\$0.54
52 Watt F64T12/CW	3900	\$20.80	\$0.53
55 Watt F72T12/CW	4600	\$22.00	\$0.48
70 Watt F84T12/CW	5400	\$28.00	\$0.52
75 Watt F96T12/CW	6300	\$30.00	\$0.48

Incandescent Lights:

15 Watt Standard	120	\$6.00	\$5.00
25 Watt Standard	210	\$10.00	\$4.76
40 Watt Standard	490	\$16.00	\$3.27
60 Watt Standard	855	\$24.00	\$2.81
75 Watt Standard	1180	\$30.00	\$2.54
100 Watt Standard	1750	\$40.00	\$2.29
150 Watt Standard	2800	\$60.00	\$2.14
200 Watt Standard	3850	\$80.00	\$2.08

Tungsten Halogen (Quartz):

75 Watt	1400	\$30.00	\$2.14
100Watt	1800	\$40.00	\$2.22
150 Watt	2800	\$60.00	\$2.14
250 Watt	5000	\$100.00	\$2.00
500 Watt	10100	\$200.00	\$1.98