

COMMISSION ACTION FORM

**SUBJECT: AMENDMENT TO LIGHTING STANDARDS ASSOCIATED WITH
ALTERNATIVE LANDSCAPE PROVISIONS FOR AUTO AND MARINE
CRAFT TRADE USES**

BACKGROUND:

On July 20, 2012, the City Council received a request from a representative of Deery Brothers to reevaluate lighting provisions in the recently adopted alternative landscape standards for auto dealers. The request expressed concern that the standards have no provisions for the lighting of a “merchandise lot”, and expressed hope that the Council would consider constructive changes to the lighting level allowed for their dealership. In response, the City Council directed staff to provide a brief report on the lighting issue.

Prior to reporting back to the Council, staff met with Deery Brother’s lighting consultant, Bob Brown of KJWW Engineering Consultants in Des Moines, who provided the following information on the output of lighting associated with a typical commercial development:

City Hall Parking Lot - 2 foot candles average

High Volume Retail – 3 to 5 foot candles average

Auto Dealers:

- * *Standard lighting* - 3 foot candles average. These would provide standard lighting levels around customer and employee parking and storage areas.
- * *Sales Display Lights* - 15 foot candles average. These are for the balance of the display lot not otherwise lighted with dazzle or highlight levels.
- * *Highlight Display Lights* - 150 foot candles at a point. – These are higher lighting levels located along the perimeter to give added focus to cars viewed from the street.
- * *Dazzle Display Lights* - 300 foot candles at a point. These are high intense lights in high accent areas, such as near dealership signs or over cars on elevated or rotating platforms.

Mr. Brown emphasized that the only standard under the adopted alternative standards that the Deerys could comply with without affecting desired light levels is the

requirement to shield the view of fixture lenses from public rights-of-way. This would entail attaching what are called glare shields on the bottom side of the fixtures. These shields extend down approximately 6 to 8 inches below the fixture housing, and are located on the public right-of-way side of each fixture visible from the right-of-way. The view angles shown on cross sections submitted by Mr. Brown provided compelling evidence that this requirement could be met. **Staff believes that compliance with this standard will significantly mitigate one of the greater glare factors of outdoor lighting by shielding the visual “hot spots” of light around fixture lenses.**

Options Considered by City Council:

In response to the Deery Brothers request, staff provided the following options to Council:

- Option 1. Retain Status Quo – leave the standards as they are.
- Option 2. Amend the standards to:
 - a. Allow typical sales display light levels (15-foot candles average) in all auto display areas (no dazzle or highlight levels)
 - b. Retain lower lighting levels of code in all non-display parking areas
 - c. Require glare shield requirements for all lights
 - d. Require security lighting levels in all areas after 10:00 p.m. (2 foot candles average)
- Option 3. Amend the standards to:
 - a. Allow full levels of auto dealers preferred lighting (e.g., standard, sales, highlight, and dazzle) in all auto display areas
 - b. Retain lower lighting levels in all non-display parking areas
 - c. Require glare shield requirements for all lights
- Option 4. Any combination of the above.

In deliberating on these options, the Council considered the impacts that high intensity lighting associated with auto dealer parking lots may have on the visual effectiveness of the decorative light columns planned for installation along Highway 30 just east of the Deery Brothers site. Staff suggested that without some means of mitigating or softening the light typically associated with auto dealer parking lots, the visual effectiveness of the light columns could be significantly diminished. With that in mind, the Council directed staff to prepare an ordinance incorporating the elements of Option 2. While this option would not allow for the most intense light auto dealers would choose if left unregulated, it would allow light commensurate with what dealers typically provide in their display sale areas while providing reasonable mitigation of lighting impacts on the community.

With that background, staff has prepared the attached draft ordinance for the Commission's consideration. (See Attachment 1) The ordinance encompasses the changes listed in Option 2 above, except that it further clarifies how the average lighting levels are to be achieved. Specifically, it allows up to 90 foot candles *at a point* on a 10 X 10 foot grid to achieve 15-foot candles average in the sales areas, and it allows up to 6 foot candles *at a point* on a 10 X 10 foot grid to achieve 2-foot candles average in non sales areas and in all areas after 10:00 pm. This clarification is needed to ensure that the display sales area will not include the highlight and dazzle lighting levels that the Council wished to avoid. **Allowing an average level without placing a maximum level at a point could facilitate extremely high light levels in some areas if they were off-set by extremely low light levels in other areas.**

There are other ranges that can be specified that will still achieve the 15 foot candle average target, and in fact Deery Brothers representative Fred Rose had indicated that they will need a range that allows up to 90 foot candles on the upper end to achieve their 15-foot candle average across the sales area. This would result in approximately 2.5 foot candles on the low end, and up to 90 foot candles on the high end. The Commission and Council will need to determine if this is an acceptable level on the upper end. To help determine this, Mr. Brown has provided lighting information and pictures from actual sites to help illustrate what this might look like (See Attachment 2).

On October 10, 2012, staff met with a workgroup to address the proposed alternative lighting text. The workgroup consisted of Bob Brown, KJWW Engineering Consultants, Scott Renaud, Fox Engineering, and representatives from the Ames Area Amateur Astronomers, including Al Johnson, Ed Engle, Joe Kollasch and Jim Bonser. At that meeting staff had indicated the maximum high point light level at 45 foot-candles, but a 90 foot-candle high point was discussed based on the request from Mr. Rose. Mr. Brown showed examples of average foot candle levels for other sites in Ames, including Ames City Hall, First National Bank, Kum N Go, Target, BP Swift Shop, and George White Chevrolet. **After reviewing the examples given by Mr. Brown and the 90 high point value proposed by Mr. Rose, the group generally agreed that the proposed language helps to address the concern for light hot spots, glare and the concern over the typical light levels associated with the auto dealers. Initially, there was still some hesitation about exceeding a maximum 45 foot candle lighting level, however, there was some degree of comfort in a 90 foot-candle maximum level seeing the comparison light source values already existing at the George White Chevrolet dealership and knowing a 15 foot candle average would be maintained in sales areas.**

This item was originally scheduled for the November 14th Planning and Zoning Commission meeting. However, staff determined that gathering additional examples of existing lighting levels in the community would be of value in the Commission's deliberations.

To that end, Mr. Brown completed additional site research (included in Attachment 2) and found some comparable 90 point source and higher values. The values indicated show point source values which range from 45 to 92 foot candles as measured from the ground. It should be noted however, that the same fixture puts out a higher value at a height of 60" from ground. The ground measured values are the City's standard that must be documented on a Photometric Plan submitted to staff for confirmation of compliance.

Since it is difficult for photographs to portray relative lighting levels, staff suggests that Commission members visit the Ames Ford dealership prior to the Commission meeting in order to view first-hand the 92 foot candle illumination level noted on Attachment 2. Commissioners may also desire to visit the other locations where light output has been measured by Mr. Brown.

Finally, at staff's request Mr. Brown also submitted additional information regarding lumen values for light fixtures to indicate the actual characteristics of a light source (also included in Attachment 2). Bulbs are given a lumen level based on the light output. However, **the lumen level is an average lumen level over the life of the bulb.** This means that, when new, a fixture would typically put out a higher light level than the average lumen value as noted on the fixture. The light level would then reduce over the life span of the fixture. As shown in the attached information, the average fixture emits only 65% of its initial lumens by the time it meets the mean lumen output or at 40% of its lamp life (typically 8000 hours). The average lumen value, along with additional information such as mounting height, fixture efficiency and distribution, etc., would be used to determine a foot-candle value and be submitted on a Photometric Plan for staff review for compliance with the proposed amendment.

Reminder that this is an alternate; auto/marine dealers may still choose to install lighting to meet the existing outdoor lighting code in Section 29.411 if they choose not to utilize this alternative landscaping option.

ALTERNATIVES:

1. The Planning and Zoning Commission can recommend that the City Council approve the attached draft ordinance amending lighting standards associated with the alternative landscape standards for auto and marine craft trade uses. (**This alternative would recommend approval of a maximum 90 foot candles on the upper end to achieve a 15 foot candle average across the sales area.**)
2. The Planning and Zoning Commission can recommend that the City Council approve the attached draft ordinance amending lighting standards associated with the alternative landscape standards for auto and marine craft trade uses with modifications (which might include a lower value on the high end of the allowable lighting range).
3. The Planning and Zoning Commission can recommend that the City Council not adopt the proposed text amendments.
4. The Planning and Zoning Commission can refer this issue back to staff for further information.

RECOMMENDED ACTION:

Staff believes that the proposed amendments reasonably reflect the lighting level targets specified in the Council's referral of these amendments and that they provide reasonable lighting levels for auto and marine craft trade uses. This option was also found to be acceptable to representatives of the Ames Area Amateur Astronomers, who played a pivotal role in development of the City's current "dark sky" ordinance.

Staff therefore recommends that the Commission act in accordance with Alternative 1, which is to recommend that the City Council approve the attached draft ordinance amending lighting standards associated with the alternative landscape standards for auto and marine craft trade uses. (**This alternative would recommend approval of a maximum 90 foot candles on the high end of the allowable lighting range.**)

Attachment 1

(PDF of Draft Ordinance to revised Section 29.403(4)(b)(i)(i))

Attachment 2

(PDF file of Examples of Average Foot Candle Measurements in Ames)

ORDINANCE NO. ____

AN ORDINANCE TO AMEND THE MUNICIPAL CODE OF THE CITY OF AMES, IOWA, BY REPEALING SECTION 29.403(4)(b)(i)(i), AND ADOPTING A NEW SECTION 29.403(4)(b)(i)(i) TO AMEND LIGHTING STANDARDS ASSOCIATED WITH ALTERNATIVE LANDSCAPE PROVISIONS FOR AUTO AND MARINE CRAFT TRADE USES; REPEALING ANY AND ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT TO THE EXTENT OF SUCH CONFLICT; PROVIDING A PENALTY; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, the City has adopted landscaping standards for the following purposes:

- i. Reduce heat-generating pavement.
- ii. Provide greater space for trees to shade and cool pavement.
- iii. Provide more space for trees to shade and cool buildings, thereby reducing energy consumption for air conditioning.
- iv. Reduce the number of lights needed to illuminate parking lots and thereby reduce energy consumption and facilitate Dark Sky objectives
- v. Reduce stormwater runoff from impervious surfaces; and

WHEREAS, the City's general landscaping standards for parking lots do not differentiate between parking lots serving different types of uses; and

WHEREAS, parking lots for auto and marine craft trade are not only for purposes of providing parking for individuals that visit or frequent the site, they also serve to display products for sale; and

WHEREAS, alternative landscaping standards for auto and marine craft trade parking lots have recently been adopted that address the marketing needs of the auto sales industry while also ensuring that the stated purposes of landscape standards are achieved; and

WHEREAS, information has been provided demonstrating that the maximum light levels associated with, and required under, the recently adopted alternative landscape standards are not adequate for outdoor display areas;

NOW THEREFORE, BE IT ENACTED, by the City Council for the City of Ames, Iowa, that:

Section One. The Municipal Code of the City of Ames, Iowa shall be and the same is hereby amended by adopting a new Section 29.403(4)(b)(i)(i), to read as follows:

- i. Landscaped area between parking lot pavement and property lines.
 - a. Minimum Landscape Width – 20 feet along all property lines abutting public right-of-way lines, 10-feet along all other property lines along a zoning boundary, and 5 feet along all other property lines of properties within the same zone, landscaped as follows:
 - i. Five feet of the landscaped setback shall be landscaped according to the L2 , Low Screen landscaping standards of this Section, with the balance landscaped according to subsection (d) below; or
 - ii. Landscaped according to L1 standards, except that required numbers of trees and shrubs may be strategically clustered to allow visual openings into the site. Trees and shrubs must be clustered in regular intervals within required landscaped areas, spaced no greater than 200 feet apart. Each cluster shall include no less than three trees spaced no greater than 15 feet apart (center to center) with the trunk of at least one tree in the cluster located within 8 feet of the parking lot edge (to ensure some shading of abutting pavement).

Because landscaping under this option is less effective at softening impacts of lighting common to parking areas, all outdoor lighting shall conform to the following regulations:

1. Lighting in sales display parking lots is limited to 15 foot candles average, with a maximum 90 foot candles at a point on a 10 X 10 foot grid; except that after 10:00 p.m. lighting shall be reduced to 2 foot candles average with a maximum 6 foot candles at a point on a 10 X 10 foot grid.*
2. Lighting in non-display parking lots (e.g., customer parking, employee parking, storage areas) is limited to 2 foot candles average with a maximum 6 foot candles at a point on a 10 X 10 foot grid.*
3. All lighting fixtures shall be shielded in such a manner that the lenses of the fixtures are not visible from public rights-of-way

* Photometric layouts to utilize mean lumen output of light source design.

- b. Setback areas beyond the minimum setbacks shall be fully landscaped applying the landscape element ratios in the LI General Landscaping standards of this Section.

Section Two. Violation of the provisions of this ordinance shall constitute a municipal infraction punishable as set out by law.

Section Three. All ordinances, or parts of ordinances, in conflict herewith are hereby repealed to the extent of such conflict, if any.

Section Four. This ordinance shall be in full force and effect from and after its passage and publication as required by law.

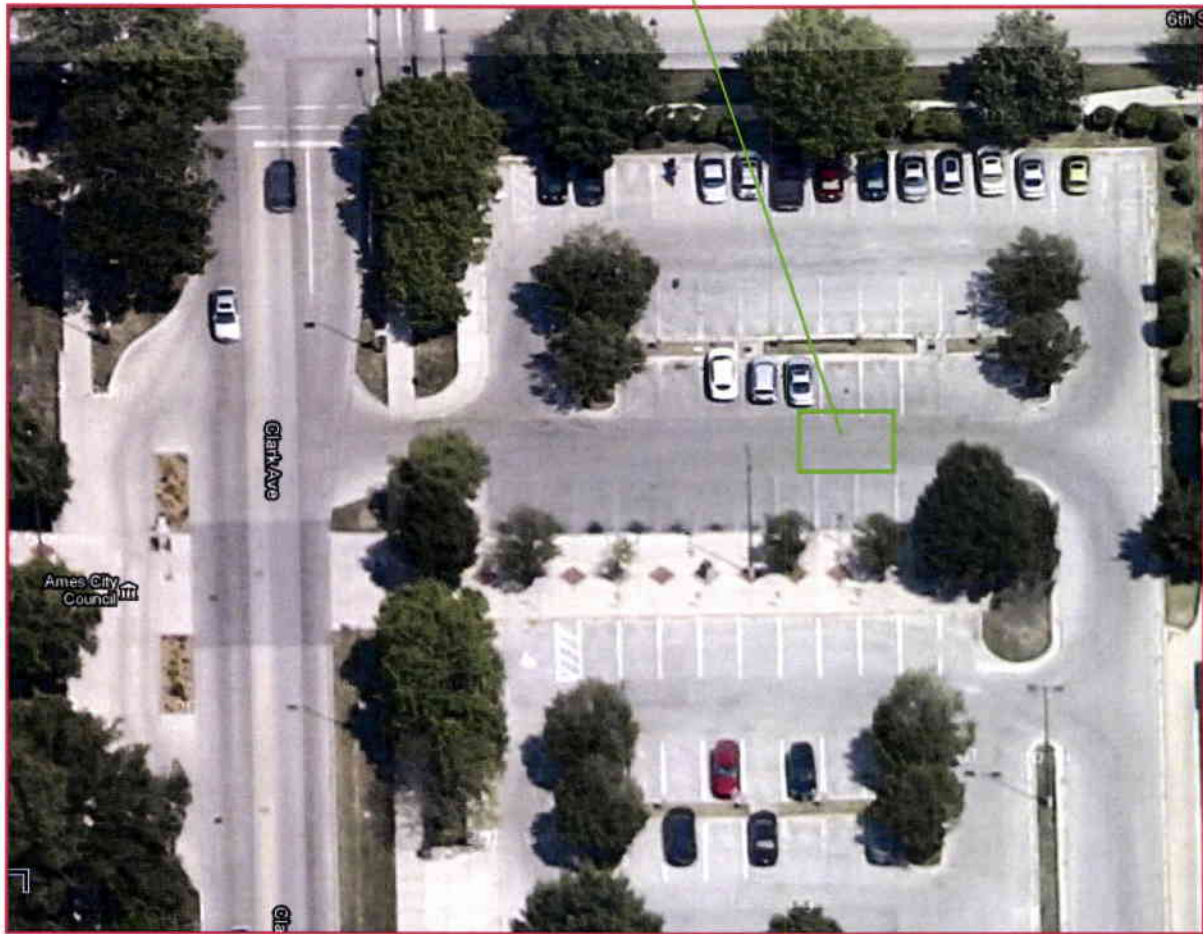
Passed this _____ day of _____, _____.

ATTEST:

Diane R. Voss, City Clerk

Ann H. Campbell, Mayor

Ames City Hall East Parking lot – (4.4 Foot-Candle Average)



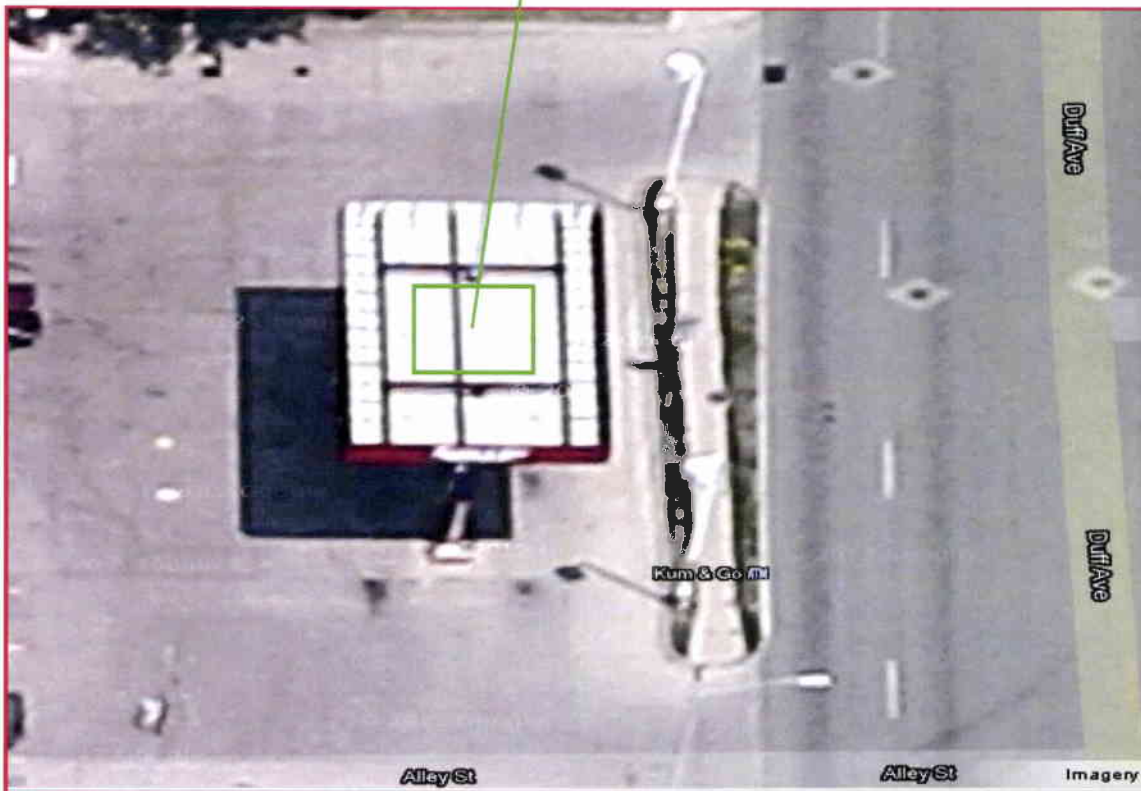
First National Bank Canopy – (23 Foot-Candle Average)



First National Bank Drive through – (5 Foot-Candle Average)



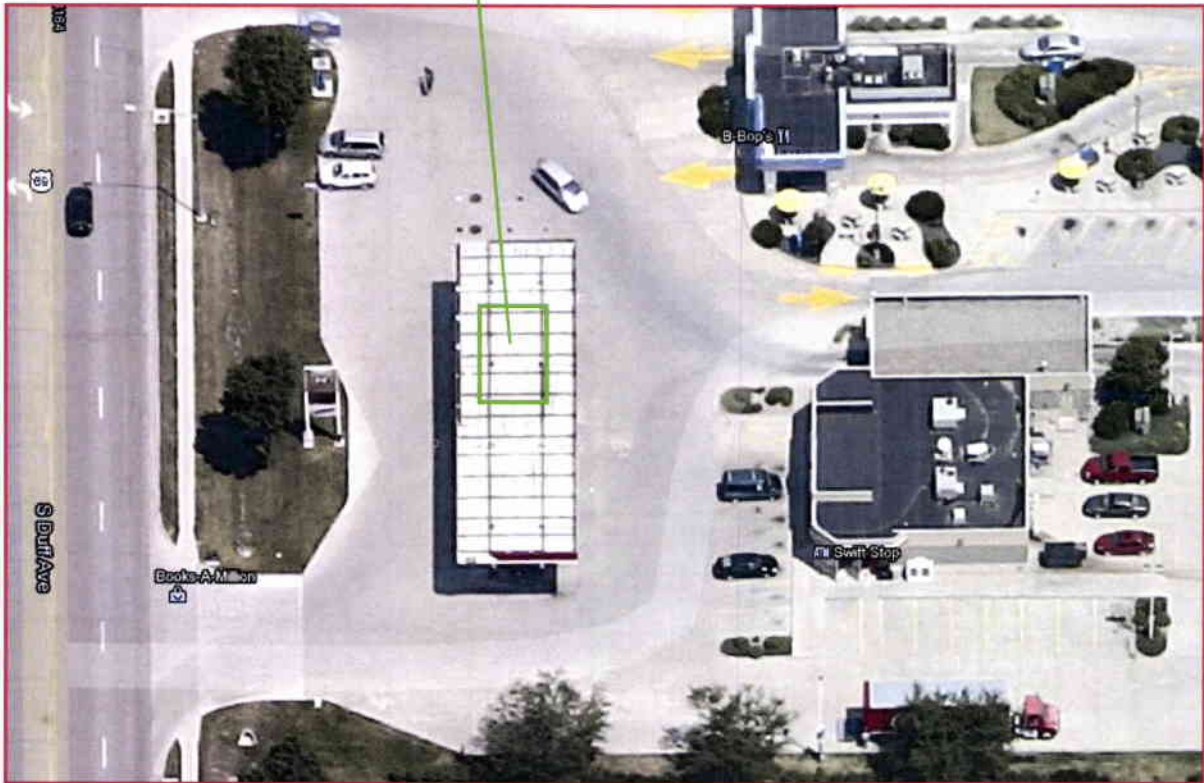
Kum n Go Canopy– (25 Foot-Candle Average)



Target Parking Lot - (5 Foot-Candle Average)

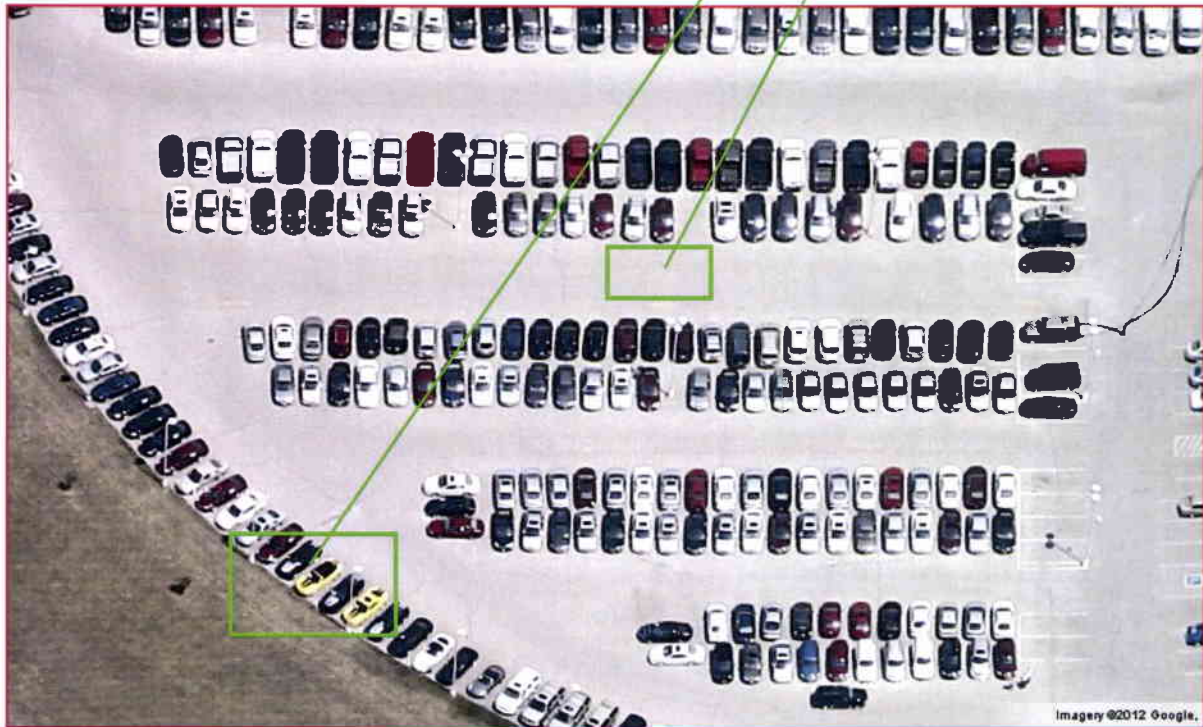


BP Swift Shop - (50 Foot-Candle Average)



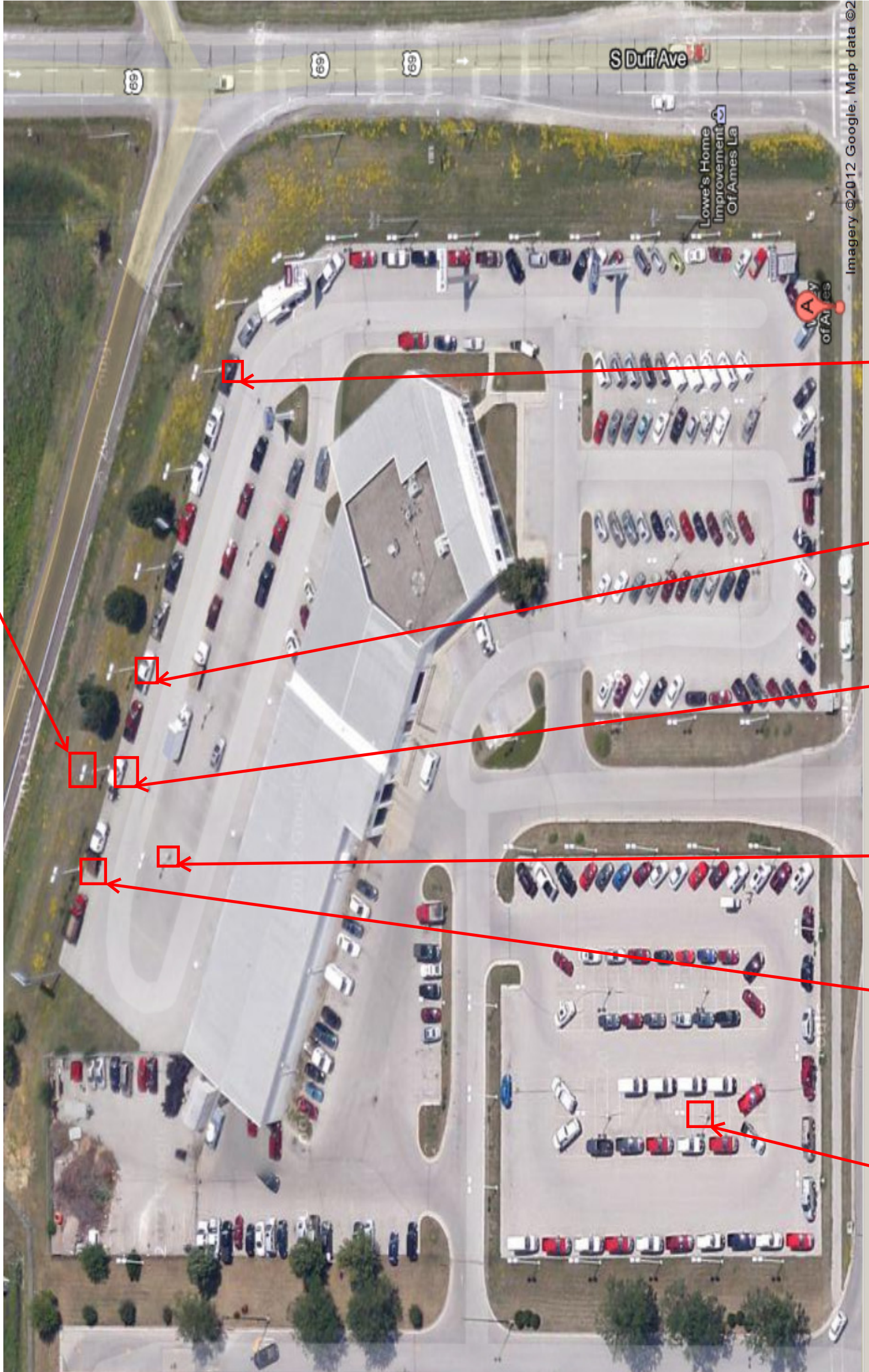
George White Chevrolet Sales - (15 Foot-Candle Average)

George White Chevrolet Front Row- (70 Foot-Candle Average)



1, WILLEY OF AMES

NO LENS



Imagery ©2012 Google, Map data ©2

45/70

60/105

45/70

92/130

53/75

92/155

XY = FIRST NUMBER IS FOOT-CANDLES AT GROUND
SECOND NUMBER IS FOOT-CANDLES AT 60"

MEAN LUMENS - The average lumen output of a lamp over its rated life. Mean lumen values for fluorescent and HID lamps are typically measured at 40% of their rated lives. The average 400w Metal Halide fixture emits only 65% of its initial lumens by the time it hits Mean lamp life (40% of total lamp life or 8000 hours) and as low as 40% of its initial lumens by the end of lamp life.

TYPICAL METAL HALIDE LAMPS
Typical Lumen Maintenance Curve

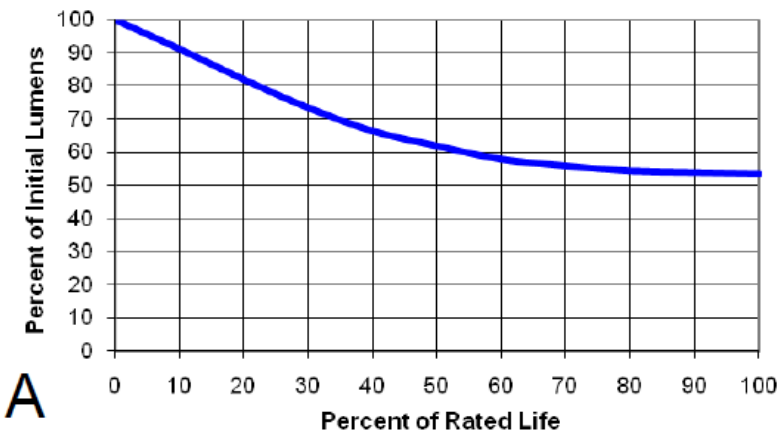
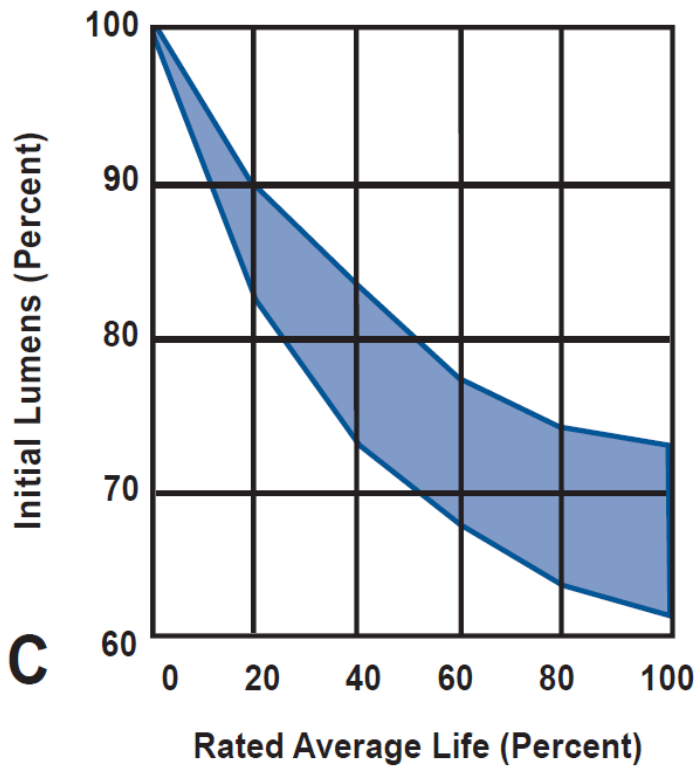


Figure5. HID lamp lumens maintenance curves: (A) I

**Approximate Lumen Maintenance
of Metal Halide Lamps**

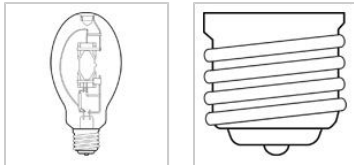
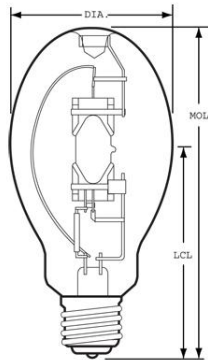




GE
Lighting

27501 - MVR320/VBU/HO/PA

GE Multi-Vapor® PulseArc® Quartz Metal Halide ED28



CAUTIONS & WARNINGS

R- WARNING: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if outer envelope of the lamp is broken or punctured, and the arc tube continues to operate. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain types of lamps that will automatically extinguish when the outer envelope is broken or punctured are commercially available. Visit the FDA website for more information: <http://www.fda.gov/cdrh/radhealth/products/urburns.html>

Caution

- Lamp may shatter and cause injury if broken
 - Dispose of lamp in a closed container.
 - Do not use excessive force when installing lamp.
 - Do not use lamp if outer glass is scratched or broken.

Warning

- Unexpected lamp rupture may cause injury, fire, or property damage
 - Do not exceed rated voltage.
 - Do not turn on lamp until fully installed.
 - Do not use beyond rated life.
 - Do not use lamp if outer glass is scratched or broken.
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - If used on a dimming system, see instructions.
 - Operate lamp only in specified position.
 - Turn lamp off at least once for 15 minutes per week.
 - Use in enclosed fixture rated for this product.
 - Use only properly rated ballast.
- A damaged lamp emits UV radiation which may cause eye/skin injury
 - Turn power off if glass bulb is broken. Remove and dispose of lamp.
- Risk of Burn
 - Allow lamp to cool before handling.
 - Do not turn on lamp until fully installed.
- Risk of Electric Shock
 - Do not use where directly exposed to water or outdoors without an enclosed fixture.
 - Turn power off before inspection, installation or removal.
- Risk of Fire
 - Keep combustible materials away from lamp.
 - Use in fixture rated for this product.

GRAPHS & CHARTS

Graphs_Spectral Power Distribution

GENERAL CHARACTERISTICS

Lamp Type	High Intensity Discharge - Quartz Metal Halide
Bulb	ED28
Base	Mogul Screw (E39)
Bulb Finish	Clear
Rated Life	20000.0 hrs
Bulb Material	Hard glass
Lamp Enclosure Type (LET)	Enclosed fixtures only
Base Temperature (MAX)	210.0 °C
Bulb Temperature (MAX)	400.0 °C
LEED-EB MR Credit	83 picograms Hg per mean lumen hour

PHOTOMETRIC CHARACTERISTICS

Initial Lumens	31000.0
Mean Lumens	18000.0
Nominal Initial Lumens per Watt	90
Color Temperature	4000.0 K
Color Rendering Index (CRI)	65.0

ELECTRICAL CHARACTERISTICS

Wattage	320.0
Burn Position	Vertical base up ±15°
Warm Up Time to 90% (MIN)	2.0 min
Warm Up Time to 90% (MAX)	5.0 min
Hot Restart Time to 90% (MIN)	10.0 min
Hot Restart Time to 90% (MAX)	15.0 min

DIMENSIONS

Maximum Overall Length (MOL)	8.2500 in(209.5 mm)
Bulb Diameter (DIA)	3.500 in(88.9 mm)
Light Center Length (LCL)	5.000 in(127.0 mm)

PRODUCT INFORMATION

Product Code	27501
Description	MVR320/VBU/HO/PA
ANSI Code	M132/M154
Standard Package	Case
Standard Package GTIN	10043168275016
Standard Package Quantity	12
Sales Unit	Unit
No Of Items Per Sales Unit	1
No Of Items Per Standard Package	12
UPC	043168275019



Switch Start Metal Halide Standard

Switch Start MH Std 400W ED37 CL U

High performance, Long life and Superior light quality A compact, energy efficient metal halide lamp that provides crisp, sparkling light with long life and high efficiency.

Product data

• General Characteristics

Base	Mogul [Mogul]
Base Information	Brass [Brass Base]
Bulb	ED37
Bulb Material	Hard Glass
Bulb Finish	Clear
Operating Position	Universal [Any or Universal (U)]
Main Application	General Lighting
RatedAvgLife(See Family Notes)	20000 hr
Energy Saving	Not Applicable

• Electrical Characteristics

Watts	400 W
Lamp Voltage	135 V
Lamp Current	3.25 A
Ignition Time	120 (max) s
Re-ignition Time	12 (max) min

• Environmental Characteristics

Mercury (Hg) Content	52 (max) mg
Picogram per Lumen Hour	102.6 p/LuHr

• Light Technical Characteristics

Color Code	640 [CCT of 4000K]
Color Rendering Index	65 Ra8
Color Designation	Cool White
Color Temperature	3900 K
Color Temperature technical	3900 K

Chromaticity Coordinate X 0.385 -

Chromaticity Coordinate Y 0.395 -

Initial Lumens	39000 Lm
Luminous Efficacy Lamp	97.5 Lm/W
Design Mean Lumens	25350 Lm
Lumen Maintenance - 40% life	65 %

• UV-related Characteristics

Damage Factor D/fc	0.51 -
PET (NIOSH)	204 h500lx
UV A	19.23 mW/cm ²
UV B	0.06 mW/cm ²
UV C	0.01 mW/cm ²

• Product Dimensions

Light Center Length L	7 in
Max Overall Length (MOL) - C	11.5 (max) in
Diameter D	4.625 in

• Luminaire Design Requirements

Cap-Base Temperature	210 (max) C
Bulb Temperature	400 (max) C

• Product Data

Product number	274498
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PHILIPS
sense and simplicity



Product Number: 64188

Order Abbreviation: M400/PS/U/BT28

General Description: 400W METALARC PULSE START compact quartz metal halide lamp, high output, reduced outer jacket, reduced color shift, E39 base, BT28 bulb, enclosed fixture rated, universal burn, clear, 4000K

Product Information	
Abbrev. With Packaging Info.	M400PSUBT28 6/CS 1/SKU
ANSI Code	M155/E
Approx. Lumens (initial - horizontal)	31000
Approx. Lumens (initial - vertical)	36000
Approx. Lumens (mean - horizontal)	22400
Approx. Lumens (mean - vertical)	25500
Arc Length (in)	1.5
Arc Length (mm)	38
Average Rated Life - Horizontal (hr)	15000
Average Rated Life - (hr)	15000
Average Rated Life - Vertical (hr)	20000
Base	E39 Mogul
Bulb	BT28
Color Rendering Index (CRI)	65
Color Temperature/CCT (K)	4000
Diameter (in)	3.504
Diameter (mm)	89.00
Family Brand Name	Metalarc® Pulse Start
Fixture Requirement	E
Hot Restrike Time (min)	5-7
Lamp Finish	Clear
Light Center Length - LCL (in)	5
Light Center Length - LCL (mm)	127
Maximum Base Temperature - Fahrenheit	482
Maximum Base Temperature - Celsius	250
Maximum Bulb Temperature - Fahrenheit	752
Maximum Bulb Temperature - Celsius	400
Maximum Overall Length - MOL (in)	8.31
Maximum Overall Length - MOL (mm)	211
Nominal Wattage (W)	400.00
Operating Position	Universal