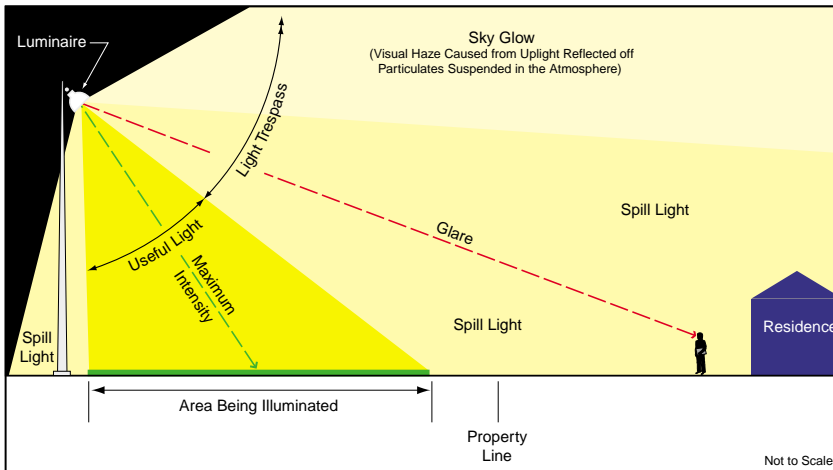


Obtrusive Light



DMD applies insight gained from years of experience to mitigate light trespass through innovative design.

Glare

Obtrusive light that hinders or bothers the human eye. Glare is the result of light emitted from a source that is in sharp contrast to its surroundings.

Disability Glare

The presence of an amount of glare so significant as to prevent adequate vision. Objects in the field of vision are obscured, and the individual is disabled from performing a visual task.

Discomfort Glare

The presence of a sufficient amount of glare to cause discomfort. Visual tasks may be performed, but the experience is unpleasant.

Nuisance Glare

The presence of a sufficient amount of glare to be bothersome, but not enough to prevent visual task performance or lead to discomfort.

Spill Light

Illuminance falling beyond the area that is being lighted. Spill light is quantifiable and measurable, and is used to define levels of light trespass.

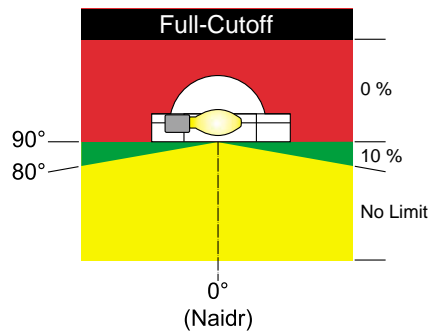
Sky Glow

The visible haze or glow seen above a lighting installation that reduces the ability to view the darkened nighttime sky. Sky glow is a combination of light emitted upwards from a light source and reflected light cast upwards from the surface being illuminated reflecting off particles suspended in the atmosphere.

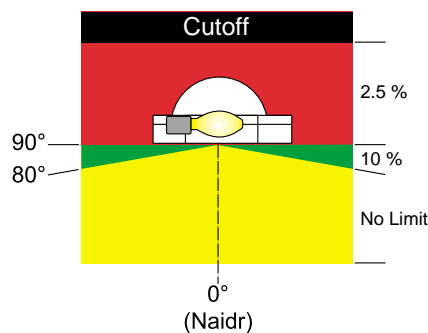
Cutoff Designations



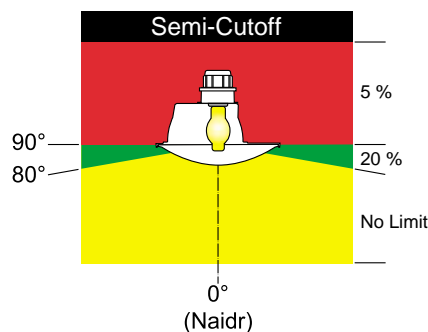
DMD staff members understand the impact of luminaire performance and develop designs that mitigate or eliminate obtrusive light impacts.



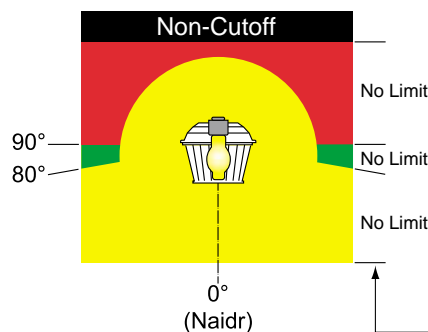
A luminaire is classified as full-cutoff when no light is directed at or above a horizontal plane located at the bottom of the luminaire, and less than 10-percent of the lamp's rated lumens are present in a zone 10-degrees below the bottom of the luminaire.



A luminaire is classified as cutoff when less than 2.5-percent of the lamp's rated lumens are directed at or above a horizontal plane located at the bottom of the luminaire, and less than 10-percent of the lamp's rated lumens are present in a zone 10-degrees below the bottom of the luminaire.



A luminaire is classified as semi-cutoff when less than 5-percent of the lamp's rated lumens are directed at or above a horizontal plane located at the bottom of the luminaire, and less than 20-percent of the lamp's rated lumens are present in a zone 10-degrees below the bottom of the luminaire.



A luminaire considered non-cutoff has no limitations on the amount of light directed above the horizontal plane located below the bottom of the luminaire.

This column shows the maximum candlepower percentage of lamp lumens allowed in each zone around a luminaire to meet the stated IESNA classification.

Luminaire Examples



**Cobra Head Luminaire with
Semi-Cutoff Optics
(Drop Refractor)**



**Cobra Head Luminaire with
Full-Cutoff Optics
(Flat Glass)**

*DMD chooses
luminaires based on
the unique require-
ments of each project.*



**Post Top Luminaire with
Non-Cutoff Optics**



**Post Top Luminaire with
Cutoff Optics**

Light Trespass Limits



The IESNA publication TM-11 establishes environmental zones based on a subjective assessment of existing levels of ambient light and community goals. These zones are based on, and generally follow the European-based International Commission on Illumination (CIE) standards.

IESNA Recommended Light Trespass Limitations

Environmental Zone	Pre-Curfew/Post-Curfew Spill Light Limits*	Plain Language Definition
E1	1.0 lux / 0.0 lux	Areas with intrinsically dark landscapes. Examples are national parks, areas of outstanding natural beauty, or residential areas where inhabitants have expressed a strong desire for strong limitation of light trespass.
E2	3.0 lux / 1.0 lux	Areas of low-ambient lighting. These may be suburban or rural residential areas. Roadways may be lighted to typical residential standards.
E3	8.0 lux / 3.0 lux	Areas of medium ambient brightness. These will generally be urban residential areas. Roadways lighting will normally be allowed to approximate traffic route standards.
E4	15.0 lux / 6.0 lux	Areas of high ambient brightness. Normally this category will include dense urban areas with mixed residential and commercial use with high levels of nighttime activity.

DMD staff members are fully aware of existing standards for illumination and obtrusive light control.

* A curfew time is usually established by ordinance or practice, and is the beginning of a recognized period of reduced activity with lower illumination requirements. Typically a curfew is established as 10 or 11 p.m.

Meet the IESNA



IES

Illuminating Engineering Society of North America (IESNA)

DMD staff are active in the IESNA at the local and national level, and are active members of committees focused on outdoor lighting.

- Founded in 1904 to “Advance knowledge and disseminate information for the improvement of the lighted environment for the benefit of Society.”
- Membership is primarily made up of engineers, manufacturers, and municipal and government staff that practice within the lighting industry.
- Includes established committees, such as the Roadway Lighting Committee and the Sports Lighting Committee, to advance knowledge and improve the practice of design in specific areas.
- Publishes Technical Memorandums (TMs) and Recommended Practices (RPs) that are used throughout North America as design standards and resources. Applicable publications for outdoor lighting include the following.

RP-8 Roadway Lighting

RP-20 Lighting Parking Facilities

RP-33 Lighting For Exterior Environments

TM-11 Light Trespass: Research, Results and Recommendations

TM-10 Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjunction with Roadway Lighting

RP-19 Roadway Sign Lighting

Meet the IDA



International Dark-Sky Association (IDA)

DMD staff are members of the IDA and actively support the mission of reducing obtrusive light.

- Founded as a nonprofit organization in 1988 to mitigate or eliminate the adverse impacts of lighting on views of the darkened nighttime sky. DMD agrees with the reduction of obtrusive light through good design.
- Currently the IDA has over 100,000 members worldwide with members in nearly every community in North America. The IDA is growing at a rate of approximately 200 new members per month.
- The IDA publishes a Lighting Code Handbook and a host of other materials focused on their narrow mission (stated above).
- The IDA has an extensive web site that makes their information available to professionals as well as those unqualified in lighting design. This has equipped community activists with quantities of information about lighting, some which is of questionable authority.
- IDA members are often politically involved, and have often aggressively pushed for the adoption of restrictive lighting ordinances. This has resulted in the development of many unrealistic lighting ordinances in North America based on the IDA goals rather than the judgement of practicing lighting designers and engineers.
- Because lighting issues are complex and require the artful application of theory to result in good design, DMD recommends that a qualified and knowledgeable professional engineering firm be retained to translate the goals of the IDA into reality for your projects.

Lighting Ordinances



What is a Lighting Ordinance?

Lighting ordinances are a practical and enforceable way to prevent poor exterior lighting practices through the established framework of municipal codification. Lighting ordinances legally limit the installation of lighting that is deemed unacceptable by the governmental body with jurisdiction.

Benefits of Lighting Ordinances

A well written exterior lighting ordinance will permit all forms of necessary illumination at reasonable intensities, but will require measures to prevent or reduce obtrusive light and save energy. A well-written ordinance will apply to all forms of outdoor lighting, including streets, highways, and exterior signs, as well as lighting on dwellings, commercial and industrial buildings and building sites. Major benefits of a well-written ordinance include the following.

- Reduction in Obtrusive Light
- Reduced Impact on Residents
- Reduced Energy Consumption
- Improved Visibility for Motorists

Risks of Poorly Written Ordinances

Lighting ordinances and exterior lighting codes have been used throughout the world for many years. A majority of existing ordinances, however do not take advantage of emerging knowledge and developments and have become counterproductive and contradictory. Without the assistance of technical experts, politicians and their legal advisors may develop lighting ordinances that do more harm than good.

DMD Can Assist in Ordinance Development

DMD & Associates can economically assist you in developing a lighting ordinance that meets the needs of your jurisdiction and will stand the tests of time. As lighting professionals with extensive outdoor lighting experience and knowledge of accepted standards and practices, we can assess your situation and goals and provide the expert guidance you need.

DMD's experience and knowledge of lighting practices and standards means your lighting ordinance will be defensible and achieve desired results.

Does Quality Matter?



Poor Quality



Poor Paint Finish



Poor Powder Coating

Good Quality



**Concrete Pole
(Over 20 Years Old)**



**Powder Coated
Aluminum Cabinet**

Benefits of Quality

- Fewer Maintenance Headaches/Reduced Maintenance Costs
- Lower Life Cycle Costs
- Reduced Risk for Owners
- Better Performance

Using DMD means you receive quality installations that deliver the performance you expect.

Most people can identify good quality only after the fact. A pole or electrical cabinet that is rusted out after only a few years of service is obviously of poor quality and undesirable, even though the product may have appeared equivalent to other available products at installation.

The trick to achieving a quality installation is knowing how and when to specify performance and/or specific products in order to get the desired results within budget. This ability is not universal among consultants, who are often long gone when problems are discovered. At DMD, our years of design experience, knowledge of manufacturing and extensive experience providing renovations has taught us what works and what does not in a wide variety of situations. This means we know when to apply a tight performance specification or require a particular component so that your installation will deliver the expected performance.

Why use DMD?



*DMD is good people,
doing great work, so
that clients receive
best value.*

We Are Objective and Independent

We work hard to understand your needs, design specifically for your unique situation, and apply the technology that gives you the best value. Because we are independent of all suppliers, clients can be confident that our services and designs are not influenced by conflicts of interest.

We Are Experienced and Fully Qualified

Our staff has over 110-years of combined experience, and each staff member is a recognized specialist in their field. Our expertise and knowledge is enhanced through involvement in local, national and international professional organizations. For instance, our staff members are active members of the IESNA Roadway Lighting Committee, acquiring knowledge of emerging issues and investigating approaches that will set the standards for the future.

We Know What Works (and What Doesn't)

Our years of design and construction management experience have taught us which products and design solutions work best in specific situations. We stay current on new products and design approaches, and understand emerging issues. Our expertise allows us to see through fads and marketing claims and analyze products and design approaches in light of performance and suitability. The result? You get solutions that work, not unpleasant surprises.

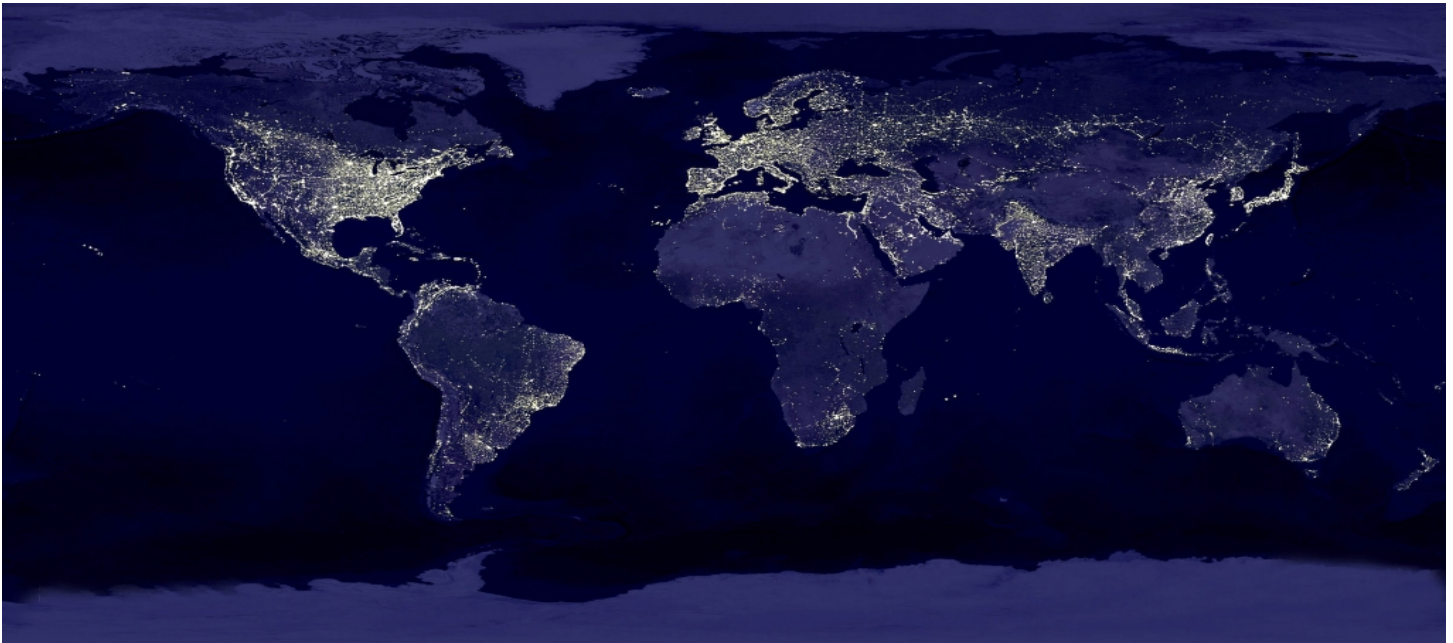
We Listen

Engineers have a reputation for being insensitive to client needs and objectives. At DMD we work hard to overcome this reputation by focusing on listening carefully to your concerns and working hard to understand your needs and desires. We then economically translate your ideas into reality.

DMD Delivers Best Value

Our engineered solutions and focused consulting services deliver best value to owners and clients. Your installation will be delivered for the right price, and perform efficiently with minimal maintenance over its intended life cycle.

A Shrinking World ...



The Need for Good Design is Obvious

This composite nighttime photo from space illustrates the need for proper lighting design. As the world becomes more crowded, the impacts of outdoor lighting are intensified, especially in North America.

The good news is that technology can change the way we light our world. Advances in optics, fixture efficiency and understanding of the human eye have given us a range of fixture options that direct light efficiently and reduce energy consumption.

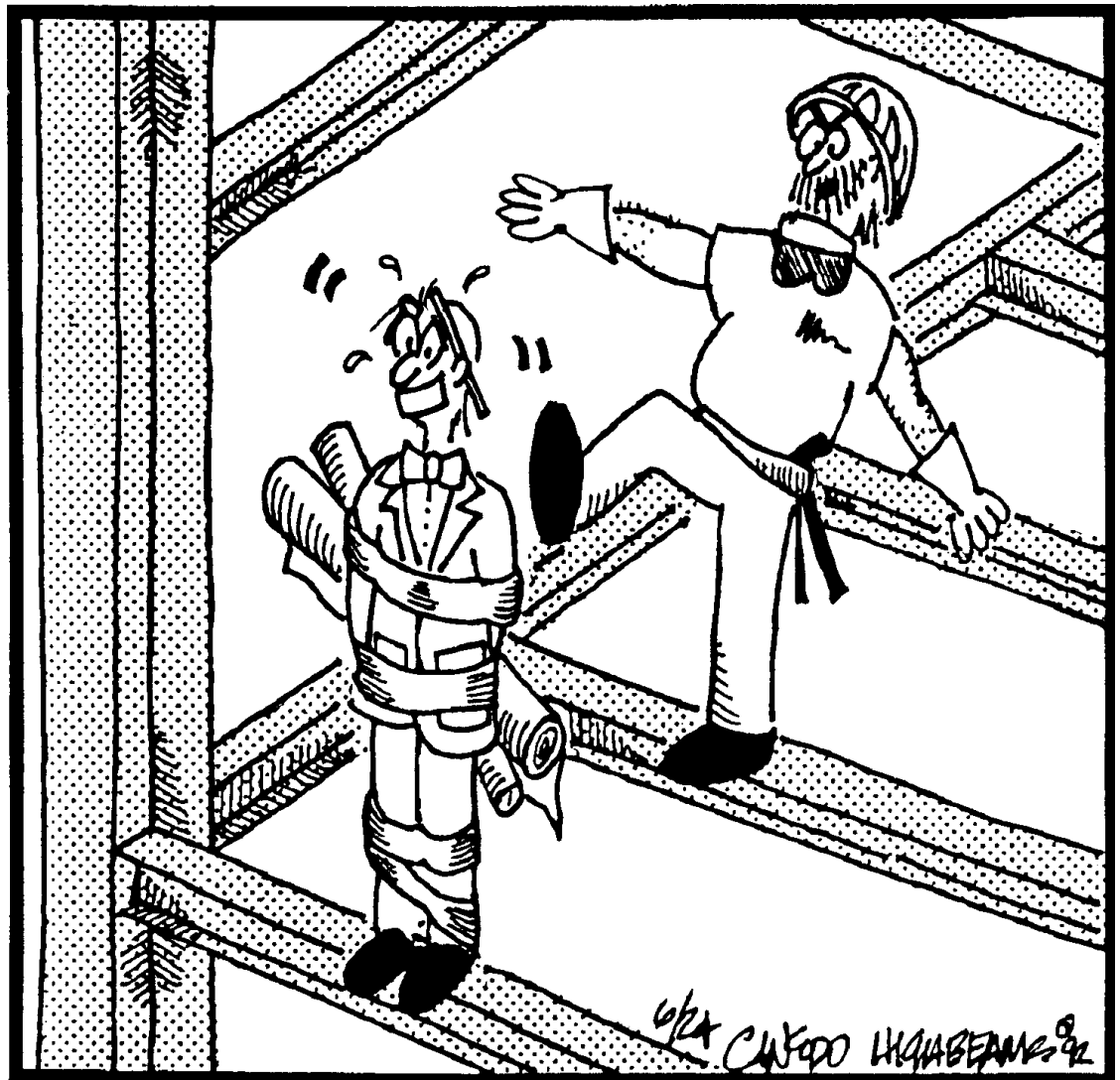
Skilled engineers using high-technology software and accumulated knowledge of good versus poor lighting design can apply advanced fixtures to each unique situation, providing recommended illumination levels while reducing obtrusive light.

DMD & Associates has the experienced staff and resources to meet your need for state-of-the-art lighting designs that are most appropriate for your unique situation.

Take a Humor Break



Careful design and tight quality control means no DMD staff member has ever suffered the fate of Addendum 215.



“Sorry, but according to Addendum 215, the Contractor has the option of killing the Engineer at no additional cost to the Owner.”

Take a Humor Break



DMD staff members are not only highly qualified, but are also fun to work with and have a good sense of humor.

