STOUCH LIGHTING®
LED LIGHTING SOLUTIONS

LIGHTING COMPARISON

High Mast Lighting vs. Flood Lighting

Photo from Holophane

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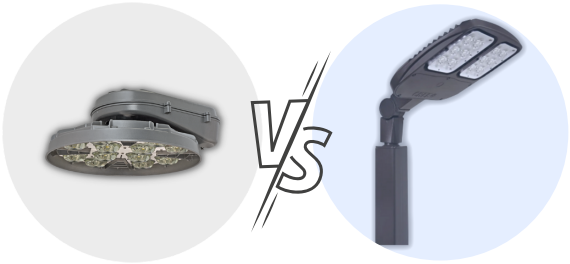
STOUCH LIGHTING®
LED LIGHTING SOLUTIONS

Lighting Comparison:
High Mast Lighting vs Flood Lighting

It can be difficult to choose the most appropriate type of LED light fixtures for large outdoor lighting projects. Two common outdoor lighting application options include: **High Mast Lighting** and **Flood Lighting**. These two words are often interchanged with one another, however, they do in fact offer different features, specifications, and solutions.



What's the main difference between high mast lighting and flood lighting?

High-mast lights are similar to flood lights in that both have the capability of illuminating large areas. However, there are also many differences in terms of light distribution patterns, mounting, vibration resistance, surge protection, Darky Sky Compliance, and more.

One of the most noticeable differences is that the poles for high mast lights are often much taller than flood lights. The larger the area that you want to illuminate, the higher up your lights will need to be mounted (if you want to keep the total amount of poles to a minimum). Therefore, high mast lights are often the go-to option when illuminating large areas.

We'll dive into the more significant differences below. But first, we'll define high mast lighting and flood lighting, because many times these words are often inter-changed or utilized together, when in reality, they are two different applications and provide solutions for different problems.

High Mast Lighting

Photo from Holophane

High mast lighting is commonly used to illuminate large areas from a very high mounting height, typically on poles ranging in height from 50ft-150ft and are mounted to those poles via Fixed Rings or Lowering Devices. There are typically between 3 to 12 fixtures on each pole. High mast lights are the ideal option when you want to illuminate a large area with less poles.

High Mast Lighting Applications: This type of outdoor lighting is often used by industrial, commercial and municipal organizations in large parking lots, rail yards, ports, highways, and airports to name a few.

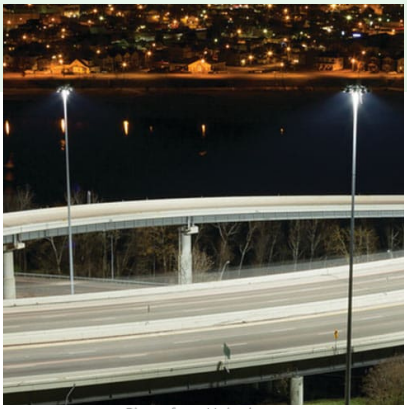


Photo from Holophane

Photo from Cooper Lighting

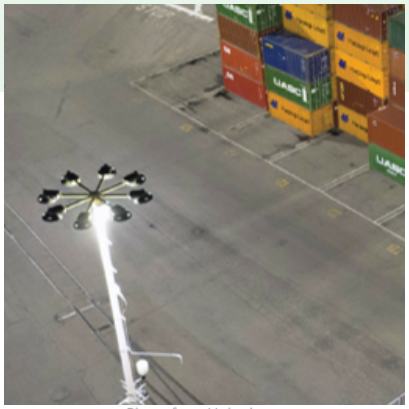


Photo from Holophane

Flood Lighting


(Image by Cooper Lighting)

Flood lighting is also used for exterior lighting and is typically mounted on poles or buildings to provide directional illumination to a variety of areas. The fixtures on flood lights can be mounted at a variety of angles, distributing the light accordingly.

Flood Lighting Applications: This type of lighting is often used to provide light to areas for security, vehicle & pedestrian use, as well as used for sports activities and other large areas in need of targeted outdoor illumination.

High Mast Lights vs. Flood Lights

LED high mast lights are currently the most cost effective and efficient way of providing even and controlled illumination of large outdoor areas due to the high mounting height and multiple luminaire configuration.

Other recognizable aspects that separate LED High Mast products from LED Flood Lighting products include:

- Light Distribution Patterns
- Mounting
- IDA Dark Sky Compliance
- Vibration Resistance/Rating
- Surge Protection

Specifications: High Mast Lighting vs. Flood Lighting

Specification Attribute	High Mast Lighting	Flood Lighting
Lumen Output	30,000 Lumens to 150,000 Lumens	1,000 Lumens to 100,000 Lumens
Mounting	4-Bolt Horizontal Secure Mounting	Adjustable Slip Fitter or Trunnion
Vibration Resistance	Minimum 3G Vibration Rating (Per ANSI C136.31-2001)	Unknown
Light Distribution Patterns	IESNA Light Distribution Patterns	NEMA Beam Spreads
Surge Protection	20KV/10KA per ANSI/IEEE C62.41	4kV, 10kV/5kA per ANSI C136.2
IDAA Dark Sky Compliance/Uplight Control	IDAA Dark Sky Compliant	Not compliant if mounted at an angle other than 90 Degrees to pole

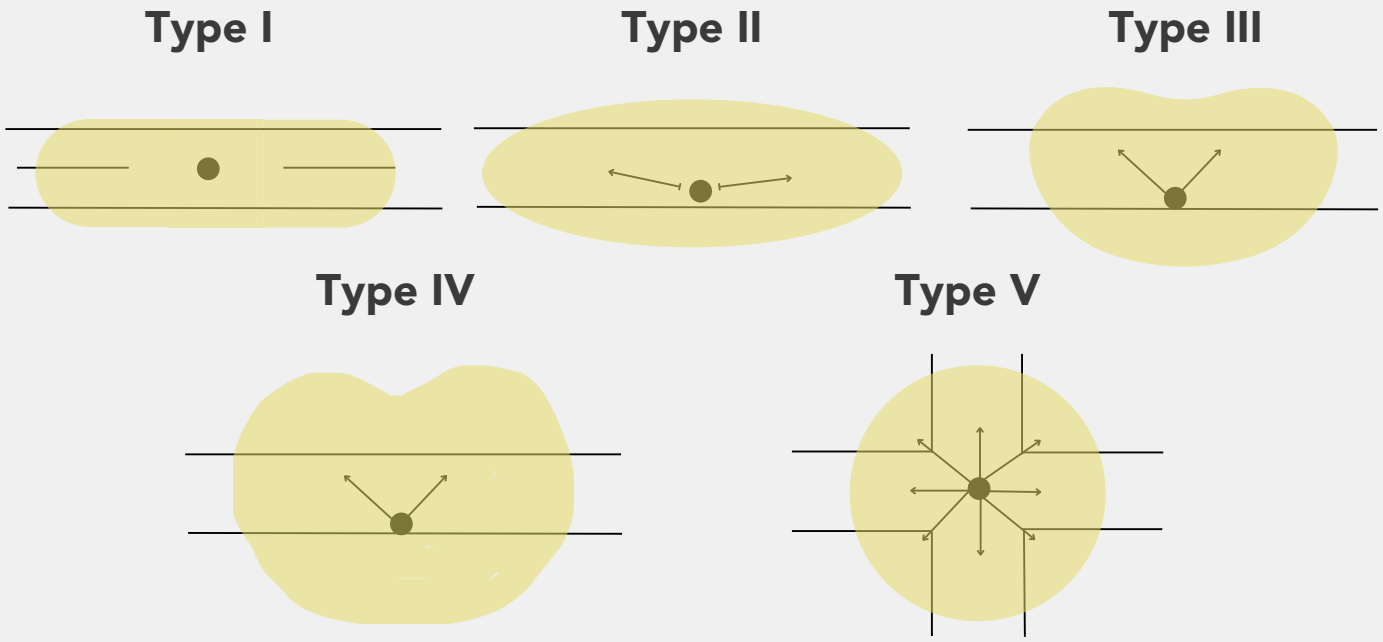
LIGHT DISTRIBUTION PATTERNS

High Mast Lighting

Most High Mast Light fixtures utilize IESNA Light Distribution Patterns (see image below). IESNA distribution patterns produce an overlapping light pattern resulting in high application efficacy, and excellent uniformity and glare control, that all result in outstanding visibility for large outdoor spaces. Translation: High Mast Lights utilize light distribution patterns that provide EVEN lighting WHERE YOU NEED IT. When functional visibility is a priority at the site, high mast lighting is often chosen over floodlights.

Zero uplight optics also reduce sky glow and usually meet Dark Sky requirements.

IES Lighting Distribution Types



LIGHT DISTRIBUTION PATTERNS

Flood Lighting

Flood lights are directional fixtures manufactured with a variety of beam spreads and projection distances. Flood lights have a wide beam spread, or beam angle, which measures the spread of light (width of beam) from a reflected light source. A wide beam spread means that light comes from a smaller angle which creates a light that will become more diffused further away. So as light moves away from a reflected light source, it spreads out and becomes less intense. Flood lights most often have beam spreads of more than 45 degrees and up to 120 degrees. Particularly with flood lights, it's imperative to look at the mounting angles when discussing light patterns.

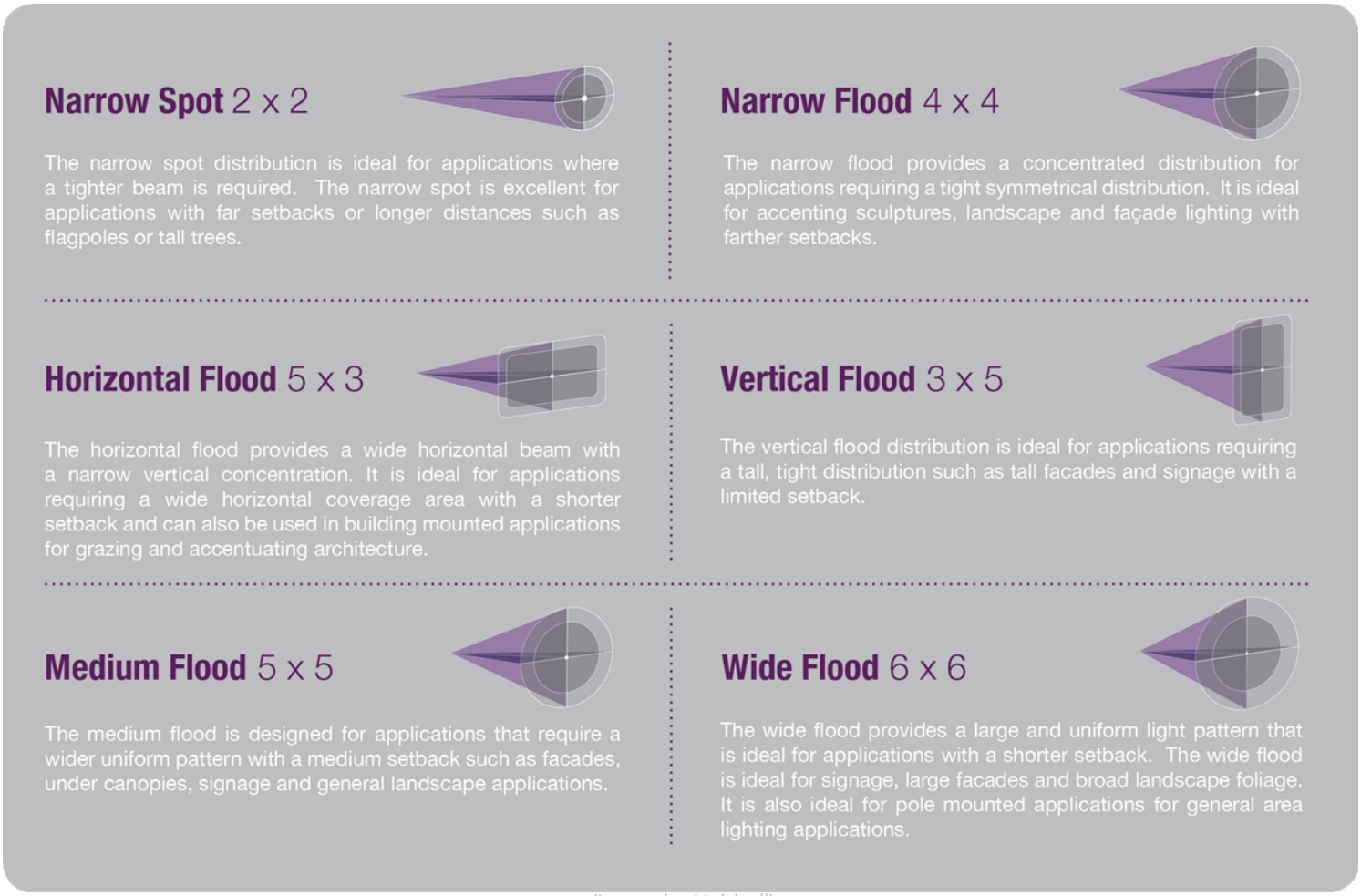
Flood lights utilize NEMA Beam Spreads (different than IESNA Light Distribution Patterns) and since most flood lights utilize adjustable angle mounting, the mounting angle affects how those NEMA Beam Spreads project light at a surface. WARNING – Technical information incoming! A NEMA light distribution is indicated by two numbers that correspond to the horizontal and vertical light spread of a fixture and indicates the two planes of light where the intensity is at least 10% of the maximum light intensity of the fixture.

The ideal NEMA light distribution for your project is determined by the distances between where the light is mounted and the area being illuminated. A wider beam works best for closer distances and a narrower beam is best for longer distances. Flood Lights, and by association NEMA Bead spreads, are intended to provide focused illuminations in smaller areas, compared to even illumination across larger areas.

LIGHT DISTRIBUTION PATTERNS

Flood Lighting Continued...

NEMA's classification system describes distribution of light within the beam produced by the fixture:



(Image by Hubbell)

Flood Lights, and by association NEMA Bead spreads, are intended to provide focused illuminations in smaller areas, compared to even illumination across larger areas.

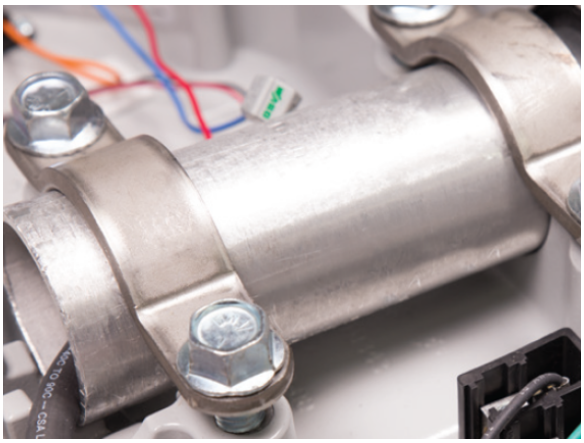
Determining the ideal beam angle for your fixture means you must know the distance where the light will be mounted and the area being illuminated. By using the appropriate NEMA classification type, you can get the right type of light distribution for your project.

MOUNTING

Another difference between high mast and flood lighting are the **mounting types**. Flood lights can be mounted on a variety of adjustable mount-types (shown below) to change the angles of illumination, while high mast lights will always be mounted via a RIGID Horizontal Tenon (which ensures IDA compliance, which we'll discuss more about below).

MOUNTING TYPES

High Mast Lighting



4 Bolt Mounting Configuration

(Image by Cooper Lighting)

RIGID Horizontal Tenon - This mount ensure the fixtures are pointing downward (which is IDA compliant). High Mast Lights are not only mounted via Horizontal Tenon, but they also utilize a 4-bolt mounting system to ensure that the fixtures are safely secured.

Flood Lights that mount to Horizontal Tenons typically use "Slipfitter" mounts that secure via SET SCREWS, which are more susceptible to vibration concerns.

MOUNTING

Flood Lighting

Knuckle Mount

This mount attaches buildings via a ½” Thread and enables directional aiming of the fixture to one of several fixed angles.

Adjustable Slip Fitter

The most common due to its versatility. This mount allows the angle of the fixture to be adjusted from 90 to 180, which enables directional aiming of light output.

Trunnion Mount

his convenient mount attaches easily to flat surfaces (either buildings or poles) and enables directional aiming of the fixture to one of several fixed angles.

With flood lights, the adjustable mounting of flood lights causes changes in the light patterns on the on the ground. For example, a wide beam spread means that light will become more diffused further away as the fixture is angled “up”. So as light moves away from a targeted surface, it spreads out and becomes less intense. Imagine your pointing a flash light directly down to the ground. Then imagine (or remember) how that beam of light changes as you turn the flash light on its access until it is pointing straight ahead.

MOUNTING

MOUNTING HEIGHT

Mounting height plays an important role in effectiveness a light has on its intended target areas. Determining the ideal light distribution pattern for your fixture requires knowing the distance between where the light will be mounted, and the area you plan to illuminate. For multiple fixture per pole applications, you need to consider the distance between the poles in order to most effectively illuminate a given area.

High Mast Lighting Mounting Heights

High mast lights typically have higher mounting heights (50ft+), and because high mast lighting poles' heights are large relative to their cross-sectional dimension, these poles can be flexible and sensitive to wind loading. Higher mounting heights also allow for fewer poles due to optimized light coverage.

Flood Lighting Mounting Heights

Flood lights typically have a mounting height of approximately 15ft-35ft, however, in several applications they can have a pole height greater than the typical max (although rarely reaching the height of high mast lighting). A closer distance will not need a long-range narrow beam, so a wider flood beam will be best. To illuminate an area at a further distance, a more narrow, farther-reaching beam is necessary.

Its important to note that when installing light poles for a new project, you will also need to consider the distance between light sources and the beam's radius to avoid extensive overlapping (or a complete lack of overlapping, which is also bad) of illumination.

IDA Dark Sky Compliance

MOUNTING HEIGHT

Dark Sky Compliance requirements help protect from light pollution. Outdoor lighting fixtures that are Dark Sky Compliant shield the light source to minimize glare and facilitate improved vision at night.

A few characteristics of Dark Sky Compliance include:

- Lights be on only when needed (with dimmers, timers or photo-controls)
- Lights are only illuminating areas that need it
- Lights are no brighter than what's necessary or safe

★ ***Lights must use optics or shielding to prevent "uplight"***

High mast lighting will always be mounted via a Horizontal Tenon (so that the fixtures' optics are facing downward), ensuring that any IDA compliance rating is maintained. Keep in mind that you may see images of extremely tall poles that look like high mast lights, however, when high mast fixtures' optics are not pointed downward, they are not mounted properly and much of the light is wasted.

In comparison, because **flood lights** use adjustable angles with mounting brackets, they lose any IDA compliance rating when they are no longer oriented 90 degrees to the pole. Once flood lights are angled, the effectiveness of the fixture to generate even lighting on the ground is reduced.

Therefore, only certain flood lights will be considered IDA Compliant. Although it may be common to see "IDA Complaint" listed on a LED Flood Light specification sheet, if you read the fine print you will see that as soon as the light fixture changes its mounting angle (which is why you would use a flood light in the first place), it will lose IDA Compliance. In theory, flood lights that point straight downward (mounted at a 90 degree angle) are IDA compliant, however, this mounting orientation is not normal for flood lights and a 90 degree angle actually defeats the purpose of choosing flood lights in the first place.

BUG Rating

BUG stands for Backlight (light directed behind a fixture), Uplight (light directed upward above the horizontal plane of the luminaire), and Glare (amount of light emitted from the luminaire at high angles) – fixtures that minimize all three of these improve light quality, decrease light harshness, and are often Dark Sky Compliant.

Bug Rating is a system designed by IES and International Dark Sky Association that works together with the Dark Sky Compliance light zones, which are accepted levels of light in specific outdoor areas. When a fixture has a U0 BUG rating, it means the fixture emits zero light up into the sky – the lower the number, the better and more likely, IDA Compliant.

VIBRATION

Light poles will always vibrate under certain conditions, and although it's rare, severe vibration can be extremely unsafe. External forces that may cause the pole to vibrate include wind, bridges, traffic-induced vibrations, wind-blasts from large passing trucks, heavy industrial activity and more.

Certain spaces, particularly industrial, require special lighting specifications to counteract damage that can be caused by working conditions and environmental factors.

Because light fixtures mounted on tall poles have an increased exposure to wind and vibration (due to the higher mounting heights), light fixtures often need to be designed to operate in hostile environments that can withstand vibration and shock better than other “everyday” exterior light fixture options. High mast lighting is specifically designed for security and stability of components within the fixtures to withstand vibrations.

It's extremely important to consider vibration during a retrofit project, as pole vibration may lead to premature failure of lamps and fixtures. Luminaire Vibration Testing is covered by the ANSI standard, which provides the minimum vibration capability and vibration test methods for roadway luminaires. To ensure that a light fixture can withstand appropriate vibration conditions, look for **“Vibration tested to 3g level per ANSI C136.31-2018”** on the product specification sheet.

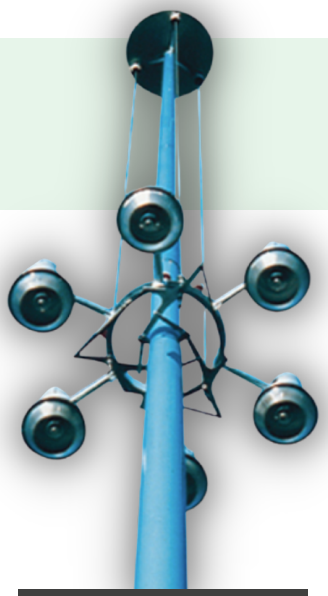
SURGE PROTECTION

Higher surge protection is something that applies to both high mast lights and flood lights. However, the higher 20kv is more standard on high mast lights for two reasons:

1. Higher poles increase exposure to lighting strikes and because they're mounted so high, the cost to replace the fixture (labor-wise) is much higher therefor you want to reduce the likelihood that a fixture will fail.

2. Strong surge protection devices cost more and standard flood light fixtures usually do not offer this feature.

LOWERING DEVICES



Lowering Device
(Image by Holophane)

Lowering devices utilize manual or motorized controls that enable luminaires to be lowered and raised for maintenance purposes. Lowering devices can add higher expenses upfront, however, they inevitably cut maintenance costs and provide for safer maintenance. Because high mast lights are mounted very high (and thus, less poles needed), lowering devices are ideal for high mast lighting.

In a retrofit project you would not likely be installing a lowering device on a pole that does not have one (the pole would have needed to be constructed in the first place to accommodate one). It's also crucial during a retrofit project that you ensure the LED Fixture in consideration is compatible with your existing lowering device. In addition, when choosing lowering devices, it's imperative to make sure that the fixtures can withstand wind resistance.

Although flood lights can be mounted on high poles, they are not usually mounted on lowering devices since the adjustable angle mounts of flood lights change their wind profiles and can cause an imbalance with the lowering device, resulting in a potential safety issues.

FINAL THOUGHTS

In summary, there are many differences between high mast lights and flood lights and there are many factors that go into choosing which product type is most appropriate for your project. Therefore, it's often ideal to get a photometric report that will help determine whether or not a fixture will meet the lighting requirements for your intended application.

Need some assistance with your fixture selection or retrofit process?

We're here for you! Stouch Lighting can help you navigate this process and help choose the right lighting, fixtures, controls and equipment for your space(s).

Tell Us About Your Project