Selecting the best Distribution for you Exterior projects

This is the first in a series of articles to discuss basic lighting design principles to provide a broader understanding of issues that can affect a lighting design. Although this information is very simplistic, the end goal is to improve the lighting quality for each of your lighting projects. In addition, you may be able to better address concerns for spill light, uniformity and overall project costs.

The site geometry for your design plays an important role in selecting the best luminaire distributions. For example, a large shopping area may require very broad distributions while a smaller site near a residential neighborhood may require better spill light control.

In some cases, projects are specified and installed before the visual impact of a poor design is realized. At that point, the solution is a costly option with additional equipment or possibly legal impact if minimal IES levels are not achieved. Projects that only use one distribution are inherently not able to provide adequate lighting levels and optical control. Reasons for this common practice vary greatly but the common denominators seem to be inexperience and general lack of understanding. Using an improper distribution may require you to add more poles to meet your lighting criteria. The end result is a more costly initial and maintained design. To help bridge the gap for those not regularly involved with lighting design let's discuss the "distribution type".

The term "distribution type" defines how far forward of the luminaire (i.e., on the street side) the effective output reaches. The specific classification of distribution types is based on locating the luminaires effective major output pattern on a grid representing distances in units of Mounting Height (MH) from the luminaire. This pattern is defined by tracing an area representing light distribution at 50% of maximum candela. By measuring where the bulk of this pattern falls on the grid, a luminaire can be classified as follows and as shown in Figure 1.

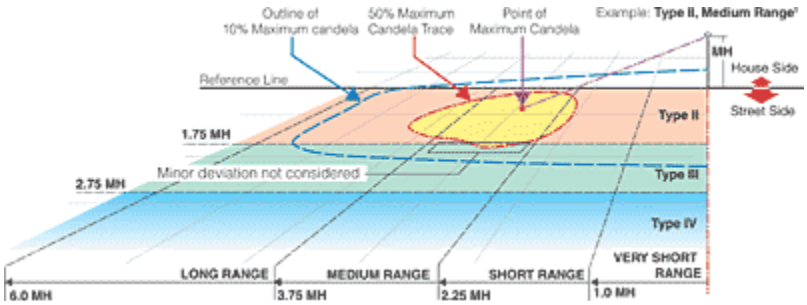
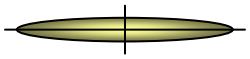
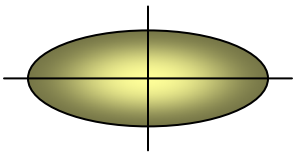


Figure 1: Grid and light patterns to determine Distribution Type

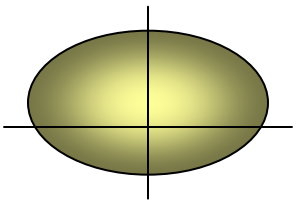
These roadway classifications are not to be confused with the cutoff classifications the IESNA also references. Cutoff classifications deal with the amount of light above the aperture of a luminaire and not the horizontal distribution pattern or range. Below are generic patterns to better illustrate the overall pattern and possible application areas.



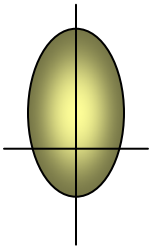
Type 1 is very lineal and intended for 1 or 2 lane roadways.



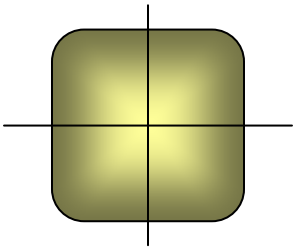
Type 2 is still lineal but wider in the front to accommodate 4 lane roadways, or wider drive lanes.



Type 3 (commonly known as a "Bat-Wing") is suitable for perimeters, often where other interior pole placements fill the site.



Type 4 (commonly known as a "Forward Throw" or Asymmetric) Is best along perimeters where spill light is a concern or there are no place to add poles within a site.



Type 5 – is available in a round or square pattern. Best suited for interior areas within a site or on the median of 4-6 lane roadways.

Despite these standard 5 classifications, manufacturers will stretch those parameters and develop unique distributions and nomenclature in some cases. For Acuity Brands Lighting exterior products, distributions are classified as R2 thru R5 with some specialty distributions such as R4W, R4SC, SYM, ASY, and VFA for pole mounted luminaires. All of these still falls within the 5 basic classifications but their unique patterns allow the product to serve for specific site conditions.

R4W – is a pattern that is a wider pattern than a normal Type 4. Great for perimeters and in some cases can be used on an interior location with a twin configuration. Great for a one reflector does all option.

R4SC – Still a type 4 with very sharp cutoff. This optic excels where there are strict local ordinances for spill light or seeking LEED credits.

SYM – Also known as a Type 5 found in Lithonia's vertical lamped products for site interiors.

ASY – Can be considered a Type 3 or 4 ideal for perimeters. Although this particular distribution is a Type 4

VFA – Forward Automotive Intended primarily for use along the front display row of automotive sales lots. Intended for accent illumination for the hoods of vehicles.

The proper selection of distributions should be just as important a factor with your design as the cutoff classification, lighting budget or any design parameter you need to address. Using the template command within Visual's luminaire schedule is a great tool to see the horizontal footprint of your distribution. Just define your lighting goal and determine your spacing's from there. For example if my goal is to have a 1fc min in the area, set the templates to 0.5fc and start to place them within the project. Feel free to experiment with distributions and you may be surprised over the end results.