Sparkle Elements
for Outdoor Luminaires

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Issues Surrounding Full Cutoff or Shielded Fixtures

• Difficult to determine if light source is on or needs maintenance because source is hidden within the housing

• Since the light sources are less visible to pedestrians or drivers, the sites illuminated by these fixtures may appear dark, gloomy, and unsafe
Sparkle Elements

• Visible luminous elements used to provide cues about how much light is coming from fixtures
  – Can be reflective or transmissive elements or secondary light sources such as LEDs

• Sparkle is intended to provide small areas of high brightness without causing glare or significantly contributing excess light
Advantages of Adding Sparkle

• Sparkle elements can result in increased brightness perception and a sense of security*
  – An impression is created that the light source is indeed operating and is safely illuminating the area

• Sparkle elements provide information to easily determine whether the light source needs repair or replacement

*see references
Outdoor Lighting Efficiency

• Sparkle fixture research is one example of LRC’s goal to promote efficient lighting
  – Energy efficiency
    ◆ Reflective or transmissive elements require no additional power
    ◆ LED elements require very little additional power
    ◆ Lower wattage fixtures *may* be used
  – Light efficiency
    ◆ Promotes use of full cutoff and shielded lighting
    ◆ Sparkle elements contribute little excess light
    ◆ May promote the use of lower wattage lighting
Methods of Achieving Sparkle

- White or colored LEDs
- Reflective element below lamp
- Holes in the shield
Prototype Sparkle Example

• Prototype sparkle fixture is not optimized!!
• Assumptions about luminaire
  – 17,500 total lumens (175 W MH lamp)
  – 75% fixture efficiency
  – 7% ground reflectance (919 lumens uplight)
• Assumptions about LEDs
  – 90 LEDs emit 1 lumen each
• LEDs are responsible for 5% of the uplight
• LEDs are responsible for 0.3% of the total lumens emitted from the luminaire
Fixture in daylight
Fixture without sparkle elements
Fixture with white LED sparkle elements
Fixture with a white cone sparkle element
Fixture with red LED sparkle elements
Fixture with white and red LED sparkle elements
Conclusions

• The LRC is in the pilot phase of sparkle element research
  – Preliminary visualization prototype has been developed
  – More study needs to be done to optimize sparkle elements size, frequency, location, and luminous output

• The LRC is seeking support to advance this research on efficient outdoor lighting
References


- Yukio Akashi, Gloom is doomed, Lighting Design and Application, 30, 5, pp.88-93, 2000

- Yukio Akashi, Sparkle elements-A bright idea, Architectural Lighting, 14, 7, pp.38-41, 1999