

Incandescent Luminous Intensity Distribution Analysis

Prepared by ICF International

Background



- Concerns raised by certification bodies about inconsistent measurements due to non-specific guidance for measurement based on ENERGY STAR Integral LED Lamps specification.
- Concerns raised by test laboratories about incandescent lamps not being able to meet the existing integral LED lamps omnidirectional requirements.
- Evaluated incandescent lamp distribution against the requirements that are in the current Integral LED Lamps Specification and carried over to the Lamps V1.0 Draft 3 Proposal

Obtained test reports for different incandescent lamps

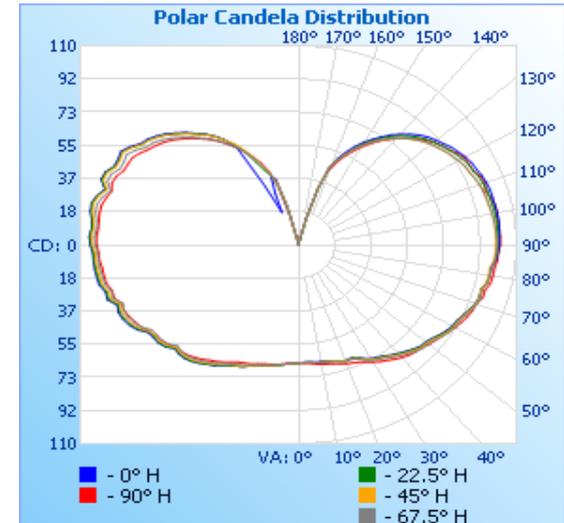
- 2 Frosted A-line
- 1 Frosted Globe
- 1 Clear A-line



Sample: Frosted A-Line Lamp



- Frosted A-Line
 - The frosted A-line type lamp did not meet the intensity uniformity requirements when evaluated with the Integral LED Lamps specification and the Lamps V1.0 Draft 3 proposals.
 - The frosted lamp intensity was too low at the top of the lamp

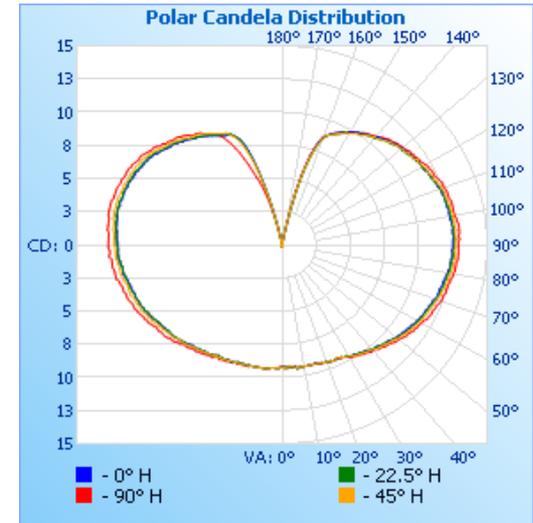


Specification	Average Intensity (cd)	Intensity Tolerance \pm	Percent of Measurement Points Outside of Tolerance	Maximum Intensity as a % of average	Minimum Intensity as a % of average
Integral LED Lamps V1.4	88	20% (± 18)	18.82%	+22% (107 cd)	-26% (65 cd)

Sample: Frosted Globe Lamp



- Frosted Globe
 - The frosted globe type lamp did meet the intensity uniformity requirements when evaluated to the Integral LED Lamps specification and the Lamps V1.0 Draft 3 proposal.
 - It was the only sample that did so.



Specification	Average Intensity (cd)	Intensity Tolerance \pm	Percent of Measurement Points Outside of Tolerance	Maximum Intensity as a % of average	Minimum Intensity as a % of average
Integral LED Lamps V1.4	11	20% (± 2)	0.0%	+17% (13 cd)	-19% (9 cd)

Sample: Frosted A-Lamp Sample



- Frosted A-Lamp:
 - 60W incandescent frosted A - lamp.
 - The 60W incandescent frosted A-lamp did not meet the intensity uniformity requirements when evaluated to the Integral LED Lamps specification and the Lamps V1.0 Draft 3 proposal.

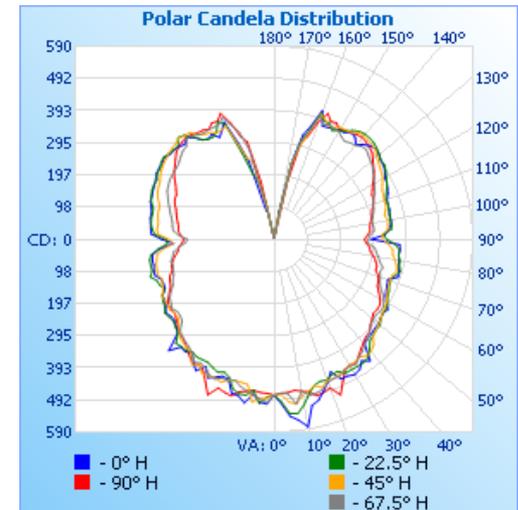


Specification	Average Intensity (cd)	Intensity Tolerance \pm	Percent of Measurement Points Outside of Tolerance	Maximum Intensity as a % of average	Minimum Intensity as a % of average
Integral LED Lamps V1.4	76	20% (± 15)	4.0%	+21% (92 cd)	-23% (59 cd)

Sample: Clear A-Line Lamp



- Clear A-Line:
 - The clear A-line type lamp had wide swings in intensity due to lack of diffusion of the filament, filament shape (C-shaped filaments are common), and refraction from the outer glass.
 - The clear A-line incandescent lamp did not meet the intensity uniformity requirements when evaluated to the Integral LED Lamps specification and the Lamps V1.0 Draft 3 proposal.



Specification	Average Intensity (cd)	Intensity Tolerance \pm	Percent of Measurement Points Outside of Tolerance	Maximum Intensity as a % of average	Minimum Intensity as a % of average
Integral LED Lamps V1.4	394	20% (\pm 79)	20.75%	+48% (582 cd)	-35% (257 cd)

ENERGY STAR Lamps V1.0 Draft 4: Revised Luminous intensity Distribution Proposal



- 90% of the luminous intensity measured values (candelas) shall vary by no more than 25% from the average of all measured values.
- All measured values (candelas) shall vary by no more than 50% from the average of all measured values.
- No less than 5% of total flux (zonal lumens) shall be emitted in the 135° to 180° zone.

