

Focal Points: ABSOLUTE VS. RELATIVE PHOTOMETRY

VOLUME 2

RELATIVE PHOTOMETRY - measures the photometric qualities of a luminaire relative to the rated lumen output of the lamp(s). This type of testing is used for traditional (fluorescent, incandescent, metal halide) luminaires.

How does it work? A stabilized reference lamp is measured and normalized with the lamp factor (Lamp Factor = rated lamp lumens/ measured lamp lumens) to the rated lamp lumens. The stabilized lamp is then installed in the luminaire and the complete unit is photometrically measured. The final candlepower output is corrected with the lamp factor from the reference lamp and gets recorded into the test report.

ABSOLUTE PHOTOMETRY - is required for LED fixtures and measures the complete lighting system including lamp, ballast/driver, thermal management and all fixture components. This ensures all combined characteristics (stabilized temperature, color temperature, thermal management, etc.) of the system are represented in the test results.

How does it work? Measured candlepower and wattage values are recorded, with no modifications or corrections. IES document LM-79 provides the requirements for testing LED luminaires with Absolute Photometry. Fixture efficacy should be reported based on the tested results of the complete unit, not the LED array/module alone.

One type of test is not superior to the other. Both present useful data and both can suffer from shortcomings if used incorrectly. Be careful comparing Relative to Absolute tests; insure that the all factors affecting both tests are included for fair and meaningful comparisons.

Focal Point provides independent Absolute photometry tests for LED products and Relative photometry tests for traditional products for your use.

References:

IES G-2-10 – Guideline for the Application of general Illumination (“White”) Light-Emitting Diode (LED) Technologies

IES LM-46-04 – Approved Method for Photometric testing of Indoor Luminaires Using high Intensity Discharge or Incandescent Filament Lamps

Additional Information:

Attached article Efficiency, Efficacy and Photometric Distribution, from Illuminate Magazine Jan-Feb 2011, written by Kevin Willmorth

	Relative Photometry	Absolute Photometry
Benefits	Because testing is done with reference lamps, and the output is relative, the same test report may be used for various lamp types (with proper correction factor) within the same fixture. Provided proper correction factors are used, results are fairly accurate.	Because all characteristics of the fixture are considered during the test, each variation of an LED fixture requires its own individual test for accuracy.
	Reduces the number of fixtures a manufacturer is required to test and allows the specifier to utilize existing tests to mimic other lamp types.	
	Minimal variation of results from test to test	
Challenges	Reference lamps are tested at 25°C. T5/T5HO lamps ideally operate at 35°C while T8 lamps operate ideally at 25°C. Temperature variations between the reference lamp test and the temperature in the lamp chamber of the fixture may skew test results.	Many more tests are required in order to have accurate information available for lighting calculations.
		Lack of correction factors guarantees anything abnormal about the specific test is reported.
		Greater likelihood of variations from test to test since no correction factors are used.
Basic test output	IES File	IES File
	Input Watts	Input Watts
	Total lumens	Total lumens
	Efficiency - Ratio of delivered lumens from the luminaire to the rated lumens of the reference lamp(s).	Efficacy - Ratio of delivered lumens from the luminaire to measured watts (LPW).