

RISING ABOVE THE COMPETITION

INDEPENDENT PHOTOMETRIC LAB TEST RESULTS

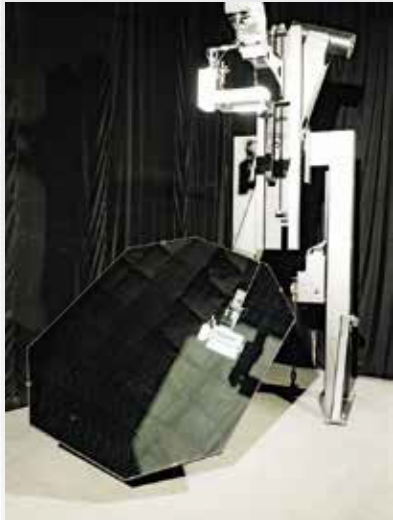
PHANTOM DE

DOUBLE-ENDED LIGHTING SYSTEMS

DE FIXTURES COMPARISON TESTING

Phantom DE Systems vs Competitive DE Brands

Independent Testing Laboratories, Inc. (ITL Boulder), the most experienced independent photometric testing lab in North America, was recently contracted by Hydrofarm to conduct independent testing of eight commercially available competitive double-ended horticultural lighting systems. Based on the test results generated by ITL, Hydrofarm's Phantom DE Open Lighting System and the Phantom DE Enclosed Lighting System were ranked first and second place, respectively, in all of five testing categories (relative efficiency, total $\mu\text{mol/s}$ output, $\mu\text{mol/s}$ per watt, absolute luminous flux and lumens/watt).



GONIOPHOTOMETER

A Goniophotometer is a device used for measurement of the light emitted from an object at different angles.

These test results show that the Phantom systems have now been scientifically proven to deliver higher PAR than the other systems tested. The Phantoms have also been confirmed to be more efficient, requiring fewer fixtures to deliver desired light levels, and thus emerge as being more cost-efficient than the other 6 fixtures in the testing group.

The independent photometric distribution testing, spectral analysis, and efficiency testing provided by ITL Boulder was performed per the procedures and recommendations of the Illuminating Engineering Society of North America (IESNA). All testing was conducted on commercially available luminaires ("commercially available" is used here to indicate units chosen at random from retailers' stock to assure that they represented off-the-shelf quality and were not modified to enhance performance for testing). <http://www.ies.org/>

For further information on ITL Boulder, visit: <http://www.itlboulder.com/>

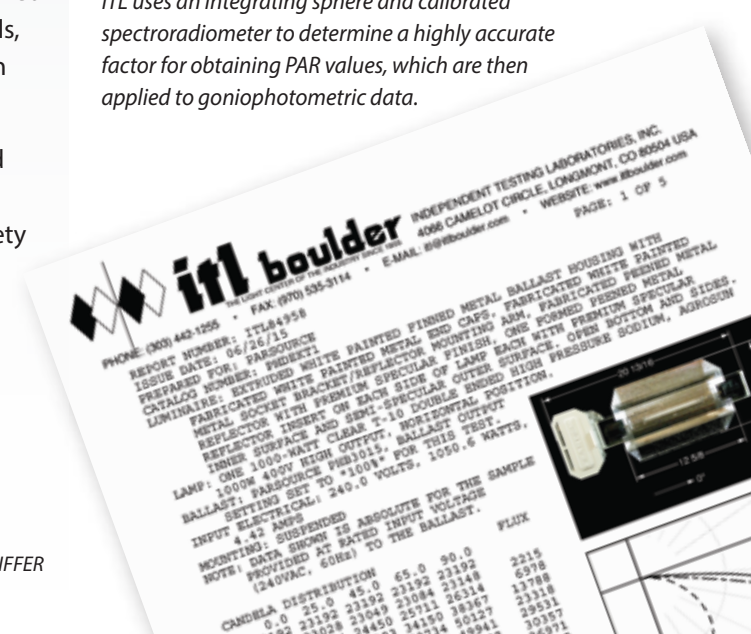
**THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.*



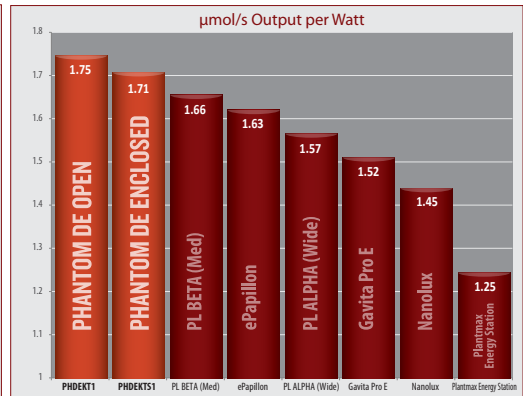
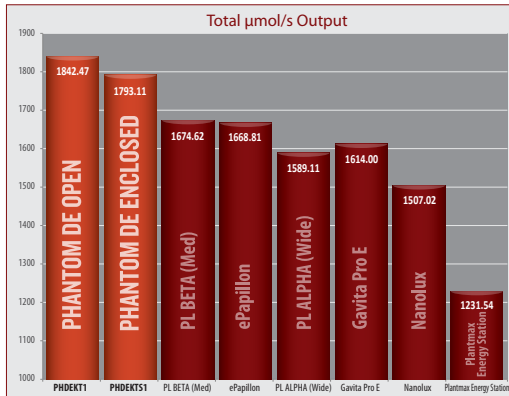
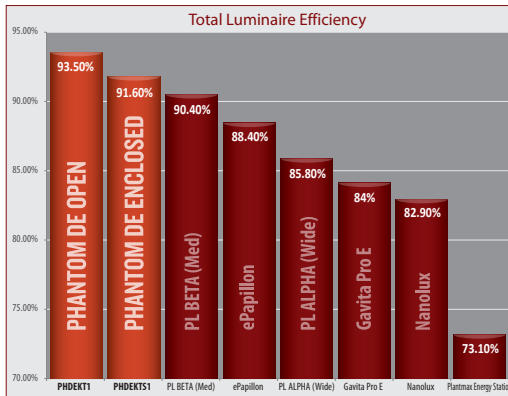
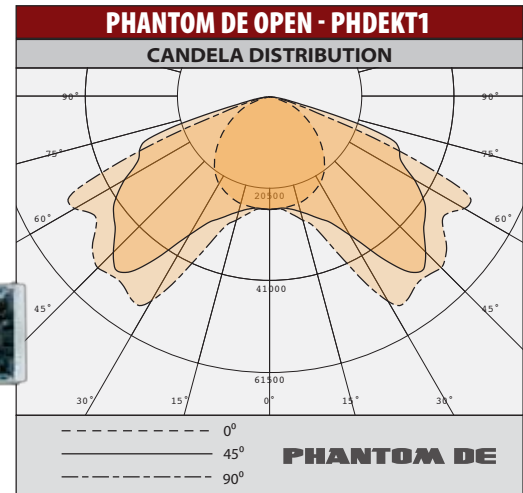
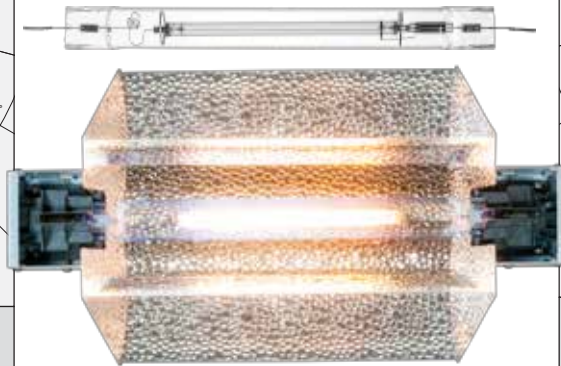
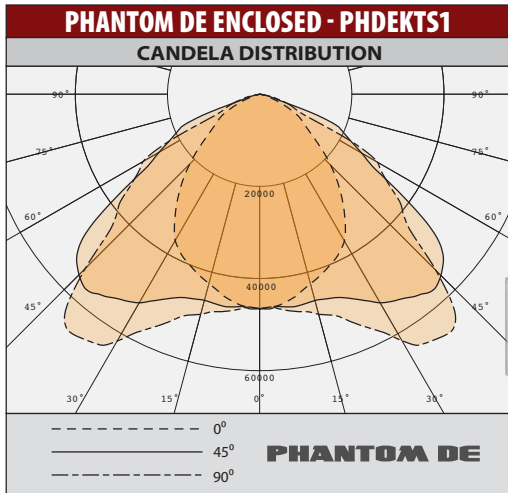
see webpage for full testing results
PhantomBallast.com



ITL uses an integrating sphere and calibrated spectroradiometer to determine a highly accurate factor for obtaining PAR values, which are then applied to goniophotometric data.



The Phantom DE Systems consistently outperform the competition on every level!



Shows how efficient a luminaire is by comparing the total rated output of a bare lamp versus what percentage actually reaches the plant canopy when the lamp is installed in a luminaire. Luminaire efficiency takes into account the effect of the luminaire on the performance of the lamp. This testing was performed using a Type C goniophotometer in conjunction with an integrating sphere and calibrated spectroradiometer, which provided very accurate calculation of photon flux, spectral power distribution, and umol/s output.

Shows the total amount of plant usable light or PAR being emitted by the fixture.

Shows how much plant usable light or PAR is being delivered in relation to the wattage the fixture consumes (how effectively the fixture converts electricity into plant usable light or PAR).

PHANTOM OPEN AND ENCLOSED DE SYSTEMS SPECIFICATIONS

PHANTOM DE 208/240V PHDEKT1 or PHDEKT5	PHANTOM DE 120/208/240V PHDEKT2 or PHDEKT52	PHANTOM DE 277V PHDEKT3 or PHDEKT53	PHANTOM DE 347V PHDEKT4 or PHDEKT54
Product/Ship Weight: 18.4 lbs.	Product/Ship Weight: 18.4 lbs.	Product/Ship Weight: 18.4 lbs.	Product/Ship Weight: 18.4 lbs.
Package Dimensions: 19.8"L x 10.8"W x 12.0"H	Package Dimensions: 19.8"L x 10.8"W x 12.0"H	Package Dimensions: 19.8"L x 10.8"W x 12.0"H	Package Dimensions: 19.8"L x 10.8"W x 12.0"H
Rated Wattage: 1000W	Rated Wattage: 1000W	Rated Wattage: 1000W	Rated Wattage: 1000W
Voltage: 208/240V 60 Hz	Voltage: 120/208/240V 60 Hz	Voltage: 277V 60 Hz	Voltage: 347V 60 Hz
Rated Amperage: 5.1/4.5A @ 100%	Rated Amperage: 8.9/5.1/4.5A @ 100%	Rated Amperage: 3.8A @ 100%	Rated Amperage: 3.0A @ 100%
Lamp: Agrosun 1000W DE HID 2100 μmol	Lamp: Agrosun 1000W DE HID 2100 μmol	Lamp: Agrosun 1000W DE HID 2100 μmol	Lamp: Agrosun 1000W DE HID 2100 μmol
Reflector: Phantom Open DE or Phantom DE Enclosed	Reflector: Phantom Open DE (DE1000Lh)	Reflector: Phantom Open DE (DE1000Lh)	Reflector: Phantom Open DE (DE1000Lh)
Ballast Type: Phantom DE Smart Ballast	Ballast Type: Phantom DE Smart Ballast	Ballast Type: Phantom DE Smart Ballast	Ballast Type: Phantom DE Smart Ballast



Patented reflector design (D731,109) and other patents pending

