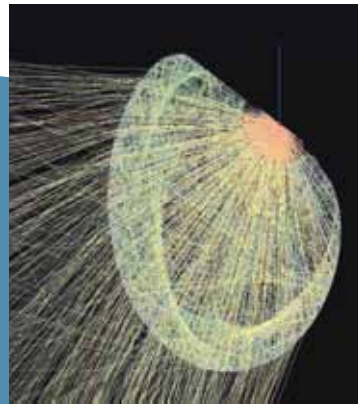
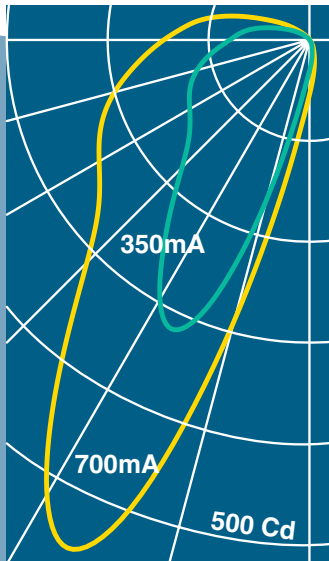




fraqtir™ point LED for wall washing



Product FAQs



THE LIGHTING QUOTIENT™

Q: What is fraqtir™?

A: fraqtir is a proprietary optic invented by The Lighting Quotient that combines principles of refraction and total internal reflection.

Q: What does the fraqtir do?

A: The fraqtir optic efficiently channels and transforms light from an array of LEDs into a highly effective asymmetric distribution ideal for illuminating surfaces evenly from one edge.

Q: What is the fraqtir made of?

A: The fraqtir is a precision molded lens made of high temperature water-clear optical acrylic.

Q: What is fraqtir point?

A: fraqtir point is our latest line of low profile LED luminaires used primarily for wall washing. The asymmetric forward distribution produces a uniform wash of light from top to bottom. The wide lateral distribution allows for greater on-center spacing to minimize the number of luminaires required while maintaining excellent uniformity.

Q: Is fraqtir patented?

A: U.S. and foreign patents are pending.

Q: Is there a cover lens?

A: The optical assembly is covered with an extruded impact resistant acrylic snap fit lens. The lens protects the refractor and LED components while providing a surface for easy wipe down.

Q: Why do you use a holographic diffusion film under the protective lens?

A: The holographic diffusion film diffuses light in an elliptical pattern. The lateral distribution is enhanced while only slightly softening the forward asymmetric distribution.

Q: Thermal management is crucial to proper operation of LEDs. How do you remove heat from the LED?

A: We use a two-piece extruded aluminum heat sink. The inner portion, or “light engine,” supports the LED board and fraqtir optic. It nests inside an outer extrusion, which has the proper mass and

surface area for optimal heat dissipation as well as a special anodic coating to maximize thermal emissivity.

Q: Which LEDs do you use with the fraqtir and why?

A: We use only Philips Lumileds LUXEON A emitters for consistent color over all angles, eliminating color separation as light passes through the fraqtir optic.

Q: What color temperatures are available?

A: Currently the Philips Lumileds LUXEON A emitters are available in 2700K and 3000K, with 3500K and 4100K expected soon.

Q: Can the light engine be removed for servicing or upgrade?

A: Yes, the light engine (inner heat sink, LED board and fraqtir optic) can be removed in the unlikely event of a failure or future upgrade to a more advanced LED technology. All boards are identified to ensure proper matching of color and light output with replacement modules. Wire trap terminals on the board allow for quick and easy removal and replacement of the board.

Q: How can I assure that my replacement light engine will match the others?

A: LUXEON A emitters have eliminated the need

for binning – all emitters fall within a three-step MacAdam ellipse centered on the black body curve. Every LED light engine is identified by emitter type to ensure the proper replacement light engine is used.

Q: If an LED fails, will all of the other LEDs in the string also fail?

A: No, if an individual LED were to fail, it fails in a “closed” condition. That allows current to flow to the remaining LEDs, minimizing the overall impact on light output.

Q: As LEDs continue to improve, will you continue to offer light engines with the same light output?

A: Yes, as LED technology continues to improve we will be able to use fewer LEDs to achieve the same light output as well as offer higher light output options. The enhanced lateral spread of the holographic film ensures that the appearance will remain the same even if fewer LEDs are used.

Q: What type of LED drivers do you use?

A: We use constant current drivers, keeping the board as simple as possible to maximize its efficiency while minimizing potential points of failure. By contrast, LED luminaires that rely on constant voltage drivers must incorporate

Q: Do you offer dimming drivers?

DIMMING DRIVERS

Manufacturer	eldoLED	Roal	Advance	LighTech	Lutron
Model	SOLOdrive	Strato	Xitanium	LED CC	A-Series
Input	120-277V	120-277V	120V	120-277V	120-277V
Dimming Control	0-10V Analog	0-10V Analog	0-10V Analog	Reverse Phase Control (ELV)	EcoSystem or 3-Wire
Dimming Range (power)	100%-0.1%	100%-10%	100%-20%	100%-10%	100%-1%
Number of Independent Output Channels	4	1	1	1	1
Remote Distance (ft) based on #18 AWG	70	50	50	30	10

Note: Not all drive currents (350mA or 700mA) are available for each type of driver. Consult factory for available drivers. Some drivers can operate multiple luminaires; eldoLED, for example, can operate up to four luminaires, reducing the number of remote drivers to install.

additional current-limiting devices onto the board, reducing efficiency and adding potential points of failure.

Q: Can LEDs be driven at different current levels?

A: Yes, although the standard operating current is 350mA DC (0.35 amps), it may be driven up to 700mA to achieve increased (high) light output. Doubling the drive current in this way doubles the power consumption while increasing light output by approximately 70-75%. As a result, the same fixture operated at high output experiences a lower efficacy (lumens per watt).

Q: Is fraqtir compatible with the Redwood Systems network platform?

A: Yes, Style S099 is available with a “Redwood Ready” option. These luminaires are provided with a special cord and quick connector to plug directly into the Redwood Adapter. Each Redwood Adapter can operate up to (3) units at maximum drive current of 500mA (Redwood System platform maximum). All Redwood Systems components are supplied by others.

Q: What is your warranty period and what does it cover?

A: We offer a 5 year warranty on our LED products from the date of manufacture. A “failure” in an LED product occurs when the LEDs are no longer operating due to failure of the LED emitter, LED circuit board and/or LED circuit board connectors. Drivers carry a 3 to 5 year warranty by the driver manufacturer.

Luminaire	fraqtir point @ 350mA	fraqtir point @ 700mA
Test Number	ITL68987	ITL68988
Model Number	S099-	S099-
Light Output	461 lumens	815 lumens
Power Input	8.89 watts	17.7 watts
Efficacy	51.9 lumens per watt	46.0 lumens per watt
Peak Intensity	317 candela	557 candela
CCT (nom. 3000K)	2953K	3015K
CRI	85	84

Q: Has the S099 been tested by an independent NVLAP (NIST) accredited lab?

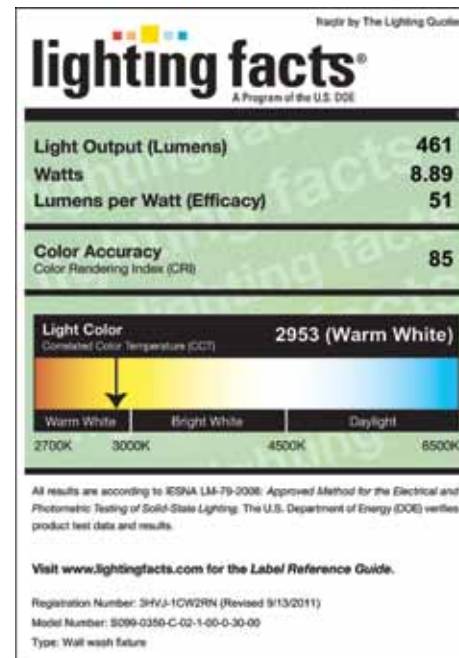


A: Yes, the S099 was tested by ITL Boulder, a NVLAP accredited lab. The LM-79-08 test results for the S099 illustrate increases in efficacy, light output, CCT and CRI as well better photometric distribution due to improvements in the LEDs as well as the fraqtir optic itself (see table).

Q: What is Cradle to Cradle® certification?

A: Cradle to Cradle® certification assesses a product’s safety to humans and the environment and design for future life cycles. The materials and manufacturing practices of each product are assessed in five categories: Material Health, Material Reutilization,

labels for fraqtir point @ 350mA (L) and 750mA (R)



Renewable Energy Use, Water Stewardship, and Social Responsibility. The S099 fraqtir point is Cradle to Cradle certified SILVER.

Cradle to Cradle Certified™ is a certification mark licensed by the Cradle to Cradle Products Innovation Institute.

Q: Do you have a Lighting Facts label?

A: We have two Lighting Facts labels to show the difference in performance when operating at 350mA and 700mA.

Q: Do you have ENERGY STAR® certification?

A: ENERGY STAR no longer offers a category for SSL Wall Washers. We are pursuing certification through DesignLights Consortium as well as working directly with some major utility companies to enroll in their applicable programs.



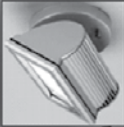
THE LIGHTING QUOTIENT

Q: Do you offer any energy saving controls for use with the S099?

A: The Lighting Quotient offers several wireless controls and devices based on the EnOcean protocol. Compatible dimming controls (by others) are available. See website for dimming compatibility and specifications.

20' x 30' x 8'H room, 18 luminaires, 2.5ft setback from walls	100W Halogen Surface Mount	26W Quad Tube CFL Surface Mount	20W CMH Surface Mount	fraqtir point Surface Mt, 700mA
Light Output per fixture (lumens)	668	632	710	815
Input Power (watts)	100	29	24	17.7
Luminaire Efficacy (lumens per watt)	7	22	30	46
Average Wall Illuminance (footcandles)	18	16	18	20
Uniformity (maximum/minimum)	3.9	4.5	2.9	2.8
Application EFFICIENCY (percent of light to wall)	83%	76%	78%	78%


100W Halogen ceiling mounted wall washer
668 lumens, 100W, 6.68 lumens per watt



17.8 fc average initial
Max to Min: 3.9

Lumens delivered to walls: 83%
Lumens per watt delivered to target: 5.5 lm/W


26W Quad CFL ceiling mounted wall washer
632 lumens, 29W, 21.8 lumens per watt



15.6 fc average initial
Max to Min: 4.5

Lumens delivered to walls: 76%
Lumens per watt delivered to target: 17 lm/W


20W Ceramic MH ceiling mounted wall washer
710 lumens, 24W, 29.6 lumens per watt



17.8 fc average initial
Max to Min: 2.9

Lumens delivered to walls: 78%
Lumens per watt delivered to target: 23 lm/W

LED ceiling mounted wall washer (fraqtir @ 700mA)
815 lumens, 17.7W, 46 lumens per watt



fraqtir point
20.4 fc average initial
Max to Min: 2.8

Lumens delivered to walls: 78%
Lumens per watt delivered to target: 36 lm/W