

## Description

Recessed LED module with interchangeable 2-inch round or square wall wash apertures are available in various finishes to suit any décor. Use with 4-inch nominal recessed housings suitable for residential and shallow plenum commercial construction or can be used to retrofit existing installations. Asymmetric primary optic redirects light through linear spread lens providing useful vertical foot-candles. Use to light walls, paintings and textured surfaces including stone, masonry and wood when energy savings, long life and optical control are required.

Catalog #		Type	
Project			
Comments		Date	
Prepared by			

## Specification Features

### Module

- Field interchangeable and upgradable LED module consists of LED array, primary optic and driver
- Integral die cast aluminum heat sink provides passive thermal cooling achieving L70 at 50,000 hours in IC and non-IC applications

### Retention

- Stainless steel springs hold module securely in the housing, can be removed thru the aperture for service or replacement

### LED Array

- Proximity phosphors over chip on board LEDs provide a uniform source with high efficiency and no pixilation
- Available in 90 CRI minimum, R9 greater than 50 and color accuracy within 3 SDCM provide color accuracy and uniformity

### Gaskets

- Closed cell gaskets achieve restrictive airflow requirements without additional caulking

### Trims

- Die formed steel trims are available in 2-inch round or square pinhole apertures and can be interchanged in the field
- Available in a broad range of painted or plated finishes, can be painted in the field to match any décor
- Magnetic attachment holds trim tightly to ceiling and eliminates light leaks.

### Media

- Integral media holder provided accepts (1) 2" diameter 3.0mm thick color filters, lens or louvers
- Order media separately

### Primary Optic

- Precision molded TIR optic organizes source flux into useful beams without stray lumens in the field
- Two-piece construction with matte black mounting ring and polarized turn and lock mounting aligns optic to source and minimizes backlight in the housing
- Exceeds ENERGY STAR® color angular uniformity requirements, color deviation is typically less than 0.002 u' v'.
- Available in spot, narrow flood, flood and wide flood distributions, ships with narrow flood or flood factory installed, order alternate distributions or replacement separately
- Integral media holder accepts (1) lens or louver

### VividTune

- D2W™ dim-to-warm option shifts color temperature from 3000 K to 1850 K as fixture dims mimicking the black body dimming response of halogen sources

### Driver

- Integral UNV 120 - 277V 50/60 Hz constant current driver provides noise free operation and can be replaced in the field
- Continuous, flicker-free dimming from 100% to 5% with select leading or trailing edge 120V phase cut dimmers
- Optional UNV 120-277V 50/60 Hz driver with 0 -10V analog dimming from 100% to 5%, provided with inline electrical quick connect for low voltage connections
- Medium base (E26) to CJT adapter (provided) provides mains connection.

### Compliance

- cULus listed for use with Halo housings, classified for use with other's housings, see instruction sheet for conditions of acceptability
- Wet location listed, covered ceilings only.
- Airtight per ASTM-E283
- Suitable for use in clothes closets when installed in accordance with the NEC 410.16 spacing requirements
- EMI/RFI emissions per FCC 47CFR Part 15 consumer limits
- Contains no mercury or lead and RoHS compliant
- Photometric testing in accordance with IES LM-79-08
- Lumen maintenance projections in accordance with IES LM-80-08 and TM-21-11
- Can be used for State of California Title 24 high efficacy LED compliance under JA8, reference Modernized Appliance Efficiency Database System (MAEDBS) for 2016 JA8 High Efficacy Lighting
- Certified to State of California Title 20, State-regulated LED Lamp; reference Modernized Appliance Efficiency Database System (MAEDBS) for State-regulate d LED Lamp
- ENERGY STAR® certified, reference Certified Light Fixtures database.

### Warranty

Five year limited warranty, consult website for details.

[www.eaton.com/lighting/legal](http://www.eaton.com/lighting/legal)



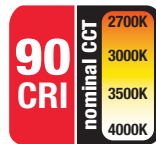
**ML4D**

**TL45R**

**TL46S**

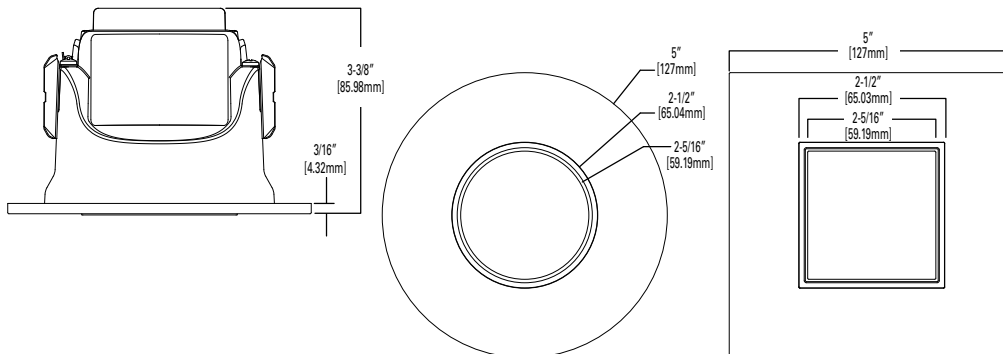
**2-Inch Round and Square Lens Wall Washer**

**Up to 700 lumens**



Refer to ENERGY STAR® Qualified Products List. Can be used to comply with California Title 24 High Efficacy requirements. Certified to California Appliance Efficiency Database under JA8. Indoor LED nominal CCT of 4000K or less.

## Dimensions



## ENERGY DATA

Lumens	900 Series	
Input Voltage	120V	277V
Input Current	107 (mA)	50 (mA)
Input Power	12.8 (W)	12.5 (W)
Inrush (A)	1.1 (A)	1.9 (A)
THD: ≤ 20%		
PF: ≥ 0.90		
T Ambient -40 - +40°C		
Sound Rating ≤ 20dba		

**Ordering Information**

**SAMPLE NUMBER:** ML4D09NFL927E - TL45R6GMWWB

A complete luminaire consists of a housing, LED module and trim, order separately.

Models	Lumens	Distribution	CRI/CCT	Driver	Accessories
<b>ML4D</b> = 4" LED module	<b>09</b> =900 lumens (nominal)	<b>NFL</b> =25 degree narrow flood <b>FL</b> =40 degree flood	<b>927</b> =90 CRI (min), 2700K <b>930</b> =90 CRI (min), 3000K <b>935</b> =90 CRI (min), 3500K <b>940</b> =90 CRI (min), 4000K <b>D2W</b> =90 CRI (min) color shifts from 3000 to 1850K mimicking black body dimming <sup>3</sup>	<b>E</b> =UNV 120 - 277V 50-60Hz, LE & TE phase cut 5% dimming at 120V only <b>E010</b> =UNV 120 - 277V 50-60Hz, 0 - 10V analog 5% dimming <sup>1</sup>	<b>TIR45SP15</b> =15° spot <b>TIR45NFL25</b> =25° narrow flood <b>TIR45FL40</b> =40° flood <b>TIR45WFL55</b> =55° wide flood <b>TIR50AWW25</b> =25° narrow flood asymmetric / wall wash <b>TIR45MH12PK</b> =replacement media holder, package of 12 <b>L100 Series</b> =2.0" lens and filters, see spec sheet

Trims	Shielding	Flange Finish	Accessories
<b>TL45R</b> = 2" round asymmetric / lens wall wash <b>TL46S</b> = 2" square asymmetric / lens wall wash	<b>6G</b> =Linear spread lens	<b>MWWB</b> =Matte white flange, white lens frame <b>MWBB</b> =Matte white flange, black lens frame	<b>T24HWKIT</b> =Title 24 hard wire kit, converts incandescent, low voltage and compact fluorescent housings to LED

**Housings**

**Halo Ultra-shallow LED Housings**

**H245ICAT**=4" IC, airtight ultra-shallow new construction housing, LED, 120 - 277V  
**H245RICAT**=4" IC, airtight ultra-shallow remodeler housing, LED, 120 - 277V

**Halo LED Housings**

**H995ICAT**=4" IC, airtight shallow new construction housing, LED, 120 - 277V  
**H995RICAT**=4" IC, airtight shallow remodeler housing, LED, 120 - 277V

**Halo Housings\***

**H45ICATD010**=4" IC, airtight shallow new construction housing, LED, 120 - 277V, 0 - 10V dimming  
**H45RICATD010**=4" IC, airtight shallow remodeler housing, LED, 120 - 277V, 0 - 10V dimming  
**H99TAT**=4" non-IC, airtight shallow new construction housing, E26, 120V  
**H99RTAT**=4" non-IC, airtight shallow remodeler housing, E26, 120V  
**H99ICAT**=4" IC, airtight shallow new construction housing, E26, 120V  
**E4TATSB**=4" non-IC, airtight shallow new construction housing, adjustable socket bracket, E26, 120V  
**E4RTATSB**=4" non-IC, airtight shallow remodeler housing, adjustable socket bracket, E26, 120V  
**E4ICATSB**=4" non-IC, airtight shallow new construction housing, adjustable socket bracket, E26, 120V  
**H4NCMF**=4" new construction mounting frame

**Halo Surface Mount Housings**

**HS4R**=Surface round, 120-277V  
**HS4S**=Surface square, 120-277V



**HE26LED\***  
Requires Edison Base Adapter for retrofit (order separately)

**Notes:**

1. The TL45R\* and TL46S\* trims ship with the TIR50AWW25 25° narrow flood asymmetric / wall wash optic
2. For 0-10V control the "E010=UNV 120 - 277V 50-60Hz, 0 - 10V analog 5% dimming" option must be used with either H45ICATD010 or H45RICATD010 housings
3. Actual lumens for D2W.

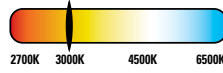
**Photometry**

**ML4D09\_930 - TIR50AWW25 - TL45R6GMWBB - TL46S6GMWBB**

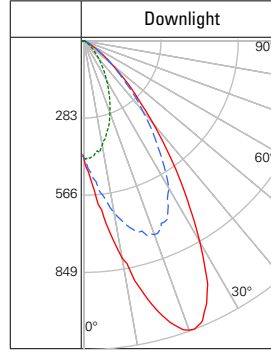
Description	Halo 2 Inch ML4 Round and Square Wall Wash- MWWB
Test Number	P275385
Module	900 Series, 90CRI
Trim	TL45R6GMWBB / TL46S6GMWBB
Lumens	651 Lm
Efficacy	57.6
Spacing Criteria	1.32

**Color Metric Summary**

TM-30-15	R <sub>f</sub> = 92.7
	R <sub>g</sub> = 99.1
CRI/ CIE	R <sub>a</sub> = 94.2
	R <sub>9</sub> = 59.9



**Candlepower Distribution**



**Candelas at Nadir**

Angle	0-deg
0	429
5	600
10	808
20	1129
30	851
40	396
50	136
60	30
70	3
80	1
90	0

**Single Unit Footcandles  
2.5' from wall  
(distance from fixture along wall)**

DD	•	1'	2'	3'
1'	0.6	0.5	0.2	0.1
2'	9	6.3	2.6	0.7
3'	16.9	12.6	5.7	1.9
4'	17.8	14.2	7.4	3.1
5'	14.5	12.1	7.2	3.5
6'	10.2	8.8	5.8	3.2
7'	6.9	6.2	4.5	2.8
8'	4.6	4.2	3.3	2.2
9'	3.2	3	2.4	1.7
10'	2.2	2.1	1.8	1.4

**Multiple Unit Footcandles  
2.5' from wall  
(spacing between fixtures)**

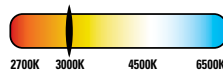
•	-- 3' --	•
0.7	0.8	0.7
9.7	8.6	9.7
18.9	17.8	18.9
20.9	21.4	20.9
18	19.3	18
13.4	14.9	13.4
9.6	10.7	9.6
6.8	7.6	6.8
4.9	5.4	4.9
3.6	3.9	3.6

**ML4D09\_930 - TIR50AWW25 - TL45R6GMWBB - TL46S6GMWBB**

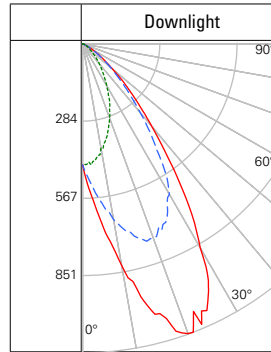
Description	Halo 2 Inch ML4 Round and Square Wall Wash MWBB
Test Number	P27791
Module	900 Series, 90CRI
Trim	TL45R6GMWBB / TL46S6GMWBB
Lumens	691 Lm
Efficacy	61.1
Spacing Criteria	1.33

**Color Metric Summary**

TM-30-15	R <sub>f</sub> = 92.7
	R <sub>g</sub> = 99.1
CRI/ CIE	R <sub>a</sub> = 94.2
	R <sub>9</sub> = 59.9



**Candlepower Distribution**



**Candelas at Nadir**

Angle	0-deg
0	444
5	619
10	827
20	1132
30	864
40	396
50	143
60	41
70	8
80	2
90	0

**Single Unit Footcandles  
2.5' from wall  
(distance from fixture along wall)**

DD	•	1'	2'	3'
1'	1.3	0.9	0.4	0.2
2'	9.4	6.7	2.6	0.7
3'	16.9	12.6	5.7	2
4'	18.5	14.6	7.4	3
5'	14.8	12.2	7.3	3.5
6'	9.8	8.9	5.9	3.4
7'	6.9	6.1	4.4	2.8
8'	4.6	4.2	3.3	2.3
9'	3.2	3	2.4	1.8
10'	2.3	2.1	1.8	1.4

**Multiple Unit Footcandles  
2.5' from wall  
(spacing between fixtures)**

•	-- 3' --	•
1.4	1.1	1.4
10.2	8.8	10.2
18.9	17.9	18.9
21.4	21.6	21.4
18.2	19.9	18.2
13.2	14.9	13.2
9.7	10.7	9.7
6.8	7.6	6.8
4.9	5.5	4.9
3.7	4	3.7

**Multiplier Table**

CCT Option	2700K	3000K	3500K	4000K
CCT Multiplier	0.93	1.00	1.04	1.06

Representative photometric test report for 3000K color temperature, 90CRI. Multipliers may be used to determine other relative CCT values.