

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 thru linear spread lens providing useful vertical food-candles. Use to light walls, paintings and textured surfaces including stone, masonry and wood.

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

- Heat treated compression 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.
- Compatible with Zhaga book 12 standards for interchangeability and can be replaced in the field.

Gaskets

- Closed cell gaskets achieve restrictive airflow requirements without additional caulking.

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'.
- Requires asymmetric TIR optic, provided with lens wall wash trims.
- Angle cut mounting ring insures alignment with spread lens.

Trims

- Die formed steel trims are available in 2-inch round or square apertures and can be interchanged in the field.
- Integral angled spread lens provides useful vertical food-candles.
- Available in painted finishes, can be painted in the field to match any décor.
- Magnetic attachment holds trim tightly to ceiling and eliminates light leaks.

Driver

- Integral UNV 120 - 277V 50/60 Hz constant current driver provides noise free operation.
- Continuous, flicker-free dimming from 100% to 5% with select leading or trailing edge 120V phase cut dimmers.
- Inline electrical quick connect and E26 adapter (provided) provides mains connection.
- Driver can be replaced in the field.

Compliance

- cULus listed / certified for use with Halo housings, classified for use with other's housings, see instruction sheet for conditions of acceptability.
- Wet location listed in covered ceilings and IP65 certified.
- 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 B.
- 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 luminaire compliance, reference the California Energy Commission Title 20 Appliance Efficiency Database for current listings.
- ENERGY STAR® listed, reference qualified product listings.
- Meets State of California voluntary lamp standards.
- Zhaga book 12 compatible.

Warranty

Five year limited warranty, consult website for details.
www.eaton.com/lighting/Legal



**ML4D
TL45R
TL46S**

**900 Lumen Series
LED**

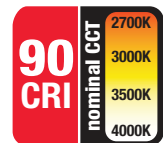
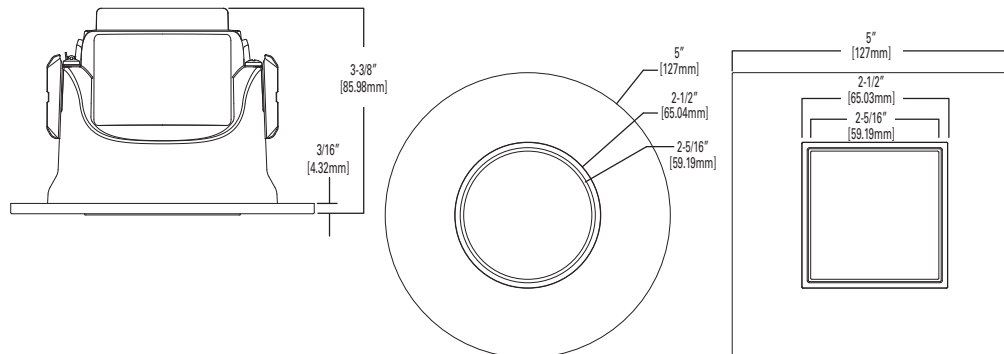
**2-Inch Round and Square
Lens Wall Washer**



Refer to ENERGY STAR® Certified Products List. Can be used to comply with California Title 24 High Efficacy requirements. Certified to California Title 20 Appliance Efficiency Database.

Eaton is a founding member of the Zhaga Consortium

Dimensions



ENERGY DATA		
Lumens	900 Series	
Input Voltage	120V	277V
Input Current	101.6 (mA)	45.7 (mA)
Input Power	12.1 (W)	11.9 (W)
Efficiency	84.93 %	83.45 %
Inrush (A)	1.3	4.7
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
ML4D = 4" LED module	09 =900 lumens (nominal)	NFL =25 degree narrow flood	927 =90 CRI , 2700K 930 =90 CRI , 3000K 935 =90 CRI , 3500K 940 =90 CRI , 4000K	E =UNV 120 - 277V 50-60Hz, LE & TE phase cut 5% dimming at 120V only	TIR50AWW25 =asymmetric wall wash

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

Housings
<p>H245RICAT=4" IC, airtight ultra-shallow remodeler housing, LED, 120 - 277V 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 H995ICAT=4" IC, airtight shallow new construction housing, LED, 120 - 277V H995RICAT=4" IC, airtight shallow remodeler housing, LED, 120 - 277V 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 HS4R=Surface round, 120-277V HS4S=Surface square, 120-277V</p>

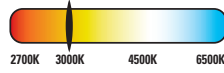
Photometry

ML4D09NFL927-TIR50AWW25-TL45R6GMWWB

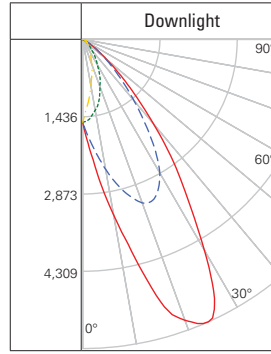
Description	Halo 2 Inch ML4 Round Wall Wash-MWWB
Test Number	P27790
Module	900 Series, 90CRI
Trim	TL45R6GMWWB
Lumens	617 Lm
Efficacy	55.06
Spacing Criteria	1.5
Peak intensity	1249
Peak angle	23

Color Metric Summary

TM-30-15	R _f = 91.4
	R _g = 97.6
CRI/ CIE	R _a = 92.7
	R ₉ = 56.9



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	333
5	487
10	717
20	1203
30	979
40	443
50	131
60	22
70	3
80	2
90	0

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

DD	•	1'	2'	3'
1'	0.5	0.5	0.3	0.1
2'	8.3	5.7	2	0.5
3'	19	13.4	5.5	1.7
4'	20.2	15.6	7.4	2.8
5'	17	13.4	7.5	3.4
6'	11.3	9.7	6.1	3.2
7'	7.3	6.4	4.5	2.7
8'	4.8	4.2	3.2	2.1
9'	3.2	2.9	2.3	1.6
10'	2.1	2	1.7	1.2

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

•	-- 3' --	•
0.7	0.9	0.7
10.3	11.4	10.3
24.5	26.8	24.5
27.7	31.2	27.7
24.5	26.8	24.5
17.4	19.4	17.4
11.8	12.8	11.8
8.1	8.5	8.1
5.5	5.8	5.5
3.8	4.1	3.8

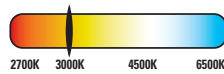
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0.6	0.6	0.6
8.7	7.3	8.7
20.6	18.3	20.6
23	22.4	23
20.3	21	20.3
14.4	15.8	14.4
10	11	10
7	7.6	7
4.8	5.3	4.8
3.4	3.7	3.4

ML4D09NFL930-TIR50AWW25-TL45R6GMWBB

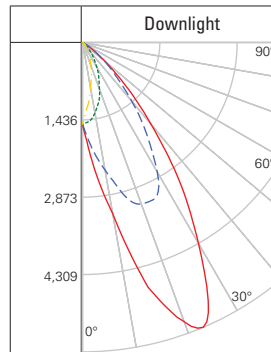
Description	Halo 2 Inch ML4 Round Wall Wash MWBB
Test Number	P27791
Module	900 Series, 90CRI
Trim	TL45R6GMWBB
Lumens	575 Lm
Efficacy	51.32
Spacing Criteria	1.48
Peak intensity	1256
Peak angle	23

Color Metric Summary

TM-30-15	R _f = 91.3
	R _g = 97.6
CRI/ CIE	R _a = 92.7
	R ₉ = 56.8



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	332
5	496
10	704
20	1206
30	943
40	432
50	121
60	16
70	1
80	1
90	0

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

DD	•	1'	2'	3'
1'	0.2	0.2	0.1	0
2'	7.7	5.2	1.7	0.3
3'	18.5	13.2	5.2	1.5
4'	19.9	14.9	7.2	2.7
5'	16.2	13.1	7.2	3.2
6'	11.4	9.5	6	3.1
7'	7.3	6.5	4.4	2.7
8'	4.8	4.3	3.2	2.1
9'	3.2	2.9	2.3	1.6
10'	2.2	2	1.7	1.3

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

•	-- 3' --	•
0.3	0.4	0.3
9.4	10.4	9.4
23.7	26.5	23.7
27.1	29.8	27.1
23.4	26.3	23.4
17.4	18.9	17.4
11.7	12.9	11.7
8	8.7	8
5.5	5.9	5.5
3.9	4	3.9

•	-- 4' --	•
0.3	0.3	0.3
8	6.4	8
20.1	17.6	20.1
22.6	21.6	22.6
19.4	20.2	19.4
14.5	15.6	14.5
9.9	10.9	9.9
6.8	7.6	6.8
4.8	5.3	4.8
3.5	3.8	3.5

Multiplier Table

CCT Option	2700K	3000K	3500K	4000K
CCT Multiplier	0.946	1.000	1.020	1.042

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

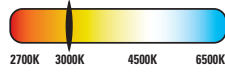
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ML4D09NFL935-TIR50AWW25-TL46S6GMWWB

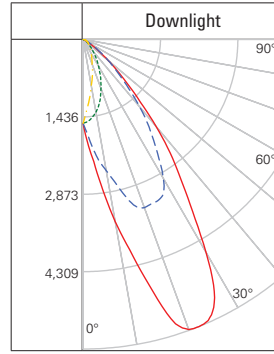
Description	Halo 2 Inch ML4 Square Wall Wash-MWWB
Test Number	P27792
Module	900 Series, 90CRI
Trim	TL46S6GMWWB
Lumens	636 Lm
Efficacy	56.28
Spacing Criteria	1.5
Peak intensity	1255
Peak angle	23

Color Metric Summary

TM-30-15	R _f = 91.4
	R _g = 97.6
CRI/CIE	R _a = 92.7
	R ₉ = 57.3



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	335
5	490
10	738
20	1233
30	984
40	453
50	134
60	22
70	3
80	2
90	0

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

DD	•	1'	2'	3'
1'	0.5	0.5	0.3	0.1
2'	8.5	6	2.4	0.7
3'	19.4	13.6	5.9	1.9
4'	20.1	15.7	7.7	3.1
5'	16.8	13.3	7.7	3.5
6'	11.2	9.8	6.1	3.3
7'	7.5	6.5	4.6	2.7
8'	4.9	4.3	3.3	2.1
9'	3.2	3	2.3	1.7
10'	2.2	2.1	1.7	1.3

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

•	-- 3' --	•
0.7	0.9	0.7
10.9	11.9	10.9
25.3	27.3	25.3
27.8	31.3	27.8
24.5	26.7	24.5
17.4	19.6	17.4
12.1	13.1	12.1
8.3	8.7	8.3
5.6	5.9	5.6
3.9	4.1	3.9

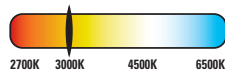
•	-- 4' --	•
0.6	0.7	0.6
9.2	8.1	9.2
21.3	19	21.3
23.2	22.8	23.2
20.3	21.2	20.3
14.6	15.9	14.6
10.2	11.2	10.2
7.1	7.8	7.1
4.9	5.4	4.9
3.5	3.8	3.5

ML4D09NFL940-TIR50AWW25-TL46S6GMWBB

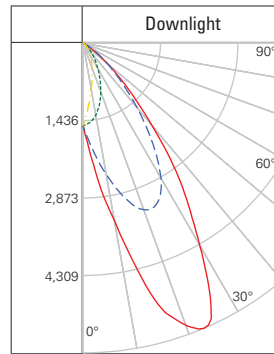
Description	Halo 2 Inch ML4 Square Wall Wash-MWBB
Test Number	P27793
Module	900 Series, 90CRI
Trim	TL46S6GMWBB
Lumens	594 Lm
Efficacy	52.57
Spacing Criteria	1.49
Peak intensity	1237
Peak angle	23

Color Metric Summary

TM-30-15	R _f = 91.4
	R _g = 97.6
CRI/CIE	R _a = 92.7
	R ₉ = 57.0



Candlepower Distribution



Candelas at Nadir

Angle	0-deg
0	330
5	489
10	717
20	1199
30	933
40	427
50	128
60	19
70	2
80	1
90	0

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

DD	•	1'	2'	3'
1'	0.3	0.2	0.1	0
2'	8.1	5.7	2.2	0.6
3'	18.3	13.4	5.8	1.8
4'	19.6	15.2	7.6	3
5'	16.3	13.2	7.4	3.5
6'	11.2	9.6	6.1	3.2
7'	7.2	6.4	4.5	2.7
8'	4.8	4.3	3.2	2.2
9'	3.2	3	2.3	1.6
10'	2.2	2.1	1.7	1.2

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

•	-- 3' --	•
0.5	0.5	0.5
10.4	11.3	10.4
24.1	26.7	24.1
27.2	30.4	27.2
23.7	26.3	23.7
17.4	19.2	17.4
11.8	12.8	11.8
8	8.6	8
5.6	5.9	5.6
3.9	4.1	3.9

•	-- 4' --	•
0.4	0.4	0.4
8.7	7.6	8.7
20.1	18.3	20.1
22.6	22.4	22.6
19.8	20.4	19.8
14.4	15.8	14.4
9.9	10.9	9.9
7	7.6	7
4.9	5.4	4.9
3.4	3.8	3.4

Multiplier Table

CCT Option	2700K	3000K	3500K	4000K
CCT Multiplier	0.946	1.000	1.020	1.042

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