



Weaver

CONSTRUCTION MANAGEMENT

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SUBMITTAL TRANSMITTAL

May 18, 2012

Submittal #: 16511-003
(Includes Section 16521)

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan
Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **McDade Woodcock, Inc.**
7222 Commerce Center Drive, #245
Colorado Springs, CO 80909
719-264-1236

SUBJECT: Interior & Exterior Lighting for P&D Building - Types C, J, K & L

SPEC SECTION: 16511: Interior Lighting & 16521 - Exterior Lighting

PREVIOUS SUBMISSION DATES: none

DEVIATIONS FROM SPEC: ___ YES x NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:

Engineer's Stamp:

Date: 5/18/12

Reviewed by: John Jacob

(X) Reviewed Without Comments

() Reviewed With Comments

ENGINEER'S
COMMENTS: _____



McDADE-WOODCOCK, INC.

HAROLD D. THOMPSON RWRF
PUMPING & DISINFECTION
BUILDING

McDADE-WOODCOCK INC.
PROJECT NUMBER - 1402

ELECTRICAL SUBMITTAL

LIGHTING
(INTERIOR & EXTERIOR)

16511-003

16521-003

TABLE OF CONTENTS

TAB 1: Type C
TAB 2: Type J
TAB 3: Type K
TAB 4: Type L

CORPORATE

2404 Claremont Ave. NE
Albuquerque, NM 87107

Mailing Address
P.O. Box 11592
Albuquerque, NM 87192

Ph 505-884-0155
Fax 505-884-6073

DENVER

10700 E. Geddes Avenue
Suite 170
Englewood CO 80112

Ph 303-803-1809
Fax 303-803-1818

COLORADO SPRINGS

7222 Commerce Center Drive
Suite 245
Colorado Springs, CO 80919

Mailing Address
P.O. Box 7349
Colorado Springs, CO 80933

Ph 719-264-1236
Fax 719-264-1450



McDADE-WOODCOCK, INC.

HAROLD D. THOMPSON RWRF
PUMPING & DISINFECTION
BUILDING

McDADE-WOODCOCK INC.
PROJECT NUMBER - 1413

ELECTRICAL SUBMITTAL

LIGHTING
(INTERIOR & EXTERIOR)

16511-003

16521-003

*** * * APPROVAL PAGE * * ***

**This submittal has been reviewed,
checked and approved for
compliance by:**

McDADE-WOODCOCK INC. - (JLS)

This Date: 5/11/2012

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2404 Claremont Ave. NE
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LAREDO SERIES

LMC SERIES **NEW** LED SYSTEM

HDT - RWRF Pumping and Disinfection Bldg.
Type: C LMC-150S8-1-LP

Cat.#	Approvals	
Job	Type	



SPECIFICATIONS

Intended Use:

Full cutoff perimeter or entry lighting for 10-15ft mounting heights that require high light output and maximum energy efficiency. Laredo LMC LED provides low installation costs with little or no maintenance and great energy savings. Ideal for schools, factories, hospitals, warehouses and retail applications.

Construction:

Decorative die cast aluminum housing and door. Rugged design protects internal components and provides excellent thermal management for long life. 70% lumen maintenance at 50,000 hours minimum. 800 series powder paint finishes provide lasting appearance in outdoor environments. Five standard finishes include: Bronze, Black, Gray, White and Platinum. Multiple options customize including a tool-free latch, which allows re-lamping of HID units from the ground, photocontrol for energy savings, integral ballast back-up battery for fluorescent units, fusing, quartz standby and EM sockets for remote power, lamps and five standard finishes.

Optics:

LED: 18 High Power LEDs deliver 2039 lumens and combination of optical lenses and reflectors deliver light in a rectangular pattern with better than 3 to 1 max to min uniformity. 5000K/70 CRI LEDs provide excellent color rendition at 46 lumens per watt.

HID/CFL: Vertical lamp position (lamp is optional on HID and CFL units) provides maximum HID performance and life. Standard, removable front shield on single lamp units, reduces forward beam projection while maintaining lateral throw, if desired.

Distribution:

Full cutoff distribution - flat glass and optics provide wide spread with an environmentally friendly light control. IDA compliant.

Electrical:

Wide selection of wattage and sources including LED, pulse start electronic metal halide and fluorescent systems (see below).

LED Amp Draw: 0.4 AMPS max

Optional battery for emergency egress - 120V or 277V - provides 90 minutes/615 lumens

Installation:

Three 1/2" conduit hubs (top and sides), allow feed-thru surface wiring capability on HID and CFL units. Foam gasket for sealing to smooth surfaces with two or three key slot configuration. Mounting template included.

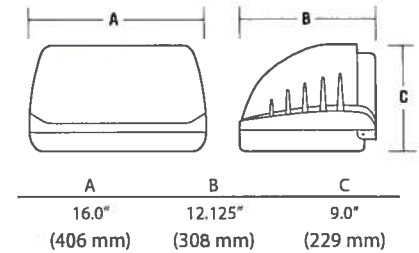
LED units, designed with quick mount system to provide rigid mounting over recessed junction boxes - fixture does not require opening for mounting.

Listings:

Listed and labeled to UL 1598 for wet locations, 25° C ambient environments. U.S. Patent No. D563,587

Limited Warranty:

One year HID & CFL, 5 years LED



ORDERING INFORMATION

ORDERING EXAMPLE: LMC-150P 8-1-TL

LMC	Wattage/Source/Voltage		Finish	Options
SERIES	WATTAGE/SOURCE/VOLTAGE	WATTAGE/SOURCE/VOLTAGE	FINISH	OPTIONS
LMC Laredo Medium Cutoff	LED*	ELECTRONIC METAL HALIDE	1 Bronze	PC(X) Button Photocontrol replace X with voltage, specify 1-120V, 2-208V, 3-240V, 4-277V
	18LU-5K 44.5w Universal Voltage 120-277V	70E ⁸ 8 70w Quad-Tap [®] 120, 208, 240, 277V	2 Black	
	PULSE START METAL HALIDE	100E ⁸ 8 100w Quad-Tap [®] 120, 208, 240, 277V	3 Gray	TL ⁴ Touch Latch, Tool-free Entry
	50P 9 50w 120/277V Dual Volt	ELECTRONIC FLUORESCENT	4 White	LP ² Lamp Included
	70P 8 70w Quad-Tap [®] 120, 208, 240, 277V	42F ⁸ 8 42w Quad-Tap [®] 120, 208, 240, 277V	5 Platinum	F(X) ¹ Fusing replace X with voltage, 1-120V, 2-208V, 3-240V, 4-277V
	70P 6 70w Tri-Tap [®] 120, 277, 347V	ELECTRONIC FLUORESCENT		QST ^{7,8} Time Delay Quartz stand by system less lamp
	100P 8 100w Quad-Tap [®] 120, 208, 240, 277V	84F ^{3,8} 8 84w Quad-Tap [®] 120, 208, 240, 277V		EM ^{3,7,8} DC Bayonet Socket (for remote power by others)
	100P 6 100w Tri-Tap [®] 120, 277, 347V	HIGH PRESSURE SODIUM		EM12 ^{3,7,8} MR11/MR16 Two Pin Socket (for 12V power by others)
	100P 5 100w 480V	70S 8 70w Quad-Tap [®] 120, 208, 240, 277V		2EM12 ^{3,7,8} Two MR11 or MR16 Two Pin Sockets (for 12V power by others)
*LED	150P 8 150w Quad-Tap [®] 120, 208, 240, 277V	70S 6 70w Tri-Tap [®] 120, 277, 347V		BBU-XXX ^{4,8} Emergency Battery Back-up, rated -4°F, 120 or 277V
18 LEDs, 44.5watts, 2039 lumens out of fixture, 5000K color, 70 CRI	150P 6 150w Tri-Tap [®] 120, 277, 347V	150S 8 150w Quad-Tap [®] 120, 208, 240, 277V		BOC-XXX ⁴ Emergency Battery Back-up, rated -0°C, 120 or 277V
	150P 5 150w 480V	150S 6 150w Tri-Tap [®] 120, 277, 347V		BOC-LED(X) LED Emergency Battery providing 615 lumens for egress on LMC18LU specify 1-120V or 4-277V
		150S 5 480V		

1 '0' in voltage selection indicates less ballast.
 2 For "Lamp included" option on fluorescent: indicate desired wattage: 42F - LP42, LP32, LP26; 84F - LP84 (2x42w), LP64 (2x32w), LP52 (2x26w).
 3 Lamps not included.
 4 BBU option provides integral emergency battery back up and operates one fluorescent lamp at up to 1250 lumens for a minimum of 90 minutes. Operation is reliable between -4°F and +131°F. Maximum output is achieved when the lamp temperature is 77°F. Eliminates the need for remote batteries or additional fixtures. On two lamp units (2x26w, 2x32w, 2x42w) battery powers one lamp to 1250 lumens.
 5 Two lamp fluorescent units have two electronic ballasts. Field wiring can provide switching for 50% fixture output if desired.
 6 50Hz/60Hz standard on electronic MH, Fluorescent or LED.
 7 Not available LED on two lamp CFL versions
 8 Not available on LED units

ACCESSORIES (order as separate part number)**LMC-SPC** Polycarbonate shield (.125 thickness)**PBT-1** 120V button photocontrol**PBT-234** 208/240/277V button photocontrol**REPLACEMENT PART****7737101** Polycarbonate Lens**PHOTOMETRICS**

Unit Description	IES File #
18 LED - Clear Lens	LMC-18LU-5K.IES
150w Pulse Start with Shield	LMC-150P-CS.IES
150w Pulse Start - Shield removed	LMC-150P.IES
100w Pulse Start with Shield*	LMC-100P-CS.IES
100w Pulse Start - Shield removed*	LMC-100P.IES
70w Pulse Start with Shield*	LMC-70P-CS.IES
70w Pulse Start - Shield removed*	LMC-70P.IES
150w HPS with Shield	LMC-150S-CS.IES
150w HPS - Shield removed	LMC-150S.IES
42w Fluorescent with Shield	LMC-42F-CS.IES
42w Fluorescent - Shield removed	LMC-42F.IES
2x42w Fluorescent - no Shield	LMC-84F.IES

*Output for magnetic pulse start or electronic ballast.

ENCLOSED INDUSTRIAL

EGL

SUBMITTAL:

T5

JOB:

TYPE:

VOLTAGE:

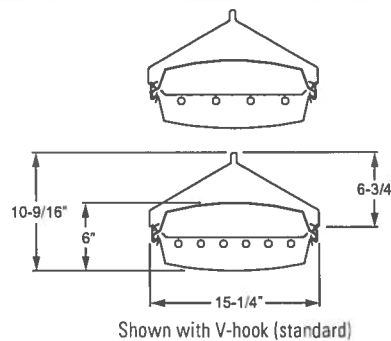
EXAMPLE **EGL - 4 - 6 54T5H - HIA - OPTIONS - EB2/2/2 - UNV**

SERIES NOMINAL LENGTH TOTAL LAMPS WATTAGE/TYPE SHIELDING OPTIKS/ACCESSORIES BALLAST TYPE VOLTAGE



FEATURES

- ▶ NEMA 4X, IP66, IP67, and NSF/ANSI Standard 2–Splash Zone certified.
- ▶ Hose-down tested at 1500 PSI @ 1.4 GPM to withstand water penetration.
- ▶ Can operate up to 40°C/104°F with high-ambient (HA/40C) option.¹
- ▶ Up to **91.3% optical efficiency**.
- ▶ Precisely formed lens provides maximum efficiency/reduced glare.
- ▶ Seamless closed-cell gasket poured and formed in place.
- ▶ Liquid-tight power entry.
- ▶ A curved-top housing without flanges reduces dust build-up.
- ▶ Optional 100% polycarbonate lens available.
- ▶ Wide variety of cord and receptacle options.
- ▶ High-performance highly specular aluminum reflector system optional.
- ▶ All internal parts painted after fabrication to facilitate installation, increase efficiency, and inhibit corrosion.
- ▶ This fixture is proudly made in the USA.



SPECIFICATIONS

Enclosure – Outer housing consists of 5VA (f1) fiberglass, rated for flame and weather resistance.

Internal Housing – 22-gauge die-formed C.R.S.

Latching – Stainless steel latches.

Reflective Surfaces – 92% minimum average reflective white polyester powder coat bonded to phosphate-free, multi-stage pretreated metal.

Shielding – High-impact acrylic (HIA) diffuser.

Electrical – Electronic ballast standard, program start T5, rated Class P.

Mounting – Suspended with stainless steel V-hooks (standard) or optional ceiling mount brackets. Stem or surface mount not available.

Labels & Certifications – UL/CUL listed as fluorescent luminaire suitable for dry, damp, or wet locations²; NSF/ANSI Standard 2–Splash Zone certified, IP66 and IP67 certified (IP65 with occupancy sensor option), and rated for NEMA 4X.

ORDERING INFORMATION

SERIES

EGL Enclosed Industrial

NOMINAL LENGTH

4 4'

TOTAL LAMPS

4 r **6**

LAMP WATTAGE/TYPE

28T5S 4', 28-watt T5
54T5H 4', 54-watt T5HO

SHIELDING

HIA High-impact acrylic (standard)
PL 100% polycarbonate lens

OPTIONS/ACCESSORIES²

3WC6 3-wire, 6' STOW cord
3WC20 3-wire, 20' STOW cord
4WC6 4-wire, 6' STOW cord
4WC20 4-wire, 20' STOW cord
3WMR 3-wire mini-male receptacle only
3WMRC6 3-wire mini-male receptacle with 6' STOW cord
3WMRC20 3-wire mini-male receptacle with 20' STOW cord
4WMR 4-wire mini-male receptacle only
4WMRC6 4-wire mini-male receptacle with 6' STOW cord
4WMRC20 4-wire mini-male receptacle with 20' STOW cord

OPTIONS/ACCESSORIES (Continued)

HA/40C^{1,2} High-ambient, 40°C max. operating temp.^{1,2}
REFL SPEC95 Highly specular aluminum reflector
GMF³ Fuse, slow blow (specify voltage)³
GLR³ Fuse, fast blow (specify voltage)³
TP⁴ Tamper-resistant (holt head) screws⁴
SSMB Stainless steel ceiling mount brackets (two per fixture), see back for details

OCCUPANCY SENSORS

Occupancy sensor must be specified from the following (specify voltage):

OCCWS HB350W-L3W/120
OCCWS HB350W-L3W/277
OCCWS HB350W-L4W/120
OCCWS HB350W-L4W/277

Fixture is IP65 certified when specified with occupancy sensor.

BALLAST TYPE

EB4 4-lamp electronic ballast
EB2/2 (2) 2-lamp electronic ballasts
EBHA2/2 (2) 2-lamp high-ambient electronic ballasts
EB4/2 (1) 4-lamp and (1) 2-lamp electronic ballast
EB2/2/2 (3) 2-lamp electronic ballasts

VOLTAGE

120	120V	347	347V
208	208V	480	480V (T5HO only)
240	240V	HRV	347-480V (T5HO only)
277	277V		
UNV	120-277V		

¹ Amalgam lamps recommended. HA/40C option not available with EM ballast. 4-lamp fixture with EBHA2/2 ballast type only.

² When specifying EM option, EM ballast for enclosed and gasketed fixtures is required for fixture to be suitable for wet locations. Not available with HA/40C option.

³ Two (2) fuses required when specifying 208V or 240V.

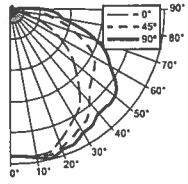
⁴ This option requires a tamper-resistant tool (must be ordered separately). Please specify quantity required per project.

PHOTOMETRY – 6 LAMPS

Catalog #: EGL-4-654T5H-HIA-WHT

TEST REPORT INFORMATION

- ▶ Test Report #: 14276.0
- ▶ Date: 09/02/08
- ▶ Lamp Type: FP54T5HO/835/C
- ▶ Lamp Quantity: 6



Note: Test performed using amalgam lamps in a still air environment at an ambient temperature of 25°C.

LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixture
0 - 30	5153.	17.5	21.1
0 - 40	8789.	29.9	36.0
0 - 60	16660.	56.7	68.2
0 - 90	23762.	80.8	97.2
Total Luminaire:			
0 - 180	24441.	83.1	100.0

Total Luminaire Optical Efficiency: **83.1%**
IES Spacing Criteria: End = 1.3, Diagonal = 1.4, Across = 1.5

CANDLEPOWER DISTRIBUTION

Vertical Angle	Horizontal Angle			Zonal Lumens
	0°	45°	90°	
0	6431.	6431.	6431.	618.9
5	6479.	6484.	6491.	1876.5
15	6492.	6613.	6761.	2657.5
25	5848.	6250.	6518.	3635.8
35	5243.	5846.	6222.	3878.6
45	4113.	4891.	5977.	3992.6
55	3057.	4492.	5645.	3377.4
65	1850.	3634.	4666.	2377.4
75	804.	2480.	3178.	1347.5
85	214.	1341.	2024.	134.7
90	134.	1193.	1501.	

ZONAL CAVITY COEFFICIENTS

Room Cavity Ratio	Ceiling			Wall			Floor		
	.80	.70	.50	.80	.70	.50	.80	.70	.50
0	.98	.98	.98	.96	.96	.96	.91	.91	.91
1	.89	.84	.80	.86	.82	.79	.78	.75	.72
2	.80	.73	.67	.78	.71	.65	.68	.63	.59
3	.73	.64	.57	.71	.62	.56	.59	.54	.49
4	.67	.56	.48	.64	.55	.48	.52	.46	.41
5	.60	.49	.41	.58	.48	.41	.46	.39	.34
6	.55	.44	.36	.54	.43	.35	.41	.34	.30
7	.51	.39	.31	.49	.38	.31	.37	.30	.25
8	.47	.35	.27	.45	.34	.27	.33	.26	.22
9	.43	.31	.24	.42	.31	.24	.29	.23	.19
10	.40	.28	.21	.39	.28	.21	.27	.21	.17

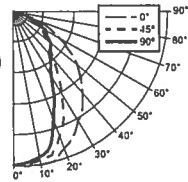
Effective Floor Cavity Reflectance = .20

PHOTOMETRY – 4 LAMPS

Catalog #: EGL-4-454T5H-HIA-REFL SPEC95

TEST REPORT INFORMATION

- ▶ Test Report #: 14275.0
- ▶ Date: 09/03/08
- ▶ Lamp Type: FP54T5HO/835/C
- ▶ Lamp Quantity: 4



Note: Test performed using amalgam lamps in a still air environment at an ambient temperature of 25°C.

LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixture
0 - 30	6576.	33.6	36.7
0 - 40	9818.	50.1	54.9
0 - 60	15030.	76.7	84.0
0 - 90	17724.	90.4	99.0
Total Luminaire:			
0 - 180	17900.	91.3	100.0

Total Luminaire Optical Efficiency: **91.3%**
IES Spacing Criteria: End = 1.2, Diagonal = 1.0, Across = 0.9

CANDLEPOWER DISTRIBUTION

Vertical Angle	Horizontal Angle			Zonal Lumens
	0°	45°	90°	
0	9070.	9070.	9070.	864.9
5	9142.	9069.	8979.	2474.9
15	9158.	8735.	8313.	3236.1
25	8265.	7026.	5710.	3242.6
35	7110.	4704.	3852.	2882.4
45	5659.	3074.	3098.	2328.8
55	4097.	2256.	2393.	1675.2
65	2381.	1601.	1738.	772.9
75	887.	750.	756.	244.
85	136.	238.	244.	89.
90	71.	131.	89.	

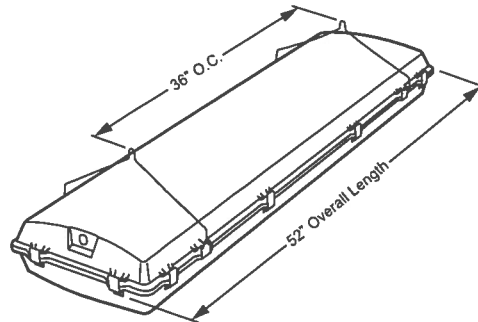
ZONAL CAVITY COEFFICIENTS

Room Cavity Ratio	Ceiling			Wall			Floor		
	.80	.70	.50	.80	.70	.50	.80	.70	.50
0	1.09	1.09	1.09	1.06	1.06	1.06	1.01	1.01	1.01
1	1.01	.97	.94	.98	.95	.92	.91	.89	.87
2	.93	.87	.82	.91	.85	.80	.82	.78	.74
3	.86	.78	.72	.84	.77	.71	.74	.69	.65
4	.80	.70	.63	.78	.69	.63	.67	.61	.57
5	.74	.63	.56	.72	.62	.55	.60	.54	.50
6	.68	.57	.50	.67	.57	.50	.55	.49	.44
7	.63	.52	.45	.62	.51	.44	.50	.44	.39
8	.59	.47	.40	.57	.47	.40	.45	.39	.35
9	.54	.43	.36	.53	.42	.36	.41	.35	.31
10	.51	.39	.32	.50	.39	.32	.38	.32	.28

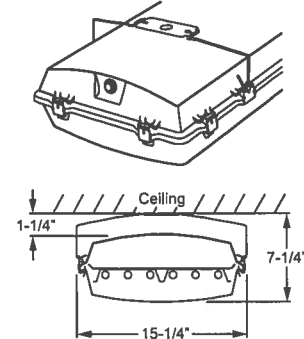
Effective Floor Cavity Reflectance = .20

FIXTURE DETAILS

STANDARD MOUNTING



OPTIONAL MOUNTING (SSMB)



Shown with SSMB and REFL SPEC95 (options)

Mounting Details – Fixture furnished with four (4) stainless steel hanger brackets and two (2) stainless steel V-hooks for suspended mounting with chain or aircraft cable. Optional stainless steel ceiling mount brackets available.

Power Supply – Fixture has holes in each end suitable for 1/2" electrical trade size liquid-tight connectors. Power supply must be with flexible liquid-tight conduit or cord rated for wet location use.



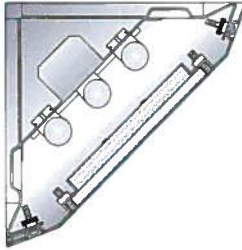
PROJECT INFORMATION	
Job Name	
Fixture Type	
Catalog Number	
Approved by	

MIGHTY MAC™

CC SERIES

PRODUCT FEATURES:

- » Corner mount, hinged clamshell
- » Available in 9" x 12", 24" and 48" lengths
- » Clamshell design prevents contraband concealment
- » Vertically adjustable 2-bracket lens retention via 6" thru-stud spacing



SPECIFICATIONS

HOUSING: One-piece die-formed prime grade material as specified – see ordering information. Corners continuously seam welded and smooth with no post grinding (TIG). Clamshell housing resistant to penetration and contraband concealment.

BASEPLATE: Prime grade material as specified – see ordering information. Die-formed blade trap (1/4" minimum) prevents contraband concealment and access. Embossed standoffs prevent distortion.

LENS: As specified – maximum thickness .875" – see ordering information. Kenall recommends a prismatic inner lens and a clear outer lens. Two clear lenses used in combination cannot be provided.

LENS RETENTION: Vertically adjustable continuous "Z" brackets of prime grade material, secured to housing via thru-studs (6" maximum spacing).

HINGE: 2' continuous heavy gauge internal piano hinge (1/2" knuckle/1/8" diameter pin) standard. Pin secured to knuckle. Hinge welded to housing and mounts to baseplate via keyholes. See Options for Full Length Internal Hinge (IHF) (standard on 1" housing).

FASTENERS: Hardened security screws as specified – see ordering information. Fully recessed.

FINISH: TGIC polyester powder coat – 5-stage pre-treatment. Salt spray test: 1,000 hours; Reflectance: 92%.

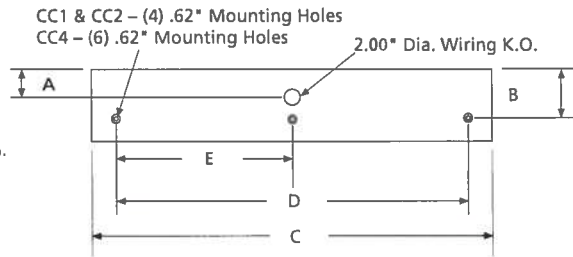
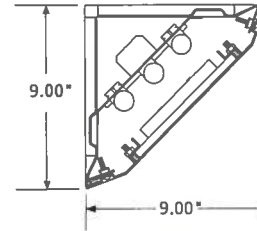
ELECTRICAL: Lamp quantity and type as specified – see ordering information. Lamps supplied by others. Ballast quantity and type as specified – see ordering information. All ballasts UL listed class P. Optional removable reflector/lamp/ballast tray with quick disconnect. **LED only.** Replaceable high-brightness LED array in 4000K, 5000K and 5700K color temperatures. 70 CRI standard. See Options for higher CRI lamp availability. 120-277V AC high-power factor constant current driver. 0-100% dimming with compatible 0-10V current sink dimmer. Compatible with Kenall SmartSense™ control system.

LUMINOUS SEAL: Polyurethane foam prevents light leaks from luminaire base.

INSTALLATION: Corner mount, surface; Fixture not suitable for Surface Conduit or Continuous Row Mounting.

WARRANTY: One year warranty against defects in materials and workmanship. Three year warranty on LED lamps and driver for defects resulting in a fixture lumen depreciation of 30% or greater.

LISTINGS: UL and CUL listed for damp locations. **LED only.** Luminaire is certified to UL 1598 and UL 8750 standards by Intertek Testing Services. See ordering information for wet location applications. All Kenall SSL Luminaires are tested to the IESNA LM-79-08 standard requiring spectroradiometric measurements for CRI and CCT as well as goniophotometric measurements for lighting distributions and total luminous flux. Kenall certifies product by both Underwriters and Intertek Testing Laboratories.



DIMENSIONAL DATA (IN INCHES)

	A	B	C	D	E
CC1	3.50	6.00	12.00	8.00	—
CC2	3.50	6.00	26.00	20.00	—
CC4	3.50	6.00	50.00	43.87	21.94

ORDERING INFORMATION

Model	Nominal Size	Hsg./Base Mtrl	Lamp Quantity	Lamp Type	Ballast/Driver Type	Ballast Quantity	Voltage	Lens (Inner/Outer)	Fastener	Options
CC		/						/		

Nominal Size

- 1 9" x 12"
- 2 9" x 24"
- 4 9" x 48"**

Lamp Type (cont'd)

- 17** F17T8
- 40B** F40TT

Voltage

- 120** 120 Volts
- 277** 277 Volts
- 347A** 347 Volts

Fastener

- 1** Torx® Head w/ Center Pin
- 2** Allen Head w/ Center Pin

Housing/Base Material

- 1** 16-Ga CRS (Painted White)
- 3 14-Ga SS (Painted White)
- 4 16-Ga SS (Painted White)
- 6* 14-Ga SS (Brushed)
- 7* 16-Ga SS (Brushed)
- 9 12-Ga CRS (Painted White)

4' Nominal Length (Quantity, Driver, Voltage)

- 50L40K** 50 Watt 4000K LED (1/DCC/120-277V)
- 50L50K** 50 Watt 5000K LED (1/DCC/120-277V)
- 50L57K** 50 Watt 5700K LED (1/DCC/120-277V)
- 100L40K** 100 Watt 4000K LED (1/DCC/120-277V)
- 100L50K** 100 Watt 5000K LED (1/DCC/120-277V)
- 100L57K** 100 Watt 5700K LED (1/DCC/120-277V)

Lens (Inner/Outer)†

- 0** No Lens
- 1** .125" Prismatic Acrylic
- 2** .125" Prismatic Polycarbonate
- 3** .125" Textured Polycarbonate
- G** .125" Clear Polycarbonate
- 4** .156" Prismatic Polycarbonate
- R** .156" Prismatic Tempered Glass
- 6** .187" Prismatic Polycarbonate
- 7** .187" Clear Polycarbonate
- 8** .187" Clear Tempered Glass
- 9** .250" Clear Polycarbonate
- A** .250" Clear Tempered Glass
- B** .375" Clear Polycarbonate
- C** .375" Clear Tempered Glass
- J** .500" Clear Polycarbonate
- P** .500" Clear Tempered Glass
- N** .750" Clear Tempered Glass
- Y††** .007" Diffuser Film

Options

- EL*** Standard Lumen EL Pack
- LEL†** LED Emergency Battery Backup (n/a with 100L)
- PEL*** High Lumen EL Pack
- SEL*** Specified EL Pack
- DLN** LED Night Light w/Light Level Control
- FS** Single Fuse & Holder
- IHF** Full Length Internal Hinge
- R80†** Minimum 80 CRI Lamp (4000K only)
- RGTA** Removable Gear Tray
- SK*** Speaker Housing Extension
- TNA** PL Night Light – 5/7/9 Watt (Lamp supplied by other) (120/277V only)
- UV*** Ultraviolet Filter
- WL** Wet Location Listed

Lamp Quantity (n/a with LED)

- 1 One
- 2 Two
- 3** Three

54 F54T5HO

Ballast Type/Driver Type

- IC** Instant Start Electronic <10% THD (T0)
- RS** Rapid Start Electronic <10% THD (CFL, T8, T5, T5HO)
- 3B** Specified Ballast
- DCC†** Dimming Constant Current LED Driver

Ballast Quantity (n/a with LED)

- 1** One
- 2** Two

Lamp Type

- 13** 13 Watt Twin
- 13Q** 13 Watt Quad (2 Lamp Max.)
- 26Q** 26 Watt Quad (2 Lamp Max.)

* n/a as Base Material
 † EL Pack n/a with F54T5HO, or 13 Watt Twin
 † LED lamping only
 † n/a with LED lamping, or 13 Watt Twin
 †† can only be used with clear outer lens
 ‡ Refer to lens specifications



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FULLY ENCLOSED INDUSTRIAL

96

SUBMITTAL:

T5 | T8

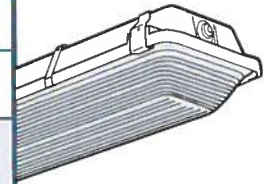
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VOLTAGE:

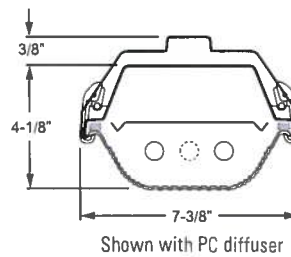
EXAMPLE **96 - 4 - 2 54T5H - PC - OPTIONS - EB2 - UNV**

SERIES NOMINAL LENGTH TOTAL LAMPS WATTAGE/TYPE SHIELDING OPTIONS/ACCESSORIES BALLAST TYPE VOLTAGE



FEATURES

- ▶ Fully gasketed fixture resists dust, bugs, and moisture.
- ▶ Polycarbonate toggle latches (standard) ensure a tight seal and provide easy access to electrical components.
- ▶ Optional stainless steel, tamper-resistant stainless steel, or tamper-resistant polycarbonate latches available.
- ▶ Closed-cell polyurethane gasket poured and formed in place to ensure tight seal—does not absorb water or support fungal growth.
- ▶ NSF/ANSI Standard 2—Splash Zone certified.
- ▶ IP65 and IP67¹ certified.
- ▶ UL listed as fluorescent fixture suitable for wet locations when ordered with factory-installed watertight hubs, STOW cord, or mini-male receptacle option².
- ▶ Can operate up to 40°C/104°F with high-ambient (HA/40C) option.³
- ▶ This fixture is proudly made in the USA.



ORDERING INFORMATION

SERIES
96 Fully Enclosed Industrial

NOMINAL LENGTH
4 4'
8 8'

TOTAL LAMPS
2, 4, or 6 (1-, 2-, or 3-lamp cross-section)

LAMP WATTAGE/TYPE

28T5S 4', 28-watt T5	54T5H 4', 54-watt T5HO
32 4', 32-watt T8	59 8', 59-watt T8

SHIELDING

PC Drop, clear, 100% polycarbonate, injection-molded diffuser (standard in 4' units, not available in 8' units)

HIA Drop, high-impact injection-molded acrylic (standard in 8' units)

DCL Drop, clear, 100% acrylic, impact-resistant diffuser with frosted ends (see back for details)

DFR Drop, frosted, 100% acrylic, impact-resistant diffuser (see back for details)

OPTIONS/ACCESSORIES

For generic EM ballast options (must specify voltage), see Fluorescent Information section.²

3WC6 3-wire, 6' STDW cord

3WC20 3-wire, 20' STOW cord

4WC6 4-wire, 6' STOW cord

4WC20 4-wire, 20' STOW cord

3WMR 3-wire mini-male receptacle only

3WMRC6 3-wire mini-male receptacle with 6' STOW cord

3WMRC20 3-wire mini-male receptacle with 20' STOW cord

4WMR 4-wire mini-male receptacle only

OPTIONS/ACCESSORIES (Continued)

4WMRC6 4-wire mini-male receptacle with 6' STOW cord

4WMRC20 4-wire mini-male receptacle with 20' STOW cord

WET/1 (1) 1/2" watertight hub (factory-installed in end of housing)

WET/2 (2) 1/2" watertight hubs (factory-installed in ends of housing)

SSCMB Stainless steel chain mounting brackets (2 per fixture)

HA/40C³ High-ambient, 40°C max. operating temp.³

GMF⁴ Fuse, slow blow (specify voltage)⁴

GLR⁴ Fuse, fast blow (specify voltage)⁴

TP⁵ Tamper-resistant polycarbonate latches⁵

SS LATCH Stainless steel latches

TP/SS LATCH⁵ Tamper-resistant stainless steel latches⁵

OCCUPANCY SENSORS¹
Occupancy sensor must be specified from the following (specify voltage):

OCCWS HB350W-L3W/120¹

OCCWS HB350W-L3W/277¹

OCCWS HB350W-L4W/120¹

OCCWS HB350W-L4W/277¹

BALLAST TYPE

EB1 1-lamp electronic ballast

EB2 2-lamp electronic ballast

EB3 3-lamp electronic ballast

EB4 4-lamp electronic ballast

EB4/2 (1) 4-lamp and (1) 2-lamp electronic ballast

VOLTAGE

120 120V	480 480V (T5HO only)
277 277V	HRV 347-480V (T5HO only)
UNV 120-277V	
347 347V	

SPECIFICATIONS

Enclosure – Outer housing consists of 5VA (f1) fiberglass, rated for flame and weather resistance.

Internal Housing – 25-gauge die-formed C.R.S.

Latching – Injection-molded polycarbonate latches.

Reflective Surfaces – 92% minimum average reflective white polyester powder coat bonded to phosphate-free, multi-stage pretreated metal.

Shielding – Clear, 100% polycarbonate, UV stabilized, injection-molded diffuser.

Electrical – Electronic ballast standard, instant start T8, program start T5, rated Class P.

Mounting – Surface or suspended. Stainless steel ceiling mount bracket standard.

Labels & Certifications – UL/CUL listed as fluorescent luminaire suitable for dry or damp locations. UL/CUL listed as suitable for wet locations⁴ when specified with watertight hub, STOW cord, or mini-male receptacle option. NSF/ANSI Standard 2—Splash Zone certified, IP65 and IP67¹ certified.

¹ Fixture is IP65 certified when specified with occupancy sensor.

² When specifying EM option for wet location fixture, EM ballast not available with HA/40C or 354T5H. EM ballast for enclosed and gasketed fixtures is required.

³ Amalgam lamps recommended. HA/40C option not available with EM ballast option or 354T5H cross-section.

⁴ Two (2) fuses required when specifying 208V or 240V.

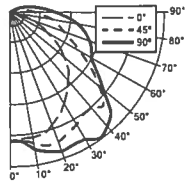
⁵ This option requires a tamper-resistant tool (must be ordered separately). Please specify quantity required per project.

PHOTOMETRY – T5

Catalog #: 96-4-254T5H-PC-EB2

TEST REPORT INFORMATION

- ▶ Test Report #: 13316.0
- ▶ Date: 11/01/06
- ▶ Lamp Type: FP54T5HO/835
- ▶ Lamp Quantity: 2



LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixture
0 - 30	1343.	13.4	20.2
0 - 40	2294.	22.9	34.5
0 - 60	4378.	43.8	65.9
0 - 90	6194.	61.9	93.2
90 - 120	426.	4.3	6.4
90 - 130	450.	4.5	6.8
90 - 150	455.	4.6	6.8
90 - 180	455.	4.6	6.8
Total Luminaire:			
0 - 180	6649.	66.5	100.0

Total Luminaire Optical Efficiency: 66.5%
IES Spacing Criteria End = 1.2, Diagonal = 1.5, Across = 1.7

CANDLEPOWER DISTRIBUTION

Vertical Angle	Horizontal Angle			Zonal Lumens
	0°	45°	90°	
0	1539.	1539.	1539.	146.8
5	1525.	1535.	1558.	146.8
15	1506.	1653.	1723.	462.0
25	1367.	1597.	1748.	733.9
35	1174.	1501.	1846.	951.6
45	982.	1568.	1692.	1109.8
55	698.	1176.	1276.	974.3
65	421.	802.	1074.	791.2
75	169.	591.	917.	606.2
85	37.	398.	672.	417.7
90	18.	287.	539.	

ZONAL CAVITY COEFFICIENTS

Room Cavity Ratio	Ceiling			Wall			Floor		
	.80	.70	.50	.70	.50	.30	.50	.30	.10
0	.78	.78	.78	.76	.76	.76	.71	.71	.71
1	.70	.67	.63	.68	.65	.62	.61	.59	.56
2	.64	.58	.53	.61	.56	.52	.53	.49	.46
3	.58	.51	.45	.56	.49	.44	.47	.42	.38
4	.53	.45	.39	.51	.43	.38	.41	.36	.32
5	.48	.39	.33	.46	.38	.32	.36	.31	.27
6	.44	.35	.29	.42	.34	.28	.32	.27	.23
7	.41	.31	.25	.39	.30	.25	.29	.24	.20
8	.37	.28	.22	.36	.27	.22	.26	.21	.17
9	.34	.25	.19	.33	.24	.19	.23	.18	.15
10	.32	.23	.17	.31	.22	.17	.21	.16	.13

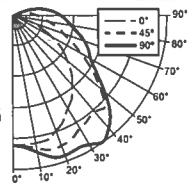
Effective Floor Cavity Reflectance = .20

PHOTOMETRY – T8

Catalog #: 96-4-232-PC-EB2

TEST REPORT INFORMATION

- ▶ Test Report #: 13317.0
- ▶ Date: 11/01/06
- ▶ Lamp Type: F32T8/835
- ▶ Lamp Quantity: 2



LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixture
0 - 30	912.	15.5	20.5
0 - 40	1560.	26.4	35.1
0 - 60	2933.	49.7	66.0
0 - 90	4082.	69.2	91.8
90 - 120	347.	5.9	7.8
90 - 130	362.	6.1	8.1
90 - 150	364.	6.2	8.2
90 - 180	364.	6.2	8.2
Total Luminaire:			
0 - 180	4446.	75.4	100.0

Total Luminaire Optical Efficiency: 75.4%
IES Spacing Criteria End = 1.2, Diagonal = 1.5, Across = 1.7

CANDLEPOWER DISTRIBUTION

Vertical Angle	Horizontal Angle			Zonal Lumens
	0°	45°	90°	
0	1039.	1039.	1039.	100.3
5	1037.	1051.	1064.	100.3
15	1029.	1116.	1179.	314.6
25	933.	1092.	1181.	496.8
35	813.	1028.	1242.	647.9
45	661.	1034.	1099.	729.7
55	470.	774.	830.	643.3
65	285.	523.	666.	508.3
75	119.	376.	541.	376.4
85	23.	251.	437.	265.1
90	11.	211.	389.	

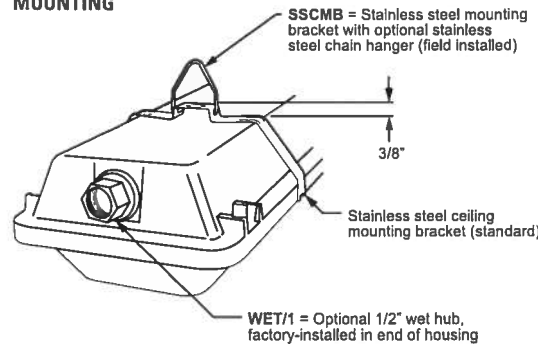
ZONAL CAVITY COEFFICIENTS

Room Cavity Ratio	Ceiling			Wall			Floor		
	.80	.70	.50	.70	.50	.30	.50	.30	.10
0	.88	.88	.88	.85	.85	.85	.80	.80	.80
1	.80	.76	.72	.77	.73	.70	.69	.66	.64
2	.72	.66	.60	.70	.64	.59	.60	.56	.52
3	.66	.58	.51	.63	.56	.50	.53	.48	.44
4	.60	.51	.44	.58	.49	.43	.47	.41	.37
5	.55	.45	.38	.53	.44	.37	.41	.36	.31
6	.50	.40	.33	.48	.39	.32	.37	.31	.27
7	.46	.36	.29	.44	.35	.28	.33	.27	.23
8	.42	.32	.25	.41	.31	.25	.29	.24	.20
9	.39	.28	.22	.38	.28	.22	.26	.21	.17
10	.36	.26	.20	.35	.25	.19	.24	.19	.15

Effective Floor Cavity Reflectance = .20

FIXTURE DETAILS

MOUNTING



SHIELDING OPTIONS

Nominal Length	Overall Length	Catalog Numbers			
		PC	HIA	DCL	DFR
4'	51-7/8"	Standard	Optional	Optional	Optional
8'	100-1/4"	N/A	Standard	Optional	Optional

