ADDENDUM #1

Eaton Street Parking Lot Project
January 12, 2023

TO ALL HOLDERS OF CONTRACT DOCUMENTS:

This Bid Addendum addresses the following modifications/clarifications to the project and must be acknowledged as directed in the Bid Documents. The following clarifications to the Bid Documents are made:

TECHNICAL NOTES & CLARIFICATIONS

1. Substitutions
    a. Bidders shall include specified products in their bid proposals. Bidders may attach a 'Substitution Request Submittal' to their bid proposals as prescribed in *Section 01 2500 Substitution Procedures* for consideration by the Owner and Engineer.

2. Existing Conditions
    a. The existing building, concrete pads, and underground tanks associated with the former Wayne's Market have been demolished, disposed offsite, and backfilled. Any unknown subsurface conditions encountered during construction will be handled as a change order.
    b. The existing concrete jersey barriers along the south property line are <u>not</u> the Site Contractor's responsibility and will be removed by the Owner prior to construction.

3. Site Removals
    a. It is the Contractor's responsibility to source locations to legally dispose of all spoils and excess fill materials offsite. The University is no longer able to accept fill materials.
    b. Existing 4-head light pole in the middle of the parking lot (flagged as removal note #9 on C-103) remains in place and must be removed and disposed offsite by Site Contractor.

4. Grading & Drainage
    a. The flow direction of the existing 12" concrete storm pipe going west from ex. catch basin #3 must be verified prior to removal.
    b. Two infiltration tests must be performed by Owner's testing agency at subsurface storm chamber subgrade elevation as noted in drawings and required by the Village of Hamilton Engineer.
    c. No inspection ports are necessary on subsurface storm chamber system due maintenance access via storm manhole. All chambers can be installed at the same elevation as detailed.
    d. Revise invert elevation on ST MH#10 per attached *Addendum Drawing #1: C-202 Site Grading and Drainage Plan* revisions.

5. Site Electrical
    a. Conduit & Wiring
        i. All electrical conduit shall be Schedule 80 PVC.
        ii. Contractor to include all conduit and wiring for complete service from Village utility pole on Eaton Street, including 25' extension of conduit and wire up pole, to proposed service panel, site lighting, and EV charging stations.
        iii. Revise Key Note #5 on Drawing C-204 Site Utility Plan: "Note: In the event that Deduct Alternate L-1 is implemented, one (1) meter box will be deleted

from project." Service panel will not be deleted if deduct alternate is accepted since site lighting and associated service remains in contract regardless.

b. Site Lighting
    i. Site lighting package supplied by LightSpec, 2806 Court Street, Syracuse, NY 13208, contact: Joe Penny (jpenny@lightspec.com), 1-315-451-8884. Refer to attached photometric plan and product specifications for proposed site lighting power requirements.
    ii. Light poles shall be mounted at 18' height above proposed finish grade and anchored to 4' deep precast light pole bases installed flush with proposed finish grade. Delete detail 9/C-301.

c. Electric Vehicle Charging Stations
    i. The Owner will purchase and provide the electric vehicle charging stations and bolt assembly/mounting kits (Qty. 2) for installation by the Site Contractor in the Base Bid condition. Refer to attached product data and installation specifications for proposed EV charging station power requirements.
    ii. If Deduct Alternate L-1 is accepted, EV charging stations and associated infrastructure will be deleted from the project (site lighting remains).

6. Hardscape
    a. Asphalt
        i. Asphalt top course shall be NYSDOT Type 7, not Type 6 as specified.
        ii. Revise Asphalt Unit Price L-9 description (Section 01 2200, 1.02 I) to include 5" total asphalt pavement as detailed 1/C-301.
        iii. Asphalt Price Adjustment:
            1. The unit cost for asphalt pavement shall be indexed to the cost of asphalt at the time of bidding in accordance with the attached 'NYSDOT Item 698-3.01 Asphalt Price Adjustment'. Proportionate payment adjustments will be made if asphalt costs change significantly at the time of construction.

    b. Concrete Curb (Deduct Alternate L-2)
        i. Slip-form concrete curb and cast-in-place concrete curb are both acceptable.
        ii. Concrete mix design shall be min. 4,000 psi.

7. Fencing
    a. The fencing shall be 6' height board-on-board vinyl fencing, beige/taupe in color, with New England-style post caps (refer to image example below for design intent).

ATTACHMENTS

1. Pre-Bid Meeting Agenda (2 pages)
2. Addendum Drawing #1: C-202 Site Grading and Drainage Plan Revisions (1 sheet)
3. LightSpec Photometric Plan & Specifications (1 sheet + 23 pages)
4. ChargePoint CT4000 Electric Vehicle Charging Station Literature (18 pages)
5. NYSDOT Item 698-3.01 Asphalt Price Adjustment (12 pages)

PRE-BID MEETING AGENDA

Eaton Street Parking Lot
January 11, 2023

1. PROJECT TEAM
    a. Owner: Hamilton Initiative, LLC
        11 Payne Street, Hamilton, NY 13346

    b. Owner's Representative: Colgate University Planning, Design, & Construction
        Katy Jacobs, Project Manager (kjacobs@colgate.edu)
        Jason Miner, Director of Capital Projects
        Steve Hughes, Associate Vice President for Facilities & Capital Projects

    c. Engineer of Record: Delta Engineers, Architects, & Land Surveyors
        Jeremy Fennel, Project Engineer

2. SCHEDULE
    a. Bidding Schedule:
        i. Bids Due (via email: kjacobs@colgate.edu): **Wednesday, January 18th at 12:00pm**
        ii. Requests for Information due: Friday, January 13, 2023 at 12:00pm
            1. Submit RFI's in writing to kjacobs@colgate.edu (*Section 01 2613*)
            2. Final bid addendum to be issued on Monday, January 16, 2023

    b. Construction Schedule:

i.	Contract Award:	February 2023
ii.	Construction Start:	Monday, May 22, 2023*
iii.	Substantial Completion:	Friday, August 18, 2023 (Hardscape) Friday, September 29, 2023 (Landscape)
iv.	Final Completion:	Friday, October 13, 2023

            1. Identify long-lead items and potential schedule conflicts/delays

3. CONTRACT REQUIREMENTS
    a. Contract Structure
        i. Privately funded & not tax exempt
        ii. There are no prevailing wage requirements
        iii. Private bid opening w/ Owner's project team

    b. Bidding (*Bid Form, Section 00 4113*)
        i. Base Bid will be lump sum
        ii. Unit Prices (*Section 01 2200*)
        iii. Alternates (*Section 01 2300*)
            1. Deduct Alternate L-1: Delete EV Charging Stations
            2. Deduct Alternate L-2: Concrete Curb in lieu of Granite Curb
        iv. No Bid Bond or Performance/Payment Bonds required

c. Contract Award Requirements
    i. Insurance (*Section 00 7316*) w/ Hamilton Initiative LLC listed as the certificate holder and Colgate University listed as additionally insured
    ii. Schedule of Values (*AIA G703 Continuation Sheet*)
    iii. Submittals Log (*Section 01 3300*)
        1. Submittals to be emailed to Owner's Representative (kjacobs@colgate.edu) and Project Engineer (jfennell@delta-eas.com) for review and approval
    iv. Proposed construction schedule (to be updated weekly throughout construction)
    v. List of subcontractors and principal suppliers

d. Payment (*Section 01 2900*)
    i. Contractor to submit applications for payment for each calendar month
    ii. 10% retainage will be withheld from all progress payments

4. PROJECT LOGISTICS
    a. Project Administration by Contractor
        i. Weekly Project Meetings
        ii. Schedule Updates
        iii. Submittals
        iv. As-Built Documentation

    b. Site Access
        i. Via Eaton Street
        ii. Any work or access on Curtis Lumber's property requires min. 48-hours' notice
        iii. Contractor is responsible for securing project site, including fencing/coning off access to active work areas

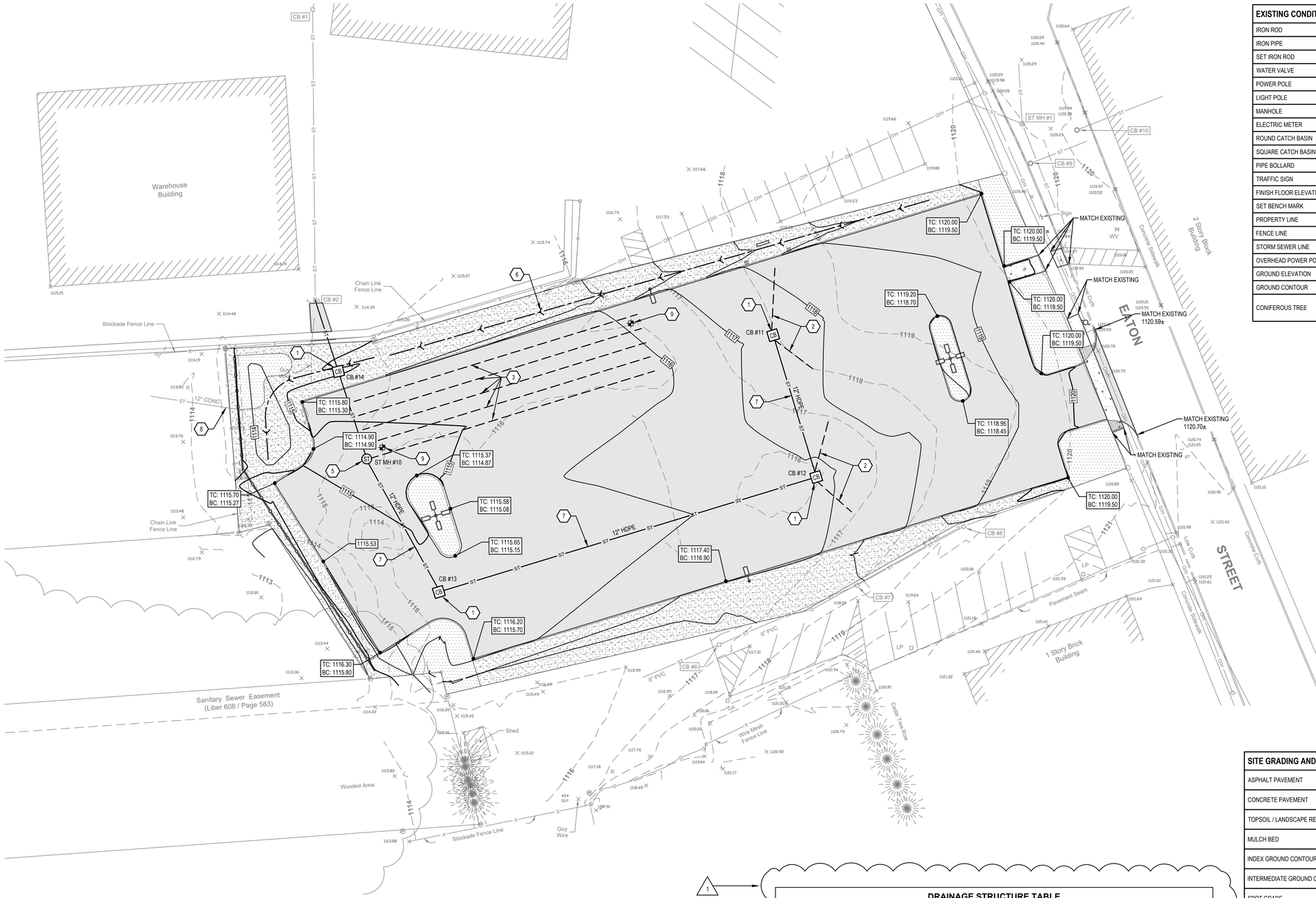
            * Parking is leased by the Owner and will be closed from May 22nd – August 18th, 2023. Work *may* commence sooner with approved sequencing and fencing plan to maintain 35 leased spaces until parking lot closure dates prescribed.

    c. Inspection & Testing
        i. Owner shall contract with & pay for independent testing agency
        ii. Contractor shall coordinate testing schedule with Owner's testing agency with min. 48 hours advance notice

5. TECHNICAL OVERVIEW
    a. Grading & drainage
    b. Site lighting & electrical
    c. Hardscape – Curbing, concrete work & asphalt paving
    d. Fencing & site appurtenances
    e. Plantings & lawns

6. GENERAL DISCUSSION

7. PROJECT SITE VISIT: 13 Eaton Street, Hamilton, NY 13346



EXISTING CONDITIONS LEGEND:	
IRON ROD	
IRON PIPE	
SET IRON ROD	
WATER VALVE	WV
POWER POLE	
LIGHT POLE	LP
MANHOLE	MH
ELECTRIC METER	EM
ROUND CATCH BASIN	
SQUARE CATCH BASIN	
PIPE BOLLARD	
TRAFFIC SIGN	
FINISH FLOOR ELEVATION	FFE
SET BENCH MARK	
PROPERTY LINE	
FENCE LINE	X
STORM SEWER LINE	ST
OVERHEAD POWER POLE LINE	OH
GROUND ELEVATION	1120.46
GROUND CONTOUR	1120
CONIFEROUS TREE	

#	KEY NOTES
1	PROVIDE NEW STORM CATCH BASIN. REFER TO DRAINAGE STRUCTURE TABLE FOR INVERT INFORMATION. SEE DETAIL 2 / C-302.
2	PROVIDE 4" UNDER DRAIN. SEE DETAIL 1 / C-302.
3	PROVIDE 5 ROWS OF 16 ADS SC-740 STORMTECH CHAMBERS. SEE DETAIL 3 / C-302 AND 4 / C-302.
4	CONNECT STORM LINE TO EXISTING STORM MANHOLE. SEE DRAINAGE STRUCTURE TABLE FOR INVERT INFORMATION.
5	PROVIDE 4' DIAMETER CONCRETE STORM MANHOLE. SEE DETAIL 5 / C-302.
6	PROVIDE DRAINAGE SWALE. SEE DETAIL 6 / C-302.
7	PROVIDE 12" HDPE STORM PIPE. SEE DETAIL 1 / C-302.
8	CONTRACTOR TO EVALUATE EXISTING 12" PIPE TO DETERMINE THE DISCHARGE POINT AND COORDINATE WITH ENGINEER PRIOR TO ABANDONING.
9	CONTRACTOR TO PERFORM INFILTRATION TEST AT ELEVATION 1110.10

1

DRAINAGE STRUCTURE TABLE

I.D. NUMBER	RIM ELEVATION	PIPE INVERT ELEVATIONS	COVER TYPE	SIZE (INSIDE DIMENSION)
CB #11	1117.40	(12") SW INVERT OUT = 1115.00	GRATE	30" x 30"
CB #12	1116.85	(12") SW INVERT OUT = 1114.40	GRATE	30" x 30"
CB #13	1115.50	(12") NE INVERT IN = 1112.70, (12") NW INVERT OUT = 1112.70	GRATE	30" x 30"
CB #14	1114.85	(12") SE INVERT IN = 1112.43, (10") NW INVERT OUT = 1112.43	GRATE	30" x 30"
ST MH #10	1114.50	(12") SE INVERT IN = 1112.20, (24") NE INVERT OUT = 1110.60, (12) NW INVERT OUT = 1112.20	GRATE	48"Ø

SITE GRADING AND DRAINAGE LEGEND:	
ASPHALT PAVEMENT	
CONCRETE PAVEMENT	
TOPSOIL / LANDSCAPE RESTORATION	
MULCH BED	
INDEX GROUND CONTOUR	1115
INTERMEDIATE GROUND CONTOUR	1116
SPOT GRADE	1096.48
STORM CHAMBER	
STORM SEWER PIPE	ST
DRAINAGE SWALE	
CATCH BASIN	CB
STORM MANHOLE	ST
INFILTRATION TEST LOCATIONS	

1 / C-202 **SITE GRADING AND DRAINAGE PLAN**

SCALE: 1" = 20'

NORTH

0' 10' 20' 40'

SCALE: 1" = 20'

ISSUED FOR BID

No.	Revision	Date
1	ADDENDUM #1	01.12.23

Project Name

HAMILTON INITIATIVE LLC
EATON STREET
PARKING LOT

HAMILTON, NEW YORK

DELTA
ENGINEERS, ARCHITECTS, & LAND SURVEYORS
4873 NYS Route 5
Vernon, NY 13476
Tel: 315.953.4200
Fax: 315.953.4202
Email: mail@delta-eas.com
www.delta-eas.com

Seal

Phase: PERMITTING

Project No.: 2020.070.001

Date: 2022.12.21

Drawing Title

SITE GRADING AND DRAINAGE PLAN

Drawing No.

C-202

DRWG. NO. V2

Scale: 1 inch= 20 Ft.

1. Calculations are the expected inittial illumination
2. Calculations are measured at grade
3. Pavement Reflectances are 26%
4. Mounting Heights:
   Area Lights shown mounted 18' AFG

Luminaire Schedule											
Symbol	Qty	[MANUFAC]	[LUMCAT]	Luminaire Lumens	Lum. Watts	Arrangement	Arrangement Lamp Lumens	Arrangement Watts	LLF	Total Watts	Mounting Height
	2	SIGNIFY GARDCO	ECF-S-32L-1A-NW-G2-4	14006	105.6	Single	N.A.	105.6	1.000	211.2	18
	2	SIGNIFY GARDCO	ECF-S-32L-530-NW-G2-4	7713	55.7	4 @ 90 Degrees	N.A.	222.8	1.000	445.6	18

THIS LAYOUT MAY NOT MEET TITLE 24 OR LOCAL ENERGY REQUIREMENTS. IF THIS LAYOUT NEEDS TO BE TITLE 24 COMPLIANT OR MEET OTHER ENERGY REQUIREMENTS, PLEASE CONSULT FACTORY WITH SPECIFIC DETAILS REGARDING PROJECT REQUIREMENTS SO THAT REVISIONS MAY BE MADE TO THE DRAWING.

THIS LIGHTING PATTERN REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRES MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS.

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Park Area_Top	Illuminance	Fc	2.09	15.4	0.4	5.23	38.50
Property Line	Illuminance	Fc	0.30	1.6	0.0	N.A.	N.A.

1. THIS LIGHTING DESIGN IS BASED ON INFORMATION SUPPLIED BY OTHERS TO LIGHTING UNLIMITED. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.

2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.

3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

LIGHTSPEC

SCALE	DATE	NEXT ASSEMBLY	REF. DRAWGS REF. DRWGS:
DRAWN BY CDH	10/6/2022		
CHECKED BY			
APPROVED BY			
APPROVED BY		FINISH	
APPROVED BY			
SHOP ORDER		MATERIAL	
PROJECT NO.			

POINT-BY-POINT FOOTCANDLE PLOT FOR:

Eaton Street Parkin

DRAWING NUMBER

Lightspec
2806 Court Street
Syracuse NY 13208
Phone: (315) 451-8884
Fax:

Date: Nov 8, 2022

Job Name
WAYNE'S MARKET - EATON STREET PARKING LOT
SYR22-70454
SYRACUSE NY

Bid Date
Oct 25, 2022

Submittal Date
Oct 25, 2022

Architect:
NO ARCHITECT

Design Build:
DESIGN BUILD-SYR

GARDCO by Signify

Site & Area

EcoForm

ECF-S small area light

Gardco EcoForm Gen-2 combines economy with performance in an LED area luminaire. Capable of delivering up to 27,800 lumens or more in a compact, low profile LED luminaire, EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems available for further energy savings. Includes Service Tag, our innovative way to provide assistance throughout the life of the product.

Project:
Location:
Cat.No:
Type:
Lamps: Qty:
Notes:

Ordering guide

example: ECF-S-64L-900-NW-G2-AR-5-120-HIS-MGY

Prefix	Number of LEDs	Drive Current	LED Color - Generation	Mounting	Distribution	Voltage
ECF-S	**32L** 32 LEDs (2 modules)	**365** 365mA **530** 530mA **700** 700mA **1A** 1050mA **1.2A** 1200mA	**WW-G2** Warm White 3000K, 70CRI Generation 2 **NW-G2** Neutral White 4000K, 70CRI Generation 2 **CW-G2** Cool White 5000K, 70CRI Generation 2	**AR**[2] Arm Mount (standard) The following mounting kits must be ordered separately (See accessories) **SF**[3] Slip Fitter Mount (fits to 2 3/8" O.D. tenon) **WS** Wall mount with surface conduit rear entry permitted **RAM**[2] Retrofit arm mount kit	**Type 2** **2** Type 2 **2-90** Rotated left 90° **2-270** Rotated right 270° **Type 3** **3** Type 3 **3-90** Rotated left 90° **3-270** Rotated right 270° **Type 4** **4** Type 4 **4-90** Rotated left 90° **4-270** Rotated right 270° **Type 5** **5** Type 5 **5W** Type 5W **AFR** Auto Front Row **AFR-90** Auto Front Row, Rotated left 90° **AFR-270** Auto Front Row, Rotated right 270° **BLC** Back Light Control **BLC-90** Back Light Control rotated at 90° **BLC-270** Back Light Control rotated at 270° **LCL**[19] LEED Corner Optic Left **RCL**[19] LEED Corner Optic Right	**120** 120V **208** 208V **240** 240V **277** 277V **347** 347V **480** 480V **UNV** 120-277V (50/60Hz) **HVU** 347-480V (50/60Hz)
	48L 48 LEDs (3 modules)	**900** 900mA **1A** 1050mA **1.2A**[19] 1200mA				
	64L 64 LEDs (4 modules)	**900** 900mA **1A**[19] 1050mA				

Options

Dimming controls	Motion sensing lens	Photo-sensing	Electrical	Luminaire	Finish
DD[4,18] 0-10V External dimming (for controls by others) **DCC**[4,5,6,18] Dual Circuit Control **FAWS**[4,5,18] Field Adjustable Wattage Selector **LLC**[4,6,7,8,18] Integral wireless module **BL**[1,4,7,18] Bi-level functionality **SRDR**[4,5,6,8,17] SR driver connected to Zhaga socket **DynaDimmer:** Automatic Profile Dimming **CS50**[4,8] Safety 50% Dimming, 7 hours **CM50**[4,8] Median 50% Dimming, 8 hours **CS30**[4,8] Safety 30% Dimming, 7 hours **CM30**[4,8] Median 30% Dimming, 8 hours	**IMRI3**[15] Integral with #3 lens **IMRI7**[16] Integral with #7 lens	**PCB**[8,9] Photocontrol Button **TLRD5**[10,17] Twist Lock Receptacle 5 Pin **TLRD7**[10,17] Twist Lock Receptacle 7 Pin **TLRPC**[9,10,11,17] Twist Lock Receptacle w/ Photocell	**Fusing** **F1**[9] Single (120, 277, 347VAC) **F2**[9] Double (208, 240, 480VAC) **Pole Mount Fusing** **FP1**[9] Single (120, 277, 347VAC) **FP2**[9] Double (208, 240, 480VAC) **FP3**[9] Canadian Double Pull (208, 240, 480VAC) **Surge Protection** (10kA standard) **SP2** Increased 20kA	Square Pole Adapter included in standard product **TB**[12] Terminal Block **RPA**[13] Round Pole Adapter (fits to 3"- 3.9" O.D. pole) **HIS**[14] Internal House Side Shield	**Textured** **BK** Black **WH** White **BZ** Bronze **DGY** Dark Gray **MGY** Medium Gray **Customer specified** **RAL** Specify optional color or RAL (ex: RAL7024) **CC** Custom color (Must supply color chip for required factory quote)

1. BL-IMRI3/7 equipped with out-boarded sensor housing when voltage is HVU (347-480V)
2. Mounts to a 4" round pole with adapter included for square poles.
3. Limited to a maximum of 45 degrees aiming above horizontal.
4. Not available with other dimming control options.
5. Not available with motion sensor.
6. Not available with photocontrol.
7. Must specify a motion sensor lens.
8. Not available in 347 or 480V
9. Must specify input voltage.
10. TLRD5, TLRD7 and TLRPC receptacle pins 4 & 5 are capped off when ordered with any of the Dimming controls DD or FAWS or LLC.
11. Not available in 480V. Order photocell separately with TLRD5/7.
12. Not available with DCC.
13. Not available with SF and WS. RPAs provided with black finish standard.
14. HIS not available with Type 5, 5W, BLC, BLC-90, BLC-270, LCL or RCL optics.
15. Not available with DD, DCC, and FAWS dimming control options.
16. Not available with DD, DCC, FAWS and LLC dimming control options.
17. When ordering SRDR, controller (by others) to be used on socket must be SR compatible (See specifications for more details). Consult factory for lead time. All 7 pins in NEMA receptacle are connected to SR driver. SRDR not available with TLRD5 or TLRPC.
18. 0-10V dimming driver standard.
19. LCL and RCL not available with 48L-1.2A or 64L-1A.

ECF-S EcoForm small

Area luminaire

EcoForm Accessories[21] (ordered separately, field installed)

Shielding Accessories

House Side shield

Standard optic orientation:
HIS-32-H [20] Internal House Side Shield for 32 LEDs (2 modules)
HIS-48-H [20] Internal House Side Shield for 48 LEDs (3 modules)
HIS-64-H [20] Internal House Side Shield for 64 LEDs (4 modules)

Optic at 90 or 270 orientation:
HIS-32-V [20] Internal House Side Shield for 32 LEDs (2 modules)
HIS-48-V [20] Internal House Side Shield for 48 LEDs (3 modules)
HIS-64-V [20] Internal House Side Shield for 64 LEDs (4 modules)

Footnotes

20. Not available with Type 5 or 5W optics
21. Consult Signify to confirm whether specific accessories are BAA-compliant.

Luminaire Accessories

ECF-BD-G2	Bird deterrent
ECF-RAM-G2-(F)	Retrofit Arm mount kit
ECF-SF-G2-(F)	Slip Fitter Mount (fits to 2 3/8" O.D. tenon)
ECF-WS-G2-(F)	Wall mount with surface conduit rear entry permitted

EcoForm PTF2
(pole top fitter fits 23/8-21/2" OD x 4" depth tenon)

PTF2-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF2-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF2-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF2-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF2-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF2-ECF-S/L-3-120-(F) 3 luminaires at 120°

EcoForm PTF3
(pole top fitter fits 3-31/2" OD x 6" depth tenon)

PTF3-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF3-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF3-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF3-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF3-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF3-ECF-S/L-3-120-(F) 3 luminaires at 120°

EcoForm PTF4
(pole top fitter fits 31/2-4" OD x 6" depth tenon)

PTF4-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF4-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF4-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF4-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF4-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF4-ECF-S/L-3-120-(F) 3 luminaires at 120°

(**F**) = Specify finish

Ready to Go configurations (when ordered with the "RS-" catalog code, the following configurations will ship in 2 weeks):

Catalog Number	12NC
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BZ	912401466002
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-MGY	912401466003
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BK	912401534554
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BZ	912401466004
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-MGY	912401466005
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BK	912401534555
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BZ	912401466006
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-MGY	912401466007
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BK	912401534556
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BZ	912401466008
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-MGY	912401466009
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BK	912401534557
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BZ	912401466010
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-MGY	912401466011
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BK	912401534558
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BZ	912401466012
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-MGY	912401466013
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BK	912401534559
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BZ	912401466014
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-MGY	912401466015

Catalog Number	12NC
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BK	912401534560
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BZ	912401466016
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-MGY	912401466017
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BK	912401534561
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BZ	912401466018
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-MGY	912401466019
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BK	912401534562
RS-ECF-RAM-G2-DGY	912401466487
RS-ECF-RAM-G2-MGY	912401466488
RS-ECF-RAM-G2-WH	912401466485
RS-ECF-RAM-G2-BZ	912401466486
RS-ECF-RAM-G2-BK	912401466484
RS-HIS-32-H	912401466489
RS-HIS-48-H	912401466491
RS-HIS-64-H	912401466493

ECF-S EcoForm small

Area luminaire

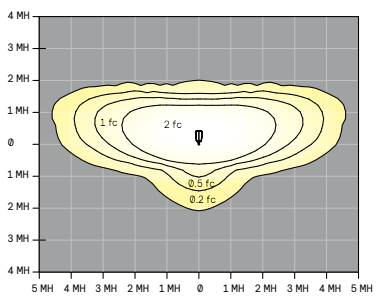
Predicted Lumen Depreciation Data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions.L_{70} is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11. Published L_{70} hours limited to 6 times actual LED test hours

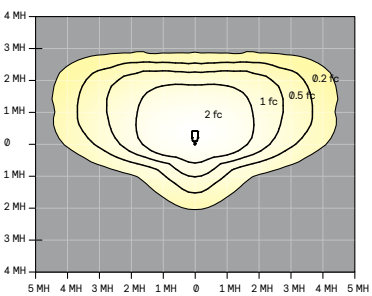
Ambient Temperature °C	Driver mA	Calculated L_{70} Hours	L_{70} per TM-21	Lumen Maintenance % at 60,000 hrs
25°C	up to 1200 mA	>100,000 hours	>120,000 hours	>99%

Optical Distributions

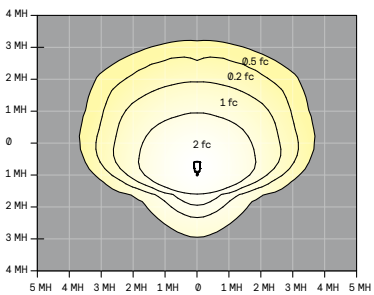
Based on configuration ECF-S-48L-1A-NW-G2 (159W) mounted at 20ft.



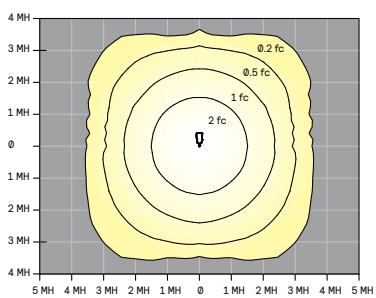
Type 2



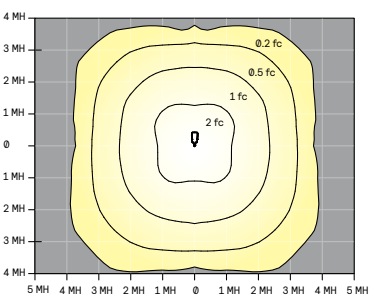
Type 3



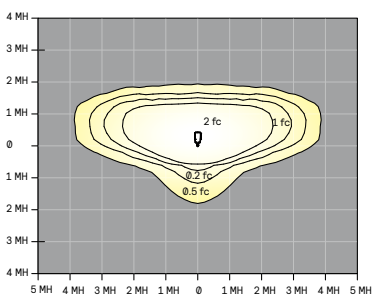
Type 4



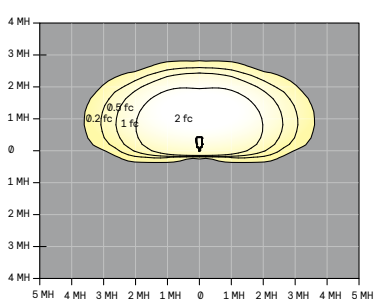
Type 5



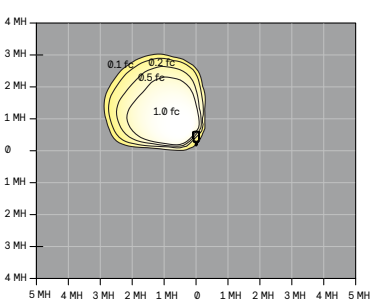
Type 5W



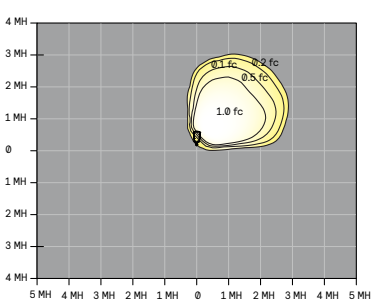
AFR



BLC



LCL



RCL

ECF-S EcoForm small

Area luminaire

3000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,508	B1-U0-G1	138	5,428	B1-U0-G2	136	5,637	B1-U0-G2	141	5,790	B3-U0-G1	145	5,604	B3-U0-G1	140
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,159	B2-U0-G2	129	7,055	B1-U0-G2	127	7,327	B1-U0-G2	132	7,526	B3-U0-G2	135	7,284	B3-U0-G2	131
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,234	B2-U0-G2	127	9,034	B2-U0-G2	124	9,452	B2-U0-G2	130	9,707	B4-U0-G2	133	9,395	B4-U0-G2	129
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,001	B3-U0-G2	123	12,719	B2-U0-G2	120	13,306	B2-U0-G3	126	13,665	B4-U0-G2	129	13,227	B4-U0-G2	125
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,421	B3-U0-G3	119	14,108	B2-U0-G3	116	14,760	B2-U0-G3	121	15,158	B4-U0-G2	125	14,671	B4-U0-G2	121
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,115	B3-U0-G3	127	16,744	B3-U0-G3	124	17,518	B2-U0-G3	130	17,990	B4-U0-G2	133	17,413	B5-U0-G3	129
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	19,381	B3-U0-G3	122	18,960	B3-U0-G3	119	19,836	B3-U0-G4	125	20,372	B5-U0-G3	128	19,717	B5-U0-G3	124
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	21,515	B3-U0-G3	118	21,048	B3-U0-G4	115	22,020	B3-U0-G4	121	22,616	B5-U0-G3	124	21,888	B5-U0-G3	120
ECF-S-64L-900-WW-G2-x	64	900	3000	178	22,652	B3-U0-G3	127	22,161	B3-U0-G4	125	23,185	B3-U0-G4	130	23,810	B5-U0-G3	134	23,045	B5-U0-G3	130
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	25,520	B3-U0-G3	124	24,966	B3-U0-G4	121	26,120	B3-U0-G4	127	26,150	B5-U0-G3	127	25,964	B5-U0-G4	126

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,706	B2-U0-G1	143	3,691	B0-U0-G1	94	2,449	B0-U0-G1	62
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,417	B2-U0-G1	133	5,005	B0-U0-G2	91	3,183	B0-U0-G1	58
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,567	B2-U0-G2	131	6,409	B0-U0-G2	89	4,106	B0-U0-G1	57
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,467	B3-U0-G2	128	9,024	B1-U0-G2	87	5,793	B0-U0-G2	56
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,939	B3-U0-G2	123	10,010	B1-U0-G2	84	6,426	B0-U0-G2	54
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,731	B3-U0-G2	131	11,880	B1-U0-G2	89	7,626	B0-U0-G2	57
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	20,076	B3-U0-G2	127	13,453	B1-U0-G2	86	8,636	B0-U0-G2	55
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	22,288	B3-U0-G2	122	14,934	B1-U0-G3	83			
ECF-S-64L-900-WW-G2-x	64	900	3000	178	23,465	B3-U0-G2	132	15,723	B1-U0-G3	90	10,093	B0-U0-G2	58
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	26,437	B4-U0-G3	128	17,714	B1-U0-G3	87			

4000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-NW-G2-x	32	700	4000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-NW-G2-x	64	900	4000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25,063	B5-U0-G3	141	24,258	B5-U0-G4	136
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27,526	B5-U0-G3	134	27,330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-NW-G2-x	32	700	4000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18664,	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-NW-G2-x	64	900	4000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

ECF-S EcoForm small

Area luminaire

5000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-CW-G2-x	32	700	5000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-CW-G2-x	64	900	5000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25063	B5-U0-G3	141	24258	B5-U0-G4	136
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27526	B5-U0-G3	134	27330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-CW-G2-x	32	700	5000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,664	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-CW-G2-x	64	900	5000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

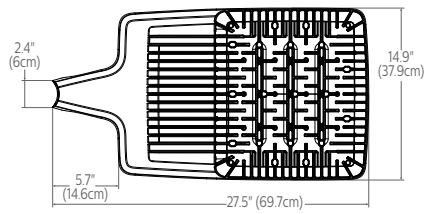
ECF-S EcoForm small

Area luminaire

Dimensions

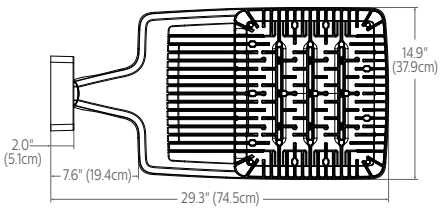
Standard Arm (**AR**)

Weight: 22 Lbs (9.9 Kg) EPA: 0.21ft² (.019m²)



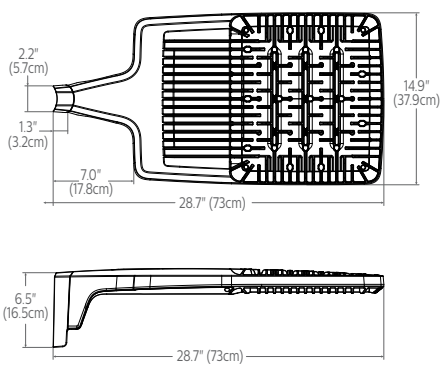
Wall (**WS**)

Weight: 27 Lbs. (12. 2Kg)EPA: 0.27ft² (.025m²)



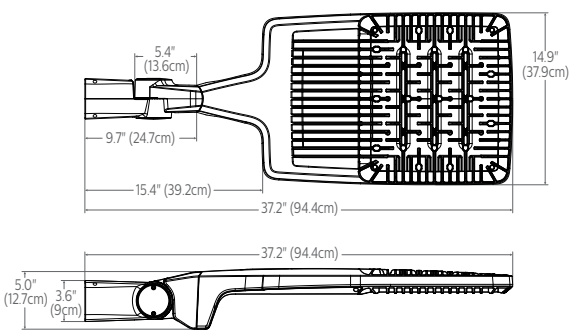
Retrofit Arm (**RAM**)

Weight: 24 Lbs (10.9 Kg) EPA: 0.24ft² (.022m²)

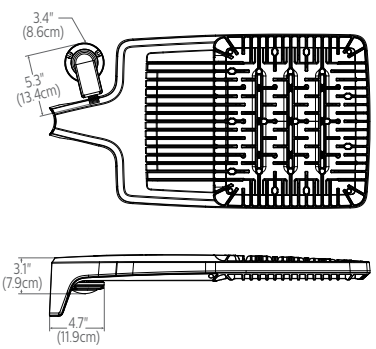


Slip fitter (**SF**)

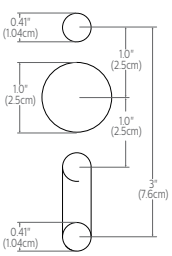
Weight: 27 Lbs (12.2 Kg) EPA: 0.33ft² (.031m²)



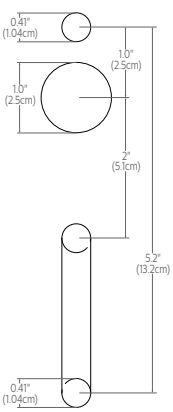
Outboard **IMR-HVU** sensor



Standard Arm (**AR**) drill pattern



Retrofit Arm (**RAM**) drill pattern



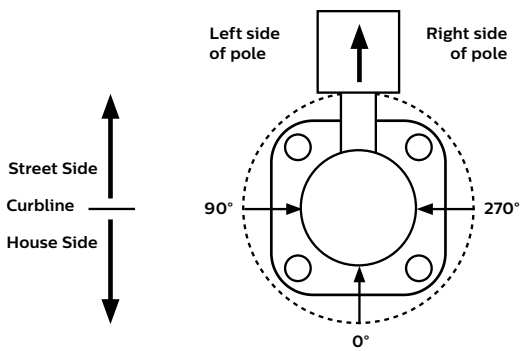
ECF-S EcoForm small

Area luminaire

Optical Orientation Information

Standard Optic Position

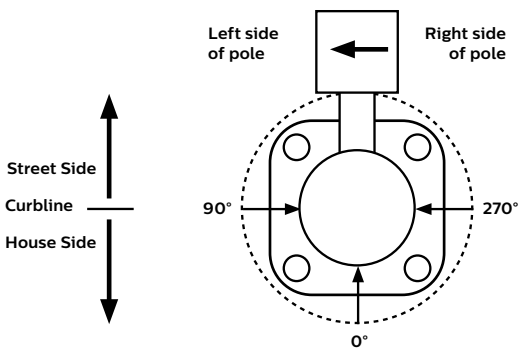
Luminaires ordered with asymmetric optical systems in the standard optic position will have the optical system oriented as shown below:



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Left (90°) Optic Position

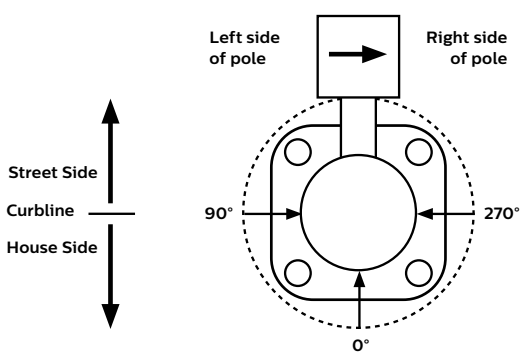
Luminaires ordered with optical systems in the Optic Rotated Left (90°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Right (270°) Optic Position

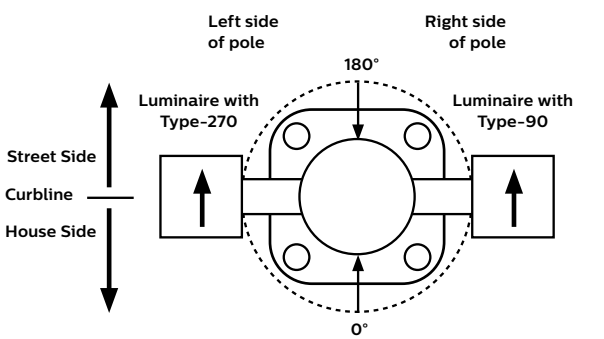
Luminaires ordered with optical systems in the Optic Rotated Right (270°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Twin Luminaire Assemblies with Type-90/Type-270 Rotated Optical Systems

Twin luminaire assemblies installed with rotated optical systems are an excellent way to direct light toward the interior of the site (Street Side) without additional equipment. It is important, however, that care be exercised to insure that luminaires are installed in the proper location.



Luminaires with Optic Rotated Right (270°) are installed on the LEFT Side of Pole

Luminaires with Optic Rotated Left (90°) are installed on the RIGHT Side of Pole

Note: The hand hole location will depend on the drilling configuration ordered for the pole.

ECF-S EcoForm small

Area luminaire

Specifications

Housing

One-piece die cast aluminum housing with integral arm and separate, self-retained hinged, one-piece die cast door frame. Luminaire housing rated to IP65, tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated 3G over 100,000 cycles conforming to standards set forth by ANSI C136.31-2018. Testing includes vibration in three axes, all performed on the same luminaire.

Light engine

Light engine comprises of a module of 16-LED aluminum metal clad board fully sealed with optics offered in multiples of 2, 3, and 4 modules or 32, 48, and 64 LEDs. Module is RoHS compliant. Color temperatures: 3000K +/-125K, 4000K, 5000K +/- 200K. Minimum CRI of 70. LED light engine is rated IP66 in accordance to Section 9 of IEC 60598-1.

Energy saving benefits

System efficacy up to 152 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

Optical systems

Type 2, 3, 4, 5, 5W, and AFR distributions available. Internal Shield option mounts to LED optics and is available with Type 2, 3, 4, and AFR distributions, including a dedicated BLC, LCL, and RCL optics to provide the best backlight control possible for those stringent requirements around property lines. Types 2, 3, 4, AFR, and BLC when specified and used as rotated, are factory set only. Performance tested per LM-79 and TM-15 (IESNA) certifying its photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

Standard luminaire arm mounts to 4" O.D. round poles. Can also be used with 5" O.D. poles. Square pole adapter included with every luminaire. Round Pole Adapter (RPA) required for 3-3.9" poles. EcoForm features a retrofit arm kit. When specified with the retrofit arm (RAM) option, EcoForm seamlessly simplifies site conversions to LED by eliminating the need for additional pole drilling on most existing poles. RAM will be boxed separately. Also optional are slipfitter and wall mounting accessories. Note that only fixed mounts (AR, RAM, WS) are required to meet IDA compliance. SF mounting will not meet IDA.

Control options

0-10V dimming (DD): Access to 0-10V dimming leads supplied through back of luminaire (for secondary dimming controls by others). Cannot be used with other control options.

Dual Circuit Control (DCC): Luminaire equipped with the ability to have two separate circuits controlling drivers and light engines independently. Permits separate switching of separate modules controlled by use of two sets of leads, one for each circuit. Not recommended to be used with other control options, motion response, or photocells.

Sensor Ready Zhaga Socket Connector (SRDR): Product equipped with Sensor Ready drivers connected to 4-pin Zhaga Book 18 compliant receptacle designed for sensor and other control system applications. Receptacle is rated IP66 assembly in a compact design that provides a sealed electrical interface and rated UV resistance, mounted on underside of the luminaire, protective dust cap included. When a controller not provided by Signify is used with Sensor Ready Zhaga socket connector, the controller must be certified to work with the Xitanium SR LED drivers as part of the SR certified program. SRDR can be used with NEMA 7-pin twist lock receptacle, which is mounted on top of the luminaire.

Automatic Profile Dimming (CS/CM/CE/CA): Standard dimming profiles provide flexibility towards energy savings goals while optimizing light levels during specific dark hours. Dimming profiles include two dimming settings including dim to 30% or 50% of the total lumen output. When used in combination with not programmed motion response it overrides the controller's schedule when motion is detected. After 5 minutes with no motion, it will return to the automatic diming profile schedule. Automatic dimming profile scheduled with the following settings:

- **CS50/CS30:** Security for 7 hours night duration (Ex., 11 PM - 6 AM)
- **CM50/CM30:** Median for 8 hours night duration (Ex., 10 PM - 6 AM)

All above profiles are calculated from mid point of the night. Dimming is set for 6 hours after the mid point and 1 or 2 hours before depending of the duration of dimming. Cannot be used with other dimming control options.

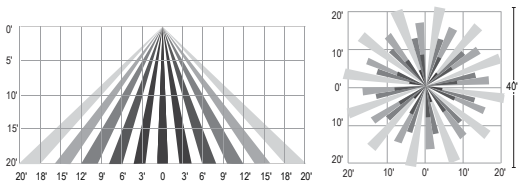
Field Adjustable Wattage Selector (FAWS): Luminaire equipped with the ability to manually adjust the wattage in the field to reduce total luminaire lumen output and light levels. Comes pre-set to the highest position at the lumen output selected. Use chart below to estimate reduction in lumen output desired. Cannot be used with other control options or motion response.

FAWS Position	Percent of Typical Lumen Output
1	25%
2	50%
3	55%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: Typical value accuracy +/- 5%

Wireless system (LLC): Optional wireless controller integral to luminaire ready to be connected to a Limelight system (sold by others). The system allows you to wirelessly manage the entire site, independent lighting groups or individual luminaires while on-site or remotely. Based on a high-density mesh network with an easy to use web-based portal, you can conveniently access, monitor and manage your lighting network remotely. Wireless controls can be combined with site and area, pedestrian, and parking garage luminaires as well, for a completely connected outdoor solution. Equipped with motion response with #3 lens for 8-25' mounting heights. Also available with remote pod accessory where pod is mounted separate from luminaire to pole or wall.

LLC wireless controller with #3 lens



Motion response options

Bi-Level Infrared Motion Response (BL-IMRI): Motion Response module is mounted integral to luminaire factory pre-programmed to 50% dimming when not ordered with other control options. BL-IMRI is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to full power/light output. Dimming on low is factory set to 50% with 5 minutes default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50%, to 50% of the normal constant wattage reducing the light level. Other dimming settings can be provided if different dimming levels are required. This can also be done with FSIR-100 Wireless Remote Programming Tool (contact Technical Support for details).

Infrared Motion Response with Other Controls: When used in combination with other controls (Automatic Dimming Profile), motion response device will simply override controller's schedule with the added benefits of a combined dimming profile and sensor detection. In this configuration, the motion response device cannot be re-programmed with FSIR-100 Wireless Remote Programming Tool. The profile can only be re-programmed via the controller.

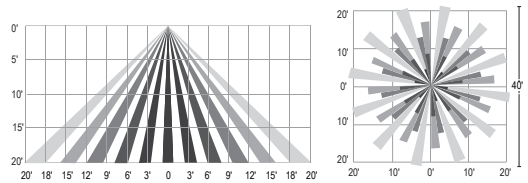
ECF-S EcoForm small

Area luminaire

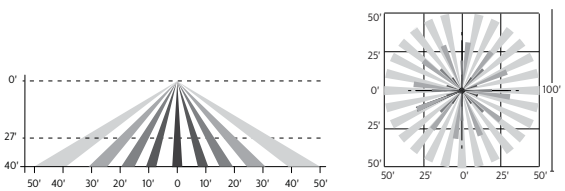
Specifications

Infrared Motion Response Lenses (IMRI3/IMRI7): Infrared Motion Response Integral module is available with two different sensor lens types to accommodate various mounting heights and occupancy detection ranges. Lens #3 (IMRI3) is designed for mounting heights up to 20' with a 40' diameter coverage area. Lens #7 is designed for higher mounting heights up to 40' with larger coverage areas up to 100' diameter coverage area. See charts for approximate detection patterns:

IMRI3 Luminaire or remote mount controller with #3 lens



IMRI7 Luminaire or remote mount controller with #7 lens



Electrical

Twist-Lock Receptacle (TLRD5/TLRD7/ TLRPC): Twist Lock Receptacle with 5 pins enabling dimming or with 7 pins with additional functionality (by others) can be used with a twistlock photoelectric cell or a shorting cap. Dimming Receptacle Type B (5-pin) and Type D-24 (7-pin) in accordance to ANSI C136.41. Can be used with third-party control system. Receptacle located on top of luminaire housing. When specifying receptacle with twistlock photoelectric cell, voltage must be specified. When ordering 7-pin Twist-lock receptacle (TLRD7), all 7 pins are wired to respective pins with the Sensor Ready (SR) driver, and photocell or shorting cap is not included. When ordering a twist-lock receptacle with a photocell (TLRPC), the receptacle used is a 5-pin receptacle, so pins 6 and 7 are not available (no SR driver). 0-10V dimming leads (pins 4 and 5) are connected if not ordered with any other dimming option.

Driver: Driver efficiency (>90% standard). 120-480V available (restrictions apply). Open/short circuit protection. All drivers are 0-10V dimming to 10% power standard, except when using Sensor Ready (SR) drivers, which uses DALI protocol (options CS50/CM50/CS30/CM30, SRDR, and TR7). Drivers are RoHS and FCC Title 47 CFR Part 15 compliant.

Button Photocontrol (PCB): Button style design for internal luminaires mounting applications. The photocontrol is constructed of a high impact UV stabilized polycarbonate housing. Rated voltage of 120V or 208-277V with a load rating of 1000 VA. The photocell will turn on with 1-4Fc of ambient light.

Surge protection (SP1/SP2): Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA. 20kV / 10kA surge protection device that provides extra protection beyond the SP1 10kV/10kA level.

Listings

UL/cUL wet location listed to the UL 1598 standard, suitable for use in ambient temperatures from -40° to 40°C (-40° to 104°F). Most EcoForm configurations are qualified under Premium and Standard DesignLights Consortium® categories. Consult DLC Qualified Products list to confirm your specific luminaire selection is approved. CCTs 3000K and warmer are Dark Sky Approved.

Finish

Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish. Standard colors include bronze (BZ), black (BK), white (WH), dark gray (DGY), and medium gray (MGY). Consult factory for specs on optional or custom colors.

Service Tag

Each individual luminaire is uniquely identifiable, thanks to the Service tag application. With a simple scan of a QR code, placed on the inside of the mast door, you gain instant access to the luminaire configuration, making installation and maintenance operations faster and easier, no matter what stage of the luminaire's lifetime. Just download the APP and register your product right away. For more details visit: signify.com

Warranty

EcoForm luminaires feature a 5-year limited warranty
See signify.com/warranties for complete details and exclusions.

Buy American Act of 1933 (BAA):

This product is manufactured in one of our US factories and, as of the date of this document, this product was considered a commercially available off-the-shelf (COTS) item meeting the requirements of the BAA. This BAA designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies. Prior to ordering, please visit www.signify.com/baa to view a current list of BAA-compliant products to confirm this product's current compliance.

Signify North America Corporation
200 Franklin Square Drive,
Somerset, NJ 08873
Telephone 855-486-2216

Signify Canada Ltd.
281 Hillmount Road,
Markham, ON, Canada L6C 2S3
Telephone 800-668-9008

Submitted by Lightspec

LIGHTSPEC

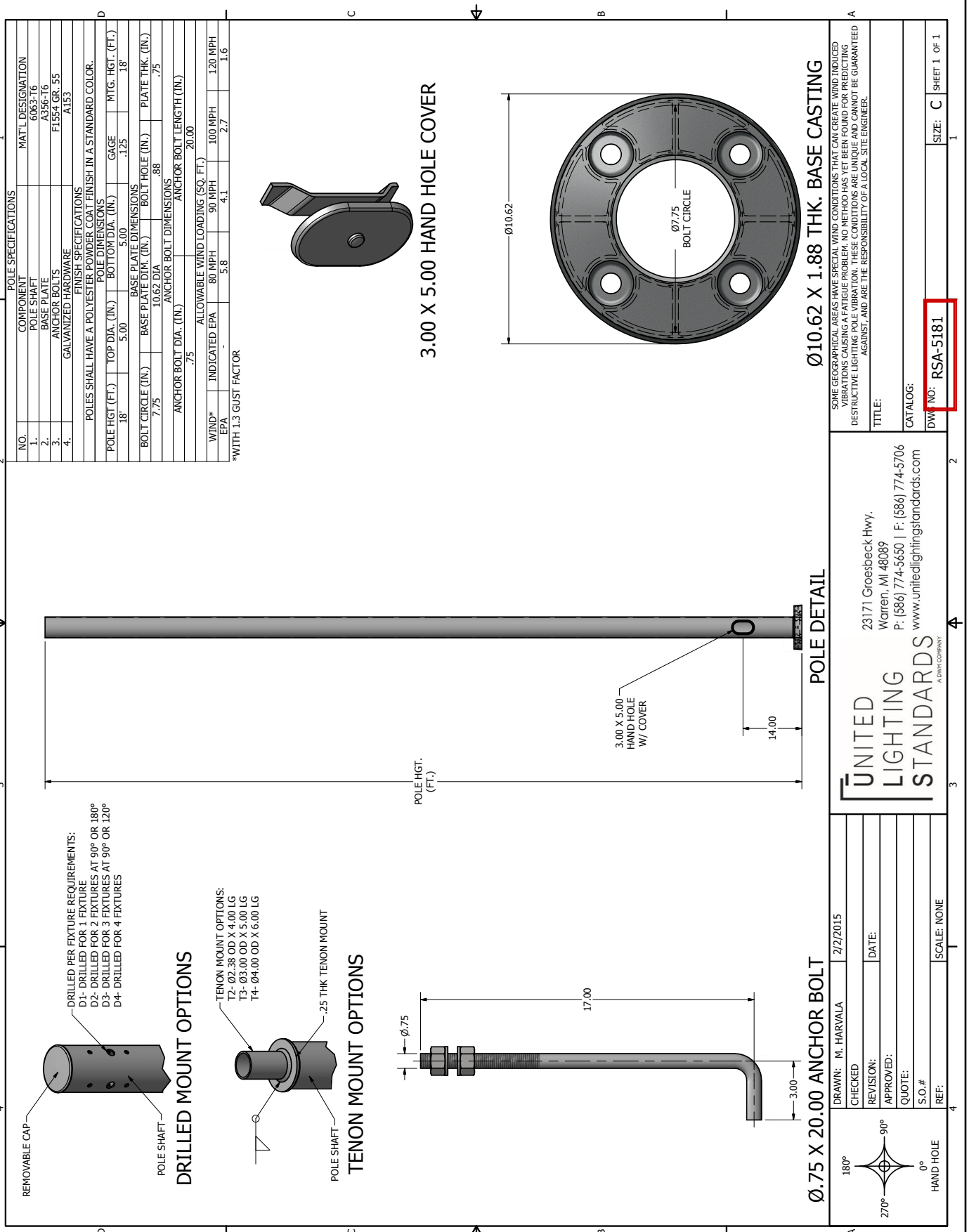
Job Name:
WAYNE'S MARKET - EATON STREET PARKING LOT
Architect: NO ARCHITECT
Design Build: DESIGN BUILD-SYR

Catalog Number:
RSA-5181

Notes:

Type:
POLES

SYR22-70454



G
RDS
A DWM COMPANY

www.un

POLE ORDERI

ORDER NU

ber

Number										

mber		Mounting Type	Fixture Mounting Arrangement	Finish	Options			
Shaft Size	Wall Thickness				Design	Orientation	Height From Base	Design
4	11	AB	T2	DB	WB-15	@90	10'	FH

nber

Number										

nber		Mounting Type	Fixture Mounting Arrangement	Finish	Options			
Shaft Size	Wall Thickness				Design	Orientation	Height From Base	Design

ial)

Finish

WH = White
TWH = Textured White
DB = Dark Bronze
TMB = Textured Medium Bronze
HB = Harvest Bronze
NB = New Bronze
SL = Silver
MGY = Medium Gray
GR = Gray
TGR = Textured Gray
GM = Graphite Metallic
DP = Dark Platinum
MA = Matte Aluminum
PSP = Platinum Silver
BK = Black
TBK = Textured Black
MG = Moss Green

Contact us for custom colors.

Note: N/A =

Options

CMB = Camera Mounting Bracket
CMP = Camera Mounting Plate
WB-15 = Welded Bracket
WC = Welded Coupling (denote size)
WN = Welded Nipple (denote size)
Festoon = Festoon Provision
CSBC = Custom Steel Base Cover
VD = Vibration Dampener
GFCI/IUC = Ground Fault Circuit Interrupter with In-Use Cover
UL = UL Listed**

Accesso

TB = Trans
ABS-BC =
LW = Lowe
LW-ELECTR
Winch BA =
FH = Flag H
PTTA = Pol

tation
is file.

**See our online product catalog for complete catalog and accessories.*

*** UL Listed labeling is available for catalog steel and Commercial & Industrial and Roadway. UL Listed labe brackets. UL Listing must be specified at the time of*

Submitted by Lightspec

LIGHTSPEC

Job Name:
WAYNE'S MARKET - EATON STREET PARKING LOT
Architect: NO ARCHITECT
Design Build: DESIGN BUILD-SYR

Catalog Number:
ECF-S-32L-530-NW-G2-AR-4-UNV-BK
Notes: QUAD HEAD

Type:
SITE HEAD
SYR22-70454

GARDCO by Signify

Site & Area

EcoForm

ECF-S small area light

Gardco EcoForm Gen-2 combines economy with performance in an LED area luminaire. Capable of delivering up to 27,800 lumens or more in a compact, low profile LED luminaire, EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems available for further energy savings. Includes Service Tag, our innovative way to provide assistance throughout the life of the product.

Project:
Location:
Cat.No:
Type:
Lamps: Qty:
Notes:

Ordering guide

example: ECF-S-64L-900-NW-G2-AR-5-120-HIS-MGY

Prefix	Number of LEDs	Drive Current	LED Color - Generation	Mounting	Distribution	Voltage
ECF-S	**32L** 32 LEDs (2 modules)	**365** 365mA **530** 530mA **700** 700mA **1A** 1050mA **1.2A** 1200mA	**WW-G2** Warm White 3000K, 70CRI Generation 2 **NW-G2** Neutral White 4000K, 70CRI Generation 2 **CW-G2** Cool White 5000K, 70CRI Generation 2	**AR**[2] Arm Mount (standard) The following mounting kits must be ordered separately (See accessories) **SF**[3] Slip Fitter Mount (fits to 2 3/8" O.D. tenon) **WS** Wall mount with surface conduit rear entry permitted **RAM**[2] Retrofit arm mount kit	**Type 2** **2** Type 2 **2-90** Rotated left 90° **2-270** Rotated right 270° **Type 3** **3** Type 3 **3-90** Rotated left 90° **3-270** Rotated right 270° **Type 4** **4** Type 4 **4-90** Rotated left 90° **4-270** Rotated right 270° **Type 5** **5** Type 5 **5W** Type 5W **AFR** Auto Front Row **AFR-90** Auto Front Row, Rotated left 90° **AFR-270** Auto Front Row, Rotated right 270° **BLC** Back Light Control **BLC-90** Back Light Control rotated at 90° **BLC-270** Back Light Control rotated at 270° **LCL**[19] LEED Corner Optic Left **RCL**[19] LEED Corner Optic Right	**120** 120V **208** 208V **240** 240V **277** 277V **347** 347V **480** 480V **UNV** 120-277V (50/60Hz) **HVU** 347-480V (50/60Hz)
	48L 48 LEDs (3 modules)	**900** 900mA **1A** 1050mA **1.2A**[19] 1200mA				
	64L 64 LEDs (4 modules)	**900** 900mA **1A**[19] 1050mA				

Options

Dimming controls	Motion sensing lens	Photo-sensing	Electrical	Luminaire	Finish
DD[4,18] 0-10V External dimming (for controls by others) **DCC**[4,5,6,18] Dual Circuit Control **FAWS**[4,5,18] Field Adjustable Wattage Selector **LLC**[4,6,7,8,18] Integral wireless module **BL**[1,4,7,18] Bi-level functionality **SRDR**[4,5,6,8,17] SR driver connected to Zhaga socket **DynaDimmer:** Automatic Profile Dimming **CS50**[4,8] Safety 50% Dimming, 7 hours **CM50**[4,8] Median 50% Dimming, 8 hours **CS30**[4,8] Safety 30% Dimming, 7 hours **CM30**[4,8] Median 30% Dimming, 8 hours	**IMRI3**[15] Integral with #3 lens **IMRI7**[16] Integral with #7 lens	**PCB**[8,9] Photocontrol Button **TLRD5**[10,17] Twist Lock Receptacle 5 Pin **TLRD7**[10,17] Twist Lock Receptacle 7 Pin **TLRPC**[9,10,11,17] Twist Lock Receptacle w/ Photocell	**Fusing** **F1**[9] Single (120, 277, 347VAC) **F2**[9] Double (208, 240, 480VAC) **Pole Mount Fusing** **FP1**[9] Single (120, 277, 347VAC) **FP2**[9] Double (208, 240, 480VAC) **FP3**[9] Canadian Double Pull (208, 240, 480VAC) **Surge Protection** (10kA standard) **SP2** Increased 20kA	Square Pole Adapter included in standard product **TB**[12] Terminal Block **RPA**[13] Round Pole Adapter (fits to 3"- 3.9" O.D. pole) **HIS**[14] Internal House Side Shield	**Textured** **BK** Black **WH** White **BZ** Bronze **DGY** Dark Gray **MGY** Medium Gray **Customer specified** **RAL** Specify optional color or RAL (ex: RAL7024) **CC** Custom color (Must supply color chip for required factory quote)

1. BL-IMRI3/7 equipped with out-boarded sensor housing when voltage is HVU (347-480V)
2. Mounts to a 4" round pole with adapter included for square poles.
3. Limited to a maximum of 45 degrees aiming above horizontal.
4. Not available with other dimming control options.
5. Not available with motion sensor.
6. Not available with photocontrol.
7. Must specify a motion sensor lens.
8. Not available in 347 or 480V
9. Must specify input voltage.
10. TLRD5, TLRD7 and TLRPC receptacle pins 4 & 5 are capped off when ordered with any of the Dimming controls DD or FAWS or LLC.
11. Not available in 480V. Order photocell separately with TLRD5/7.
12. Not available with DCC.
13. Not available with SF and WS. RPAs provided with black finish standard.
14. HIS not available with Type 5, 5W, BLC, BLC-90, BLC-270, LCL or RCL optics.
15. Not available with DD, DCC, and FAWS dimming control options.
16. Not available with DD, DCC, FAWS and LLC dimming control options.
17. When ordering SRDR, controller (by others) to be used on socket must be SR compatible (See specifications for more details). Consult factory for lead time. All 7 pins in NEMA receptacle are connected to SR driver. SRDR not available with TLRD5 or TLRPC.
18. 0-10V dimming driver standard.
19. LCL and RCL not available with 48L-1.2A or 64L-1A.

ECF-S EcoForm small

Area luminaire

EcoForm Accessories[21] (ordered separately, field installed)

Shielding Accessories

House Side shield

Standard optic orientation:
HIS-32-H [20] Internal House Side Shield for 32 LEDs (2 modules)
HIS-48-H [20] Internal House Side Shield for 48 LEDs (3 modules)
HIS-64-H [20] Internal House Side Shield for 64 LEDs (4 modules)

Optic at 90 or 270 orientation:
HIS-32-V [20] Internal House Side Shield for 32 LEDs (2 modules)
HIS-48-V [20] Internal House Side Shield for 48 LEDs (3 modules)
HIS-64-V [20] Internal House Side Shield for 64 LEDs (4 modules)

Footnotes

20. Not available with Type 5 or 5W optics
21. Consult Signify to confirm whether specific accessories are BAA-compliant.

Luminaire Accessories

ECF-BD-G2	Bird deterrent
ECF-RAM-G2-(F)	Retrofit Arm mount kit
ECF-SF-G2-(F)	Slip Fitter Mount (fits to 2 3/8" O.D. tenon)
ECF-WS-G2-(F)	Wall mount with surface conduit rear entry permitted

EcoForm PTF2
(pole top fitter fits 23/8-21/2" OD x 4" depth tenon)

PTF2-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF2-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF2-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF2-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF2-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF2-ECF-S/L-3-120-(F) 3 luminaires at 120°

EcoForm PTF3
(pole top fitter fits 3-31/2" OD x 6" depth tenon)

PTF3-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF3-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF3-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF3-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF3-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF3-ECF-S/L-3-120-(F) 3 luminaires at 120°

EcoForm PTF4
(pole top fitter fits 31/2-4" OD x 6" depth tenon)

PTF4-ECF-S/L-1-90-(F) 1 luminaire at 90°
PTF4-ECF-S/L-2-90-(F) 2 luminaires at 90°
PTF4-ECF-S/L-2-180-(F) 2 luminaires at 180°
PTF4-ECF-S/L-3-90-(F) 3 luminaires at 90°
PTF4-ECF-S/L-4-90-(F) 4 luminaires at 90°
PTF4-ECF-S/L-3-120-(F) 3 luminaires at 120°

(**F**) = Specify finish

Ready to Go configurations (when ordered with the "RS-" catalog code, the following configurations will ship in 2 weeks):

Catalog Number	12NC
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BZ	912401466002
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-MGY	912401466003
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BK	912401534554
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BZ	912401466004
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-MGY	912401466005
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BK	912401534555
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BZ	912401466006
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-MGY	912401466007
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BK	912401534556
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BZ	912401466008
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-MGY	912401466009
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BK	912401534557
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BZ	912401466010
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-MGY	912401466011
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BK	912401534558
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BZ	912401466012
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-MGY	912401466013
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BK	912401534559
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BZ	912401466014
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-MGY	912401466015

Catalog Number	12NC
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BK	912401534560
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BZ	912401466016
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-MGY	912401466017
RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BK	912401534561
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BZ	912401466018
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-MGY	912401466019
RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BK	912401534562
RS-ECF-RAM-G2-DGY	912401466487
RS-ECF-RAM-G2-MGY	912401466488
RS-ECF-RAM-G2-WH	912401466485
RS-ECF-RAM-G2-BZ	912401466486
RS-ECF-RAM-G2-BK	912401466484
RS-HIS-32-H	912401466489
RS-HIS-48-H	912401466491
RS-HIS-64-H	912401466493

ECF-S EcoForm small

Area luminaire

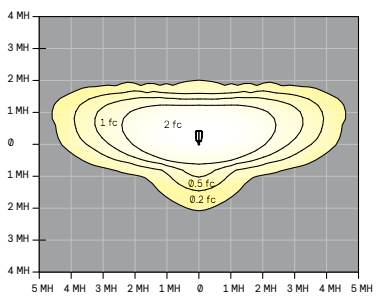
Predicted Lumen Depreciation Data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions.L_{70} is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11. Published L_{70} hours limited to 6 times actual LED test hours

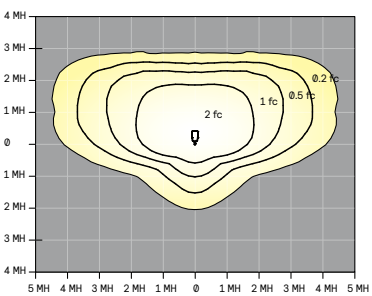
Ambient Temperature °C	Driver mA	Calculated L_{70} Hours	L_{70} per TM-21	Lumen Maintenance % at 60,000 hrs
25°C	up to 1200 mA	>100,000 hours	>120,000 hours	>99%

Optical Distributions

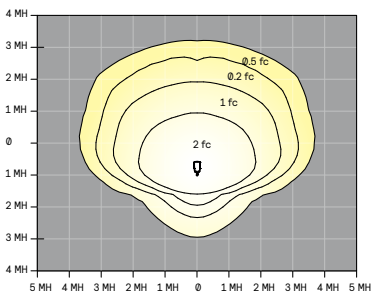
Based on configuration ECF-S-48L-1A-NW-G2 (159W) mounted at 20ft.



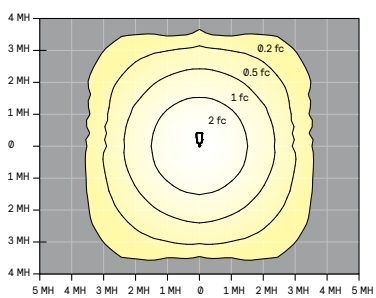
Type 2



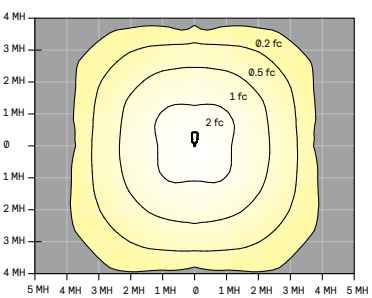
Type 3



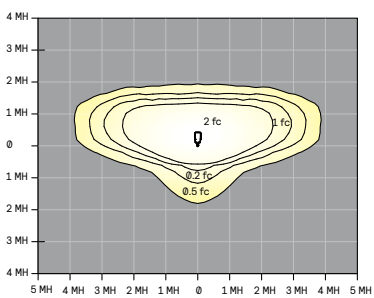
Type 4



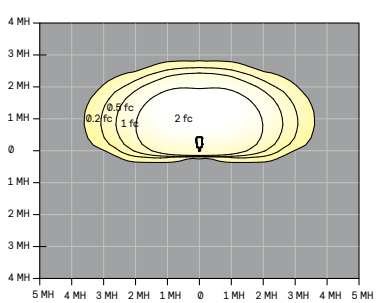
Type 5



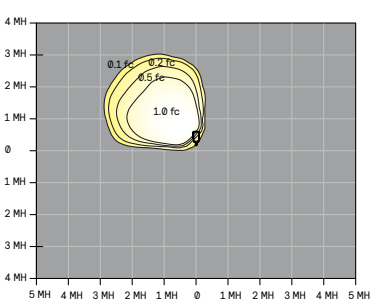
Type 5W



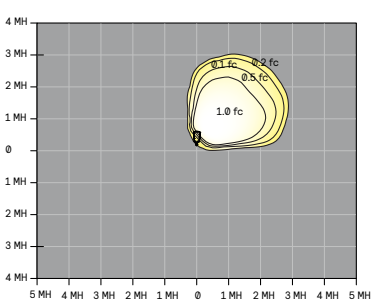
AFR



BLC



LCL



RCL

ECF-S EcoForm small

Area luminaire

3000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,508	B1-U0-G1	138	5,428	B1-U0-G2	136	5,637	B1-U0-G2	141	5,790	B3-U0-G1	145	5,604	B3-U0-G1	140
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,159	B2-U0-G2	129	7,055	B1-U0-G2	127	7,327	B1-U0-G2	132	7,526	B3-U0-G2	135	7,284	B3-U0-G2	131
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,234	B2-U0-G2	127	9,034	B2-U0-G2	124	9,452	B2-U0-G2	130	9,707	B4-U0-G2	133	9,395	B4-U0-G2	129
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,001	B3-U0-G2	123	12,719	B2-U0-G2	120	13,306	B2-U0-G3	126	13,665	B4-U0-G2	129	13,227	B4-U0-G2	125
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,421	B3-U0-G3	119	14,108	B2-U0-G3	116	14,760	B2-U0-G3	121	15,158	B4-U0-G2	125	14,671	B4-U0-G2	121
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,115	B3-U0-G3	127	16,744	B3-U0-G3	124	17,518	B2-U0-G3	130	17,990	B4-U0-G2	133	17,413	B5-U0-G3	129
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	19,381	B3-U0-G3	122	18,960	B3-U0-G3	119	19,836	B3-U0-G4	125	20,372	B5-U0-G3	128	19,717	B5-U0-G3	124
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	21,515	B3-U0-G3	118	21,048	B3-U0-G4	115	22,020	B3-U0-G4	121	22,616	B5-U0-G3	124	21,888	B5-U0-G3	120
ECF-S-64L-900-WW-G2-x	64	900	3000	178	22,652	B3-U0-G3	127	22,161	B3-U0-G4	125	23,185	B3-U0-G4	130	23,810	B5-U0-G3	134	23,045	B5-U0-G3	130
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	25,520	B3-U0-G3	124	24,966	B3-U0-G4	121	26,120	B3-U0-G4	127	26,150	B5-U0-G3	127	25,964	B5-U0-G4	126

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,706	B2-U0-G1	143	3,691	B0-U0-G1	94	2,449	B0-U0-G1	62
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,417	B2-U0-G1	133	5,005	B0-U0-G2	91	3,183	B0-U0-G1	58
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,567	B2-U0-G2	131	6,409	B0-U0-G2	89	4,106	B0-U0-G1	57
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,467	B3-U0-G2	128	9,024	B1-U0-G2	87	5,793	B0-U0-G2	56
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,939	B3-U0-G2	123	10,010	B1-U0-G2	84	6,426	B0-U0-G2	54
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,731	B3-U0-G2	131	11,880	B1-U0-G2	89	7,626	B0-U0-G2	57
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	20,076	B3-U0-G2	127	13,453	B1-U0-G2	86	8,636	B0-U0-G2	55
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	22,288	B3-U0-G2	122	14,934	B1-U0-G3	83			
ECF-S-64L-900-WW-G2-x	64	900	3000	178	23,465	B3-U0-G2	132	15,723	B1-U0-G3	90	10,093	B0-U0-G2	58
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	26,437	B4-U0-G3	128	17,714	B1-U0-G3	87			

4000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-NW-G2-x	32	700	4000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-NW-G2-x	64	900	4000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25,063	B5-U0-G3	141	24,258	B5-U0-G4	136
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27,526	B5-U0-G3	134	27,330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-NW-G2-x	32	700	4000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18664,	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-NW-G2-x	64	900	4000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

ECF-S EcoForm small

Area luminaire

5000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-CW-G2-x	32	700	5000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-CW-G2-x	64	900	5000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25063	B5-U0-G3	141	24258	B5-U0-G4	136
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27526	B5-U0-G3	134	27330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-CW-G2-x	32	700	5000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,664	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-CW-G2-x	64	900	5000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

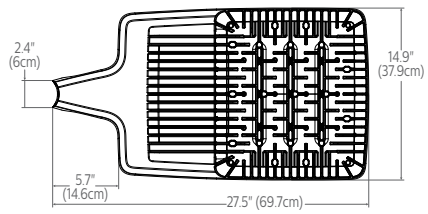
ECF-S EcoForm small

Area luminaire

Dimensions

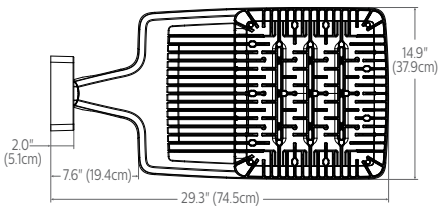
Standard Arm (**AR**)

Weight: 22 Lbs (9.9 Kg) EPA: 0.21ft² (.019m²)



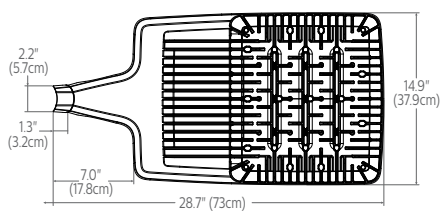
Wall (**WS**)

Weight: 27 Lbs. (12. 2Kg)EPA: 0.27ft² (.025m²)



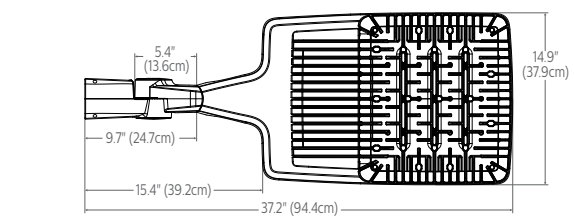
Retrofit Arm (**RAM**)

Weight: 24 Lbs (10.9 Kg) EPA: 0.24ft² (.022m²)

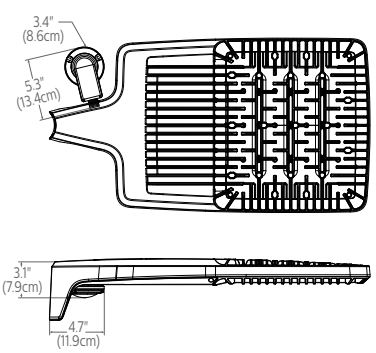


Slip fitter (**SF**)

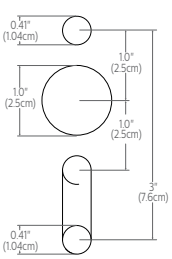
Weight: 27 Lbs (12.2 Kg) EPA: 0.33ft² (.031m²)



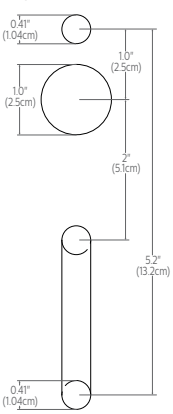
Outboard **IMR-HVU** sensor



Standard Arm (**AR**) drill pattern



Retrofit Arm (**RAM**) drill pattern



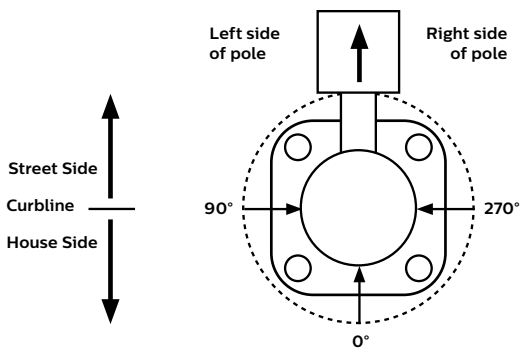
ECF-S EcoForm small

Area luminaire

Optical Orientation Information

Standard Optic Position

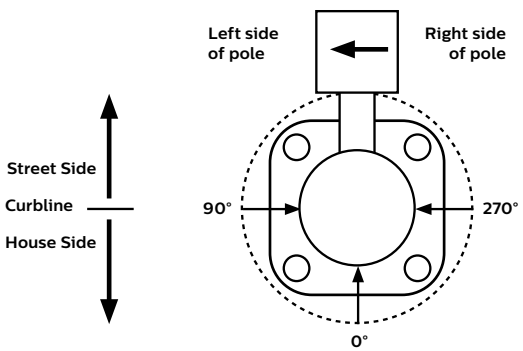
Luminaires ordered with asymmetric optical systems in the standard optic position will have the optical system oriented as shown below:



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Left (90°) Optic Position

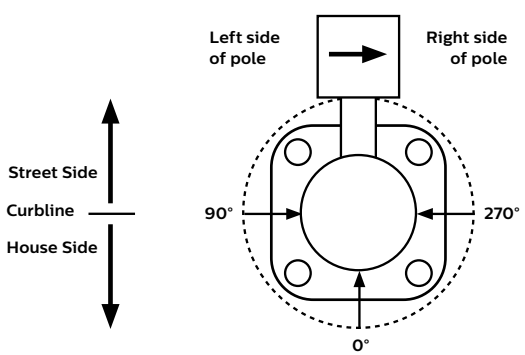
Luminaires ordered with optical systems in the Optic Rotated Left (90°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Right (270°) Optic Position

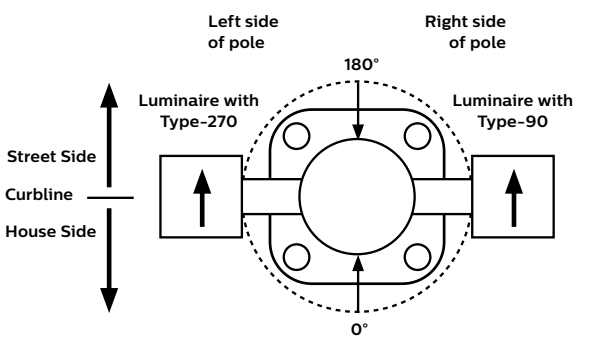
Luminaires ordered with optical systems in the Optic Rotated Right (270°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Twin Luminaire Assemblies with Type-90/Type-270 Rotated Optical Systems

Twin luminaire assemblies installed with rotated optical systems are an excellent way to direct light toward the interior of the site (Street Side) without additional equipment. It is important, however, that care be exercised to insure that luminaires are installed in the proper location.



Luminaires with Optic Rotated Right (270°) are installed on the LEFT Side of Pole

Luminaires with Optic Rotated Left (90°) are installed on the RIGHT Side of Pole

Note: The hand hole location will depend on the drilling configuration ordered for the pole.

ECF-S EcoForm small

Area luminaire

Specifications

Housing

One-piece die cast aluminum housing with integral arm and separate, self-retained hinged, one-piece die cast door frame. Luminaire housing rated to IP65, tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated 3G over 100,000 cycles conforming to standards set forth by ANSI C136.31-2018. Testing includes vibration in three axes, all performed on the same luminaire.

Light engine

Light engine comprises of a module of 16-LED aluminum metal clad board fully sealed with optics offered in multiples of 2, 3, and 4 modules or 32, 48, and 64 LEDs. Module is RoHS compliant. Color temperatures: 3000K +/-125K, 4000K, 5000K +/- 200K. Minimum CRI of 70. LED light engine is rated IP66 in accordance to Section 9 of IEC 60598-1.

Energy saving benefits

System efficacy up to 152 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

Optical systems

Type 2, 3, 4, 5, 5W, and AFR distributions available. Internal Shield option mounts to LED optics and is available with Type 2, 3, 4, and AFR distributions, including a dedicated BLC, LCL, and RCL optics to provide the best backlight control possible for those stringent requirements around property lines. Types 2, 3, 4, AFR, and BLC when specified and used as rotated, are factory set only. Performance tested per LM-79 and TM-15 (IESNA) certifying its photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

Standard luminaire arm mounts to 4" O.D. round poles. Can also be used with 5" O.D. poles. Square pole adapter included with every luminaire. Round Pole Adapter (RPA) required for 3-3.9" poles. EcoForm features a retrofit arm kit. When specified with the retrofit arm (RAM) option, EcoForm seamlessly simplifies site conversions to LED by eliminating the need for additional pole drilling on most existing poles. RAM will be boxed separately. Also optional are slipfitter and wall mounting accessories. Note that only fixed mounts (AR, RAM, WS) are required to meet IDA compliance. SF mounting will not meet IDA.

Control options

0-10V dimming (DD): Access to 0-10V dimming leads supplied through back of luminaire (for secondary dimming controls by others). Cannot be used with other control options.

Dual Circuit Control (DCC): Luminaire equipped with the ability to have two separate circuits controlling drivers and light engines independently. Permits separate switching of separate modules controlled by use of two sets of leads, one for each circuit. Not recommended to be used with other control options, motion response, or photocells.

Sensor Ready Zhaga Socket Connector (SRDR): Product equipped with Sensor Ready drivers connected to 4-pin Zhaga Book 18 compliant receptacle designed for sensor and other control system applications. Receptacle is rated IP66 assembly in a compact design that provides a sealed electrical interface and rated UV resistance, mounted on underside of the luminaire, protective dust cap included. When a controller not provided by Signify is used with Sensor Ready Zhaga socket connector, the controller must be certified to work with the Xitanium SR LED drivers as part of the SR certified program. SRDR can be used with NEMA 7-pin twist lock receptacle, which is mounted on top of the luminaire.

Automatic Profile Dimming (CS/CM/CE/CA): Standard dimming profiles provide flexibility towards energy savings goals while optimizing light levels during specific dark hours. Dimming profiles include two dimming settings including dim to 30% or 50% of the total lumen output. When used in combination with not programmed motion response it overrides the controller's schedule when motion is detected. After 5 minutes with no motion, it will return to the automatic diming profile schedule. Automatic dimming profile scheduled with the following settings:

- **CS50/CS30:** Security for 7 hours night duration (Ex., 11 PM - 6 AM)
- **CM50/CM30:** Median for 8 hours night duration (Ex., 10 PM - 6 AM)

All above profiles are calculated from mid point of the night. Dimming is set for 6 hours after the mid point and 1 or 2 hours before depending of the duration of dimming. Cannot be used with other dimming control options.

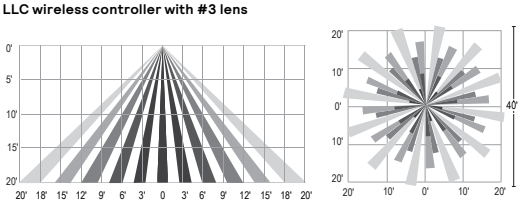
Field Adjustable Wattage Selector (FAWS): Luminaire equipped with the ability to manually adjust the wattage in the field to reduce total luminaire lumen output and light levels. Comes pre-set to the highest position at the lumen output selected. Use chart below to estimate reduction in lumen output desired. Cannot be used with other control options or motion response.

FAWS Position	Percent of Typical Lumen Output
1	25%
2	50%
3	55%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: Typical value accuracy +/- 5%

Wireless system (LLC): Optional wireless controller integral to luminaire ready to be connected to a Limelight system (sold by others). The system allows you to wirelessly manage the entire site, independent lighting groups or individual luminaires while on-site or remotely. Based on a high-density mesh network with an easy to use web-based portal, you can conveniently access, monitor and manage your lighting network remotely. Wireless controls can be combined with site and area, pedestrian, and parking garage luminaires as well, for a completely connected outdoor solution. Equipped with motion response with #3 lens for 8-25' mounting heights. Also available with remote pod accessory where pod is mounted separate from luminaire to pole or wall.

LLC wireless controller with #3 lens



Motion response options

Bi-Level Infrared Motion Response (BL-IMRI): Motion Response module is mounted integral to luminaire factory pre-programmed to 50% dimming when not ordered with other control options. BL-IMRI is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to full power/light output. Dimming on low is factory set to 50% with 5 minutes default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50%, to 50% of the normal constant wattage reducing the light level. Other dimming settings can be provided if different dimming levels are required. This can also be done with FSIR-100 Wireless Remote Programming Tool (contact Technical Support for details).

Infrared Motion Response with Other Controls: When used in combination with other controls (Automatic Dimming Profile), motion response device will simply override controller's schedule with the added benefits of a combined dimming profile and sensor detection. In this configuration, the motion response device cannot be re-programmed with FSIR-100 Wireless Remote Programming Tool. The profile can only be re-programmed via the controller.

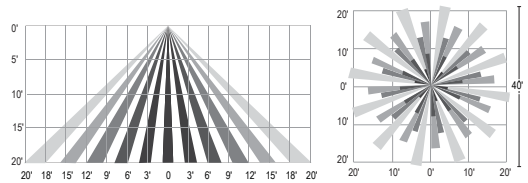
ECF-S EcoForm small

Area luminaire

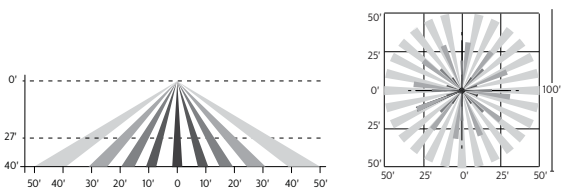
Specifications

Infrared Motion Response Lenses (IMRI3/IMRI7): Infrared Motion Response Integral module is available with two different sensor lens types to accommodate various mounting heights and occupancy detection ranges. Lens #3 (IMRI3) is designed for mounting heights up to 20' with a 40' diameter coverage area. Lens #7 is designed for higher mounting heights up to 40' with larger coverage areas up to 100' diameter coverage area. See charts for approximate detection patterns:

IMRI3 Luminaire or remote mount controller with #3 lens



IMRI7 Luminaire or remote mount controller with #7 lens



Electrical

Twist-Lock Receptacle (TLRD5/TLRD7/ TLRPC): Twist Lock Receptacle with 5 pins enabling dimming or with 7 pins with additional functionality (by others) can be used with a twistlock photoelectric cell or a shorting cap. Dimming Receptacle Type B (5-pin) and Type D-24 (7-pin) in accordance to ANSI C136.41. Can be used with third-party control system. Receptacle located on top of luminaire housing. When specifying receptacle with twistlock photoelectric cell, voltage must be specified. When ordering 7-pin Twist-lock receptacle (TLRD7), all 7 pins are wired to respective pins with the Sensor Ready (SR) driver, and photocell or shorting cap is not included. When ordering a twist-lock receptacle with a photocell (TLRPC), the receptacle used is a 5-pin receptacle, so pins 6 and 7 are not available (no SR driver). 0-10V dimming leads (pins 4 and 5) are connected if not ordered with any other dimming option.

Driver: Driver efficiency (>90% standard). 120-480V available (restrictions apply). Open/short circuit protection. All drivers are 0-10V dimming to 10% power standard, except when using Sensor Ready (SR) drivers, which uses DALI protocol (options CS50/CM50/CS30/CM30, SRDR, and TR7). Drivers are RoHS and FCC Title 47 CFR Part 15 compliant.

Button Photocontrol (PCB): Button style design for internal luminaires mounting applications. The photocontrol is constructed of a high impact UV stabilized polycarbonate housing. Rated voltage of 120V or 208-277V with a load rating of 1000 VA. The photocell will turn on with 1-4Fc of ambient light.

Surge protection (SP1/SP2): Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA. 20kV / 10kA surge protection device that provides extra protection beyond the SP1 10kV/10kA level.

Listings

UL/cUL wet location listed to the UL 1598 standard, suitable for use in ambient temperatures from -40° to 40°C (-40° to 104°F). Most EcoForm configurations are qualified under Premium and Standard DesignLights Consortium® categories. Consult DLC Qualified Products list to confirm your specific luminaire selection is approved. CCTs 3000K and warmer are Dark Sky Approved.

Finish

Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish. Standard colors include bronze (BZ), black (BK), white (WH), dark gray (DGY), and medium gray (MGY). Consult factory for specs on optional or custom colors.

Service Tag

Each individual luminaire is uniquely identifiable, thanks to the Service tag application. With a simple scan of a QR code, placed on the inside of the mast door, you gain instant access to the luminaire configuration, making installation and maintenance operations faster and easier, no matter what stage of the luminaire's lifetime. Just download the APP and register your product right away. For more details visit: signify.com

Warranty

EcoForm luminaires feature a 5-year limited warranty
See signify.com/warranties for complete details and exclusions.

Buy American Act of 1933 (BAA):

This product is manufactured in one of our US factories and, as of the date of this document, this product was considered a commercially available off-the-shelf (COTS) item meeting the requirements of the BAA. This BAA designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies. Prior to ordering, please visit www.signify.com/baa to view a current list of BAA-compliant products to confirm this product's current compliance.

Signify North America Corporation
200 Franklin Square Drive,
Somerset, NJ 08873
Telephone 855-486-2216

Signify Canada Ltd.
281 Hillmount Road,
Markham, ON, Canada L6C 2S3
Telephone 800-668-9008

Submitted by Lightspec

LIGHTSPEC

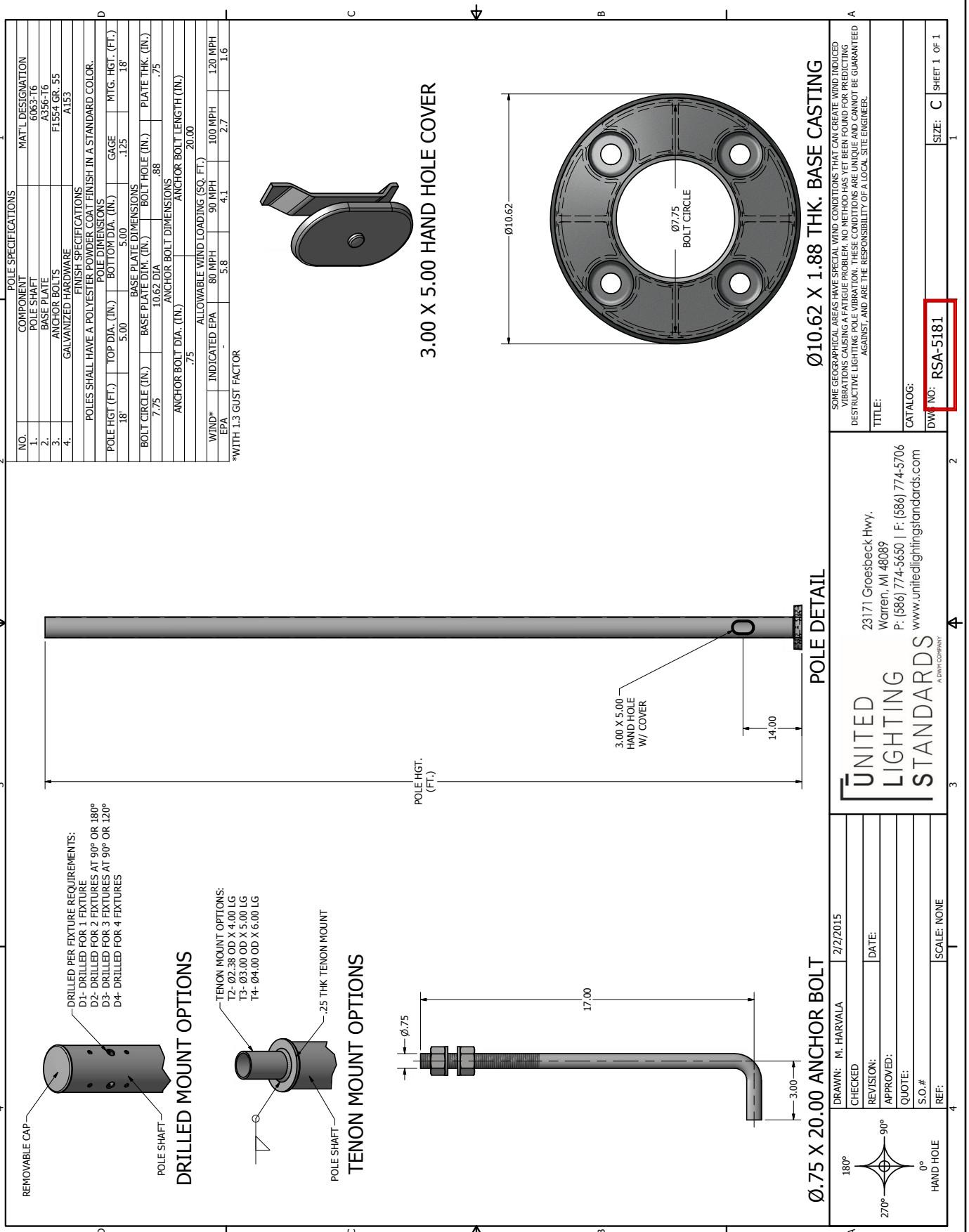
Job Name:
WAYNE'S MARKET - EATON STREET PARKING LOT
Architect: NO ARCHITECT
Design Build: DESIGN BUILD-SYR

Catalog Number:
RSA-5181

Notes:

Type:
POLES

SYR22-70454



G
RDS
A DWM COMPANY

www.un

POLE ORDERI

ORDER NU

ber

Number										

mber		Mounting Type	Fixture Mounting Arrangement	Finish	Options			
Shaft Size	Wall Thickness				Design	Orientation	Height From Base	Design
4	11	AB	T2	DB	WB-15	@90	10'	FH

nber

Number										

nber		Mounting Type	Fixture Mounting Arrangement	Finish	Options			
Shaft Size	Wall Thickness				Design	Orientation	Height From Base	Design

ial)

Finish

WH = White
TWH = Textured White
DB = Dark Bronze
TMB = Textured Medium Bronze
HB = Harvest Bronze
NB = New Bronze
SL = Silver
MGY = Medium Gray
GR = Gray
TGR = Textured Gray
GM = Graphite Metallic
DP = Dark Platinum
MA = Matte Aluminum
PSP = Platinum Silver
BK = Black
TBK = Textured Black
MG = Moss Green

Contact us for custom colors.

Note: N/A =

Options

CMB = Camera Mounting Bracket
CMP = Camera Mounting Plate
WB-15 = Welded Bracket
WC = Welded Coupling (denote size)
WN = Welded Nipple (denote size)
Festoon = Festoon Provision
CSBC = Custom Steel Base Cover
VD = Vibration Dampener
GFCI/IUC = Ground Fault Circuit Interrupter with In-Use Cover
UL = UL Listed**

Accesso

TB = Trans
ABS-BC =
LW = Lowe
LW-ELECTR
Winch BA =
FH = Flag H
PTTA = Pol

tation
is file.

**See our online product catalog for complete catalog and accessories.*

*** UL Listed labeling is available for catalog steel and Commercial & Industrial and Roadway. UL Listed labe brackets. UL Listing must be specified at the time of*

CT4000 Family

ChargePoint® Level 2 Commercial Charging Stations

The CT4000 family is the latest generation of ChargePoint commercial charging stations. Refined yet rugged, these stations set the industry standard for functionality and aesthetics.

The CT4000 full motion color LCD display instructs drivers and supports dynamic updates of custom branded videos and advertisements.

Intelligent power management options double the number of parking spaces served by allowing two charging ports to share a single circuit. Sites with single port EV stations can upgrade to dual port stations without requiring additional electrical services.

The CT4000 is the first ENERGY STAR® certified EV charger because it charges efficiently and conserves power when not charging. As an ENERGY STAR certified EV charger, the CT4000 uses significantly less energy than a standard EV charger when in standby mode to help you save money on your utility bill.

All CT4000 models offer one or two standard SAE J1772™ Level 2 charging ports with locking holsters, each port supplying up to 7.2kW. With this standard connector, ChargePoint level 2 stations can charge any EV.

Stations are available in bollard and wall mount configurations for easy installation anywhere. All stations are fully software upgradeable remotely over the air.

Stations come in both 6′ and 8′ tall models with 18′ and 23′ cords, respectively. With multiple options for size and cord reach, your station can service up to four parking spaces, reach all car models regardless of parking style or car sizes and increase the usability of your EV spots.

Driver Friendly User Interface

- Instructional video shows how to use the station
- Multi-language: English, French, Spanish
- Touch button interface; works in rain, ice and with gloves
- Backed by ChargePoint's world class 24/7 driver phone support

Easily Communicate with Your Drivers

Whether you're a retail establishment wanting to advertise your latest product, a workplace looking to communicate with employees or a municipality wanting to welcome visitors, ChargePoint's prominent LCD screen makes it easy to reach EV drivers:

- Daylight readable, with auto brightness control
- 640 X 480 resolution active matrix
- Full motion 30fps video support
- Upload up to 60 seconds of high quality video on a color LCD screen to individual stations as often as desired
- Brand your charging stations to communicate with drivers
- Instructional video in English, Spanish or French

ENERGY STAR

The First
ENERGY STAR®
Certified EV Charger

Service Products and Support

ChargePoint offers world-class service products and support that help ensure quality of work, save time and money, protect your investment and enhance the productivity of your charging stations. From site planning to installation and setup, to ongoing care and management, when you choose ChargePoint, you're covered.

- **ChargePoint Configuration and Activation:** customized setup and activation of your stations
- **ChargePoint Assure:** the most comprehensive EV Station maintenance and management in the industry

Energy Measurement and Management

- Real-time energy measurement
- 15 minute interval recording
- Time of Day (TOD) pricing
- Load shed by percentage of running average or to fixed power output

Minimize Costs with Flexible Power Management Options

In the vast majority of applications, a full power configuration is the best choice for both station owners and drivers. However, when drivers are parked for a longer time, an intelligent, lower power output can save station owners considerable installation cost while still providing drivers a great charging experience. With flexible power options, station owners can meet the needs of drivers while lowering costs:

Power Select (Patent Pending)

- Allows for a lower capacity (less than 40A) circuit to power each port
- Cuts installation costs by reducing the cost or even avoiding the need to upgrade panels or transformers

Power Sharing

- Dynamically share one 40A, 30A or 20A circuit between two parking spaces
- Doubles the number of parking spots served while reducing installation and operating costs
- Allows station owners to upgrade a single port station to dual port to serve more drivers with no electrical upgrade

Clean Cord Technology

- Keep charging cords off the ground
- Standard on all models
- Ultra-reliable second-generation gravity operated mechanism
- Flexible over entire -40°F to +122°F product temperature range

Safe, Reliable, Energy Efficient Hardware

- UL listed, meeting the stringent requirements of the nation's leading safety standards organization
- Stations are rugged, built to withstand the elements
- Safe, Reliable and Energy Efficient
- ENERGY STAR certified, charges efficiently and conserves power when not charging

When Charging is Mission Critical, Protect Your Investment with ChargePoint Assure

- **Minimize downtime:** ChargePoint Assure provides the most comprehensive EV Station maintenance and management in the industry
- **Get up and running quickly and flawlessly:** Professional guidance for station configuration saves you time, and unlimited changes to station policies flexibly supports your business
- **Eliminate unexpected future expenses:** Cost for parts and on-site labor to install is covered for all Assure eligible repairs
- **One less thing to worry about:** Proactive station monitoring provides you with regular reporting
- **Reduced risk of downtime:** We guarantee 98% annual uptime and one business day response to requests
- **Support when you need it:** We're there for you *and* your drivers. Phone support available for station owners Monday to Friday from 5 AM to 6 PM Pacific. Phone support for drivers is 24/7/365, so you never need to field a driver call

Ultra-reliable second-generation gravity operated mechanism.

18′ and 23′ cords to reach all car models and serve more parking spaces.

World-class 24/7 driver phone support.

Instructional video shows how to use the station. Multi-language charging instructions, giving drivers the choice of English, French or Spanish.

Driver interaction is supported in any weather by five rugged, back-lit buttons with audio feedback.

Strong and rugged design materials built to withstand the elements.

CT4000 stations come with 18′ or 23′ cords to increase the usability of your charging spots, on 6′ and 8′ tall models respectively.

CT4021
Dual-port bollard charging station with 18′ charging cables. Standard *EV Charging Only* sign without optional custom branding.

Promote Your Brand and Business

Having your stations installed in a visible location makes a bold statement about your business' commitment to sustainability and shows that you care about your customers. ChargePoint CT4000 stations are built for customization so you can conveniently promote your brand as well. With custom signage and video you can:

- Increase brand recognition
- Attract EV drivers by making sure your stations are highly visible
- Ensure EV charging installations are consistent with the look and feel of your brand
- Differentiate your stations from standard ChargePoint stations to make them easily identifiable by your driver base

Easily customizable branding area.

All stations come with *EV Charging Only* sign, which can be replaced with your custom signage.

5.7″ color LCD display for customizable video content.

Upload up to 60 seconds of high quality video to individual stations as often as desired.

Daylight readable with auto brightness control.

OPTIONAL:
Additional customizable branding areas.

All stations have standard extrusions to hold your custom signage.

Artwork templates and material specifications are conveniently downloadable from chargepoint.com

Branded CT4021
Shown with optional branding on bollard.
18′ cords on 6′ model.

Branded CT4025
Shown with optional branding on back.
23′ cords on 8′ model.

Bollard Charging Stations

CT4011

CT4021

CT4025

Wall Mount Charging Stations

CT4013

CT4023

CT4027

Contact Us

Visit chargepoint.com

Call +1.408.705.1992

Email sales@chargepoint.com

chargepoint

ChargePoint, Inc.
240 East Hacienda Avenue
Campbell, CA 95008-6617 USA

+1.408.841.4500 or
+1.877.370.3802 US and Canada toll-free

chargepoint.com

Listed by Underwriters Laboratories Inc.

CT4000 Make-Ready Requirements Specification

Introduction

This document provides best practices and guidelines for preparing a site to install EV charging stations (Make-Ready). "Make-ready" means that all necessary electrical infrastructure to operate the charging stations, all conduit and wire is pulled to the station location(s), all concrete work is completed properly so the stations can be mounted and any cellular repeaters are installed if required.

ChargePoint recommends that you plan for 5%-10% of parking spaces and 10%-15% for high EV adoption areas like California for future planning. Consideration of electrical infrastructure that supports current and future needs for EV charging will help avoid costly upgrades later as demands for EV charging grows.

Regardless of the specific type of CT4000 charging station you will be installing, these high level Make Ready specification will be the same.

ChargePoint recommends using a certified electrician to evaluate available capacity of existing electrical panels and to identify any electrical panel upgrades that may be required to support EV charging for multiple make-ready parking spaces. An onsite evaluation is necessary to determine conduit and wiring requirements from panel to proposed "make-ready" parking spaces, as well as to measure cellular signal levels and identify suitable locations for placement of any necessary cellular signal booster equipment.

Station Location

To help minimize costs you will want to choose station locations that are somewhat close to the available electrical infrastructure. In selecting these types of locations it helps minimize long conduit and wire runs as well as any trenching work. You should also consider locations where it will be easy to add future stations.

You also need to ensure that station locations have strong 3G cellular connectivity to allow ChargePoint to communicate with the stations. If there is a weak signal at the station location a cellular signal booster (repeater) will need to be installed (See the Cellular Signal Levels section later in this document).

Finally, consider how easy the stations are to find for drivers needing to access them.

EV Make-Ready Construction

All construction must conform to all local codes that are designated by the state, local municipality or authorities of where you are performing the construction. Conduit and wire size will need to be determined based on the length of runs from electrical panel to the station location. The National Electrical Codes and local codes will help determine appropriate sizing.

Each Level 2 charging port requires a dedicated single-phase electrical circuit (32A @ 208/240V) with 40A circuit breaker at the electrical panel. A certified electrician must install all electrical circuits in accordance with local and National Electric Code requirements.

General guidelines for "make-ready" include:

1) Evaluation of existing electrical infrastructure to determine if there is sufficient existing utility service and electrical panel capacity and identify costs for any necessary upgrades and/or a new dedicated electrical panel.
2) For installation of dedicated EV electrical panel, choose panel location in close proximity to existing electrical supply.
3) Identify station locations for EV charging that are in close proximity to an electrical room with common area electrical panel; reduce distance for conduit runs and electrical wiring from electrical panel to all proposed EV parking spaces.
4) Determine the appropriate mounting location.
5) Ensure the wiring, circuit protection and metering is in place at the station installation location by reviewing the specification, wiring diagram and grounding requirements later in this document.
6) Ensure that you are using 6 or 8 gauge wire to station. If you will be feeding the station with larger wire like 4 gauge then you will need to splice the wire for 6 or 8 gauge.
7) If possible, avoid or minimize trenching requirements, especially more costly trenching to run conduit under asphalt surfaces.
8) Choose adjacent parking spaces in an area with adequate lighting and identify suitable locations with flat surface for wall mount stations or suitable floor surface for pedestal mount stations (no asphalt surfaces).
9) Use dual-port pedestal mount stations where possible in open areas for adjacent or tandem parking spaces.
10) Determine optimum conduit layout to minimize linear conduit costs to multiple EV parking spaces and size all conduit and electrical wiring in accordance with National Electric Code requirements.
11) Measure cellular signal levels for 3G Verizon and 3G AT&T carriers and identify optimum location for placement of ChargePoint gateway devices.
12) Ensure that adequate CDMA (Verizon, Sprint) or GSM (AT&T, Rogers) cellular coverage is available at the station installation location. To ensure adequate signal strength in underground or enclosed parking structures, cellular repeaters may be required. (See the Cellular Signal Levels section later in this document)
13) For below ground-level or enclosed parking garages, installation of a cellular signal booster often is required with indoor antenna located near gateway device and EV parking spaces and outdoor antenna typically located at the garage entrance ceiling or on the rooftop where cellular signal levels are optimum.
14) Determine cost budget options for make-ready electrical infrastructure to satisfy current needs and future needs. Prioritize locations for installation of charging stations based upon immediate and future needs, construction timelines, and costs.

For bollard mount charging stations, prepare the installation site by following the instructions in the Preparing Concrete Pad chapter. The mounting template for the bollard can be found at www.chargepoint.com/support-installation-guides.php. Ensure the PDF version is accurate by printing it

at 100% scale on 11” x 17” paper and then verify at least one dimension. (See also the Prepare the Installation Site for Bollard Mount later in this document)

Review the CT4000 Data Sheet (available at www.chargepoint.com/support-product-data-sheets.php).

It is recommended that only new 40A dual pole breakers are to be used. Used breakers can damage equipment and cause a fire risk.

Always check local codes to ensure compliance. You may need to adjust this specification to comply with codes that apply at your installation location.

If you have pre-existing infrastructure or are using your own preferred electrical contractor to prepare your site for charging, a Site Validation by a ChargePoint Operations and Maintenance (O&M) partner will be required to certify compliance with electrical specification requirements and to ensure that everything was prepared to ChargePoint specifications.

Cellular Signal Levels

ChargePoint charging stations communicate over the ChargePoint network via 3G cellular carriers to provide the following features to property managers and EV drivers:

- User authentication, access control, & billing
- Energy usage reporting
- Charging station utilization and charging session details for analytical reporting
- Real-time charging status to drivers using the ChargePoint mobile app or web portal
- Ability for drivers to start & stop charging sessions using the ChargePoint mobile app
- 24-hr driver support to remotely start charging sessions (ChargePoint cards also start & stop sessions)
- Text notifications to drivers when vehicle battery is full or stops charging
- Station fault alarms and remote diagnostic capability
- Over-the-air software upgrades for new station features or enhancements (future proof)

General guidelines when measuring cellular signal levels:

- Do not rely on cell phone apps to measure cellular signals when conducting site surveys
- Take 3G AT&T & 3G Verizon signal strength readings at exact proposed charging station locations
- Take cellular readings at location of where a cellular signal booster antennae will be installed to ensure there is enough signal to boost

Requirements for acceptable 3G AT&T and 3G Verizon cellular coverage are:

- Weakest acceptable signal levels at gateway device without using a signal booster are -85 dbm for 3G AT&T WCDMA & -90 dbm for 3G Verizon EVDO (ECLO > -10 using Squid Pro 3G);
- For a cellular signal booster solution inside parking garages, the weakest acceptable signal level at outside antenna location should be between -95 dbm and -100 dbm (the weaker the signal the less coverage area inside using a signal booster);

Below are a few suggested options for cellular signal boosters:

- WeBoost 4G-X for all carriers in North America, supports voice, 2G, 3G and 4G, max gain of 70 db for up to 10,000 square feet of coverage area;
- SureCall Fusion 5 for all carriers in North America, supports voice, 2G, 3G and 4G, average gain of 65 db & max 72 db for up to 6,000 square feet of coverage area;
- SureCall Force 5 for all carriers in North America to provide up to 20,000 square feet of coverage inside parking structure.

ChargePoint O&M partners will validate acceptable cellular signal strength at the site using a cellular signal strength reader. We recommend using a Squid Pro 3G M2M signal meter from Berkeley Varitronics Systems to distinguish 2G vs 3G cellular carrier frequencies. For details concerning acceptable cellular signal levels and signal booster solutions, please reference Make-Ready Specifications section at the end of this document.

Electrical Panel

Level 2 charging stations are considered continuous load devices (EVs draw maximum load for long durations); and therefore, electrical branch circuits to EV chargers must be sized at 125% of the load in accordance with National Electric Code requirements. This means that for a maximum 32A @208/240V output to an electric vehicle, 40A breakers are required and wiring conductor ampacity sized in accordance with NEC code for continuous load devices. Typically, 6 AWG or 8 AWG insulated electrical wiring is used depending upon distance between the electrical panel and the charging station.

When planning for multiple EV charging stations, it is best practice to segment non-continuous and continuous loads, with all branch circuits for EV charging on a dedicated electrical panel assembly with 40A circuit breakers. When sizing new electrical panels dedicated for EV charging, all branch circuits will support continuous load, and the panel rating sized for at least 125% of the total load on each leg of a 3-phase panel.

Specifications

Electrical Input	SINGLE PORT			DUAL PORT		
AC Voltage	208/240VAC			208/240VAC		
	Current	Input Power Connection	Required Service Panel Breaker	Current	Input Power Connection	Required Service Panel Breaker
Standard	30A	One 40A branch circuit	40A dual pole (non-GFCI type)	30A x 2	Two independent 40A branch circuits	40A dual pole (non-GFCI type) x 2
Standard Power Share	n/a	n/a	n/a	32A	One 40A branch Circuit	40A dual pole (non-GFCI type)
Power Select 24A	24A	One 30A Branch circuit	30A dual pole (non-GFCI type)	24A x 2	Two independent 30A branch circuits	30A dual pole (non-GFCI type) x 2
Power Select 24A Power Share	n/a	n/a	n/a	24A	One 30A branch circuit	30A dual pole (non-GFCI type)
Power Select 16A	16A	One 20A Branch circuit	20A dual pole (non-GFCI type)	16A x 2	Two independent 20A branch circuits	20A dual pole (non-GFCI type) x 2
Power Select 16A Power Share	n/a	n/a	n/a	16A	One 20A branch circuit	20A dual pole (non-GFCI type)
Service Panel GFCI	Do not provide external GFCI as it may conflict with internal GFCI (CCID)					
Wiring - Standard	3-wire (L1, L2, Earth)			5-wire (L1, L1, L2, L2, Earth)		
Wiring - Power Share	n/a			3-wire (L1, L2, Earth)		
Station Power	8W typical (standby), 15W maximum (operation)					

Electrical Output		
Standard	7.2kW (240VAC@30A)	7.2kW (240VAC@30A) x 2
Standard Power Share	n/a	7.2kW (240VAC@30A) x 1 OR 3.8kW (240VAC@16A) x 2
Power Select 24A	5.8kW (240VAC@24A)	5.8kW (240VAC@24A) x 2
Power Select 24A Power Share	n/a	5.8kW (240VAC@ 24A) x 1 OR 2.9kW (240VAC@12A) x 2
Power Select 16A	3.8kW (240VAC@16A)	3.8kW (240VAC@16A) x 2
Power Select 16A Power Share	n/a	3.8kW (240VAC@16A) x 1 OR 1.9kW (240VAC@8A) x 2

Functional Interfaces		
Connector(s) Type	SAE J1772™	SAE J1772™ x 2
Charging Cable Length	18' (5.5 meters)	18' (5.5 meters) x 2
Overhead Cable Management System	Yes	
LCD Display	5.7" full color, 640x480, 30fps full motion video, active matrix, UV protected	
Card Reader	ISO 15693, 14443, NFC	
Locking Holster	Yes	Yes x 2

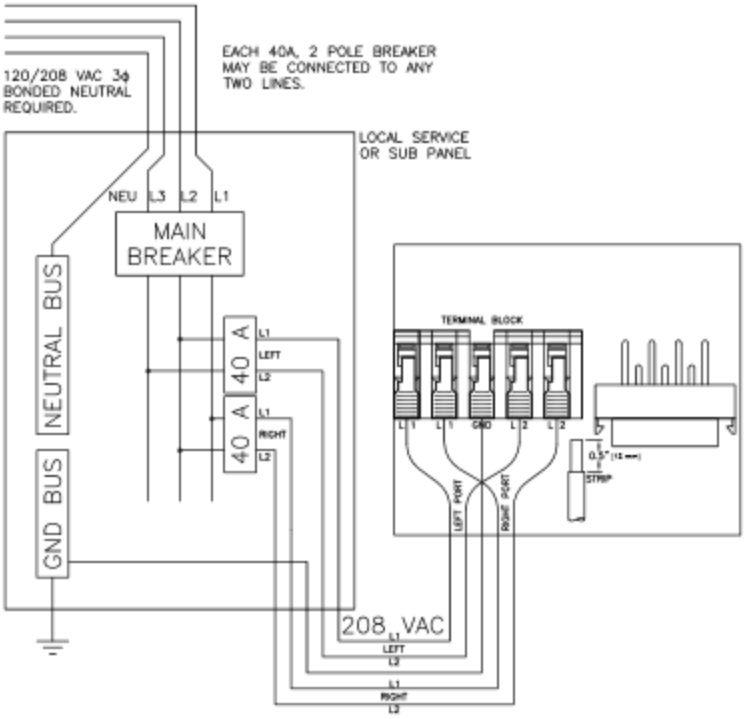
Safety and Connectivity Features	
Ground Fault Detection	20mA CCID with auto retry
Open Safety Ground Detection	Continuously monitors presence of safety (green wire) ground connection
Plug-Out Detection	Power terminated per SAE J1772™ specifications
Power Measurement Accuracy	+/- 2% from 2% to full scale (30A)
Power Report/Store Interval	15 minute, aligned to hour
Local Area Network	2.4 GHz Wi-Fi (802.11 b/g/n)
Wide Area Network	3G GSM, 3G CDMA

Safety and Operational Ratings	
Enclosure Rating	Type 3R per UL 50E
Safety Compliance	UL listed for USA and cUL certified for Canada; complies with UL 2594, UL 2231-1, UL 2231-2, and NEC Article 625
Surge Protection	6kV @ 3000A. In geographic areas subject to frequent thunder storms, supplemental surge protection at the service panel is recommended.
EMC Compliance	FCC Part 15 Class A
Operating Temperature	-22°F to 122°F (-30°C to +50°C)
Storage Temperature	-40°F to 122°F (-40°C to +50°C)
Operating Humidity	up to 85% @ +50°C (122°F) non-condensing
Non-Operating Humidity	up to 95% @ +50°C (122°F) non-condensing
Terminal Block Temperature Rating	221°F (105°C)
Maximum Stations per 802.11 Radio Group	10. Each station must be located within 150 feet "line of sight" of a gateway station.

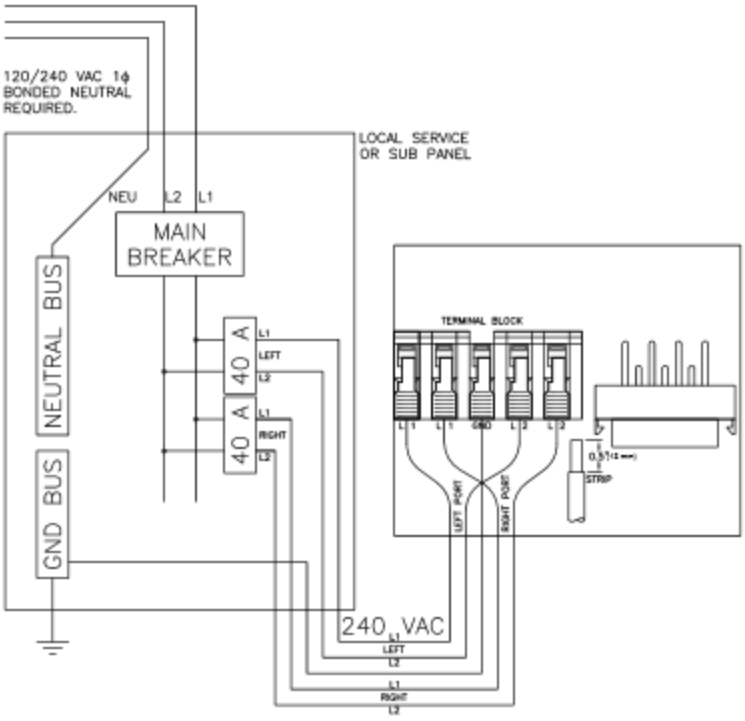
Dual Circuit Wiring Diagram

The following illustration describes the wiring for installing a CT4000 on a dual circuit. Wiring for a single circuit installation is described on the next page. Grounding requirements are described on page 1-6.

NOTE: Requires two dedicated circuits, each with its own two pole 40 A breaker. See Appendix B for lower power operation options.



208 VAC, THREE PHASE PANEL

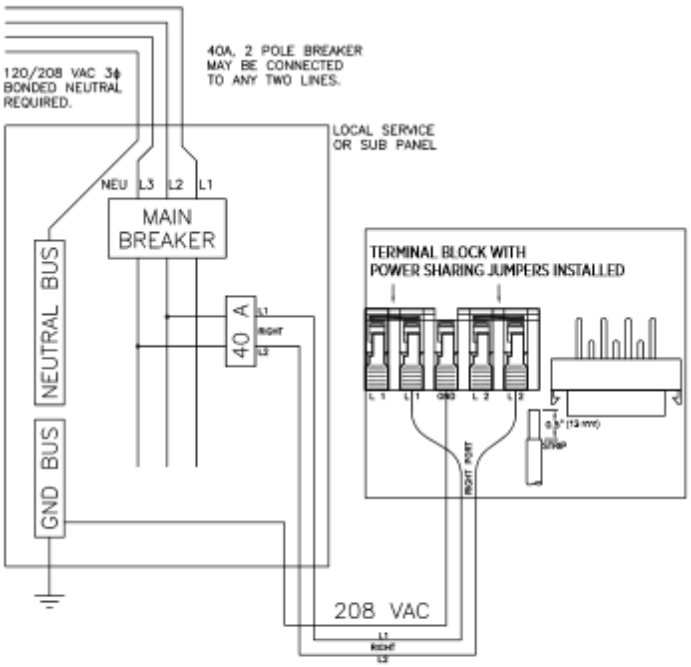


240 VAC, SINGLE PHASE PANEL

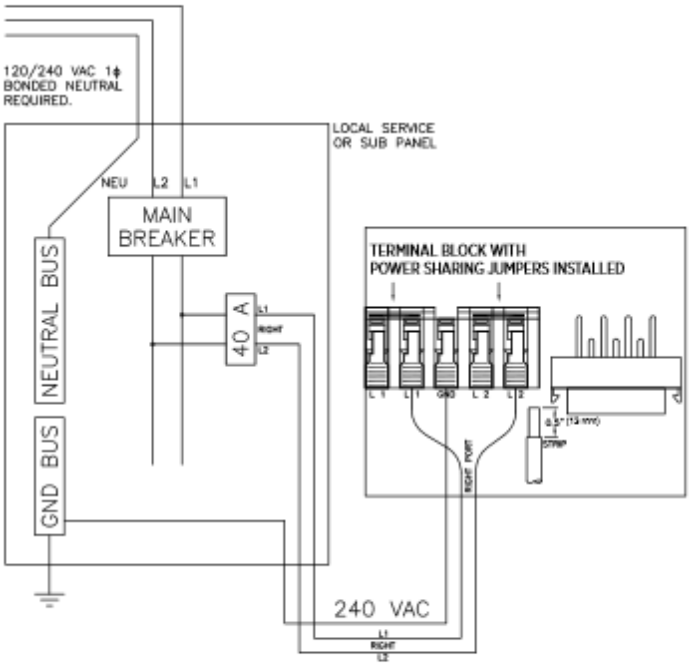
Single Port or Shared Power Wiring Diagram

The following illustration describes the wiring for installing a dual port CT4000 on a shared single circuit. For this installation, you will need the power sharing kit to allow both ports to share a two pole 40A circuit breaker. Wiring connections are provided in Appendix B. Grounding requirements are described on page 1-6. See Appendix B for lower power operation options.

Wiring for a dual circuit installation, see the previous page.



208 VAC, THREE PHASE PANEL



240 VAC, SINGLE PHASE PANEL

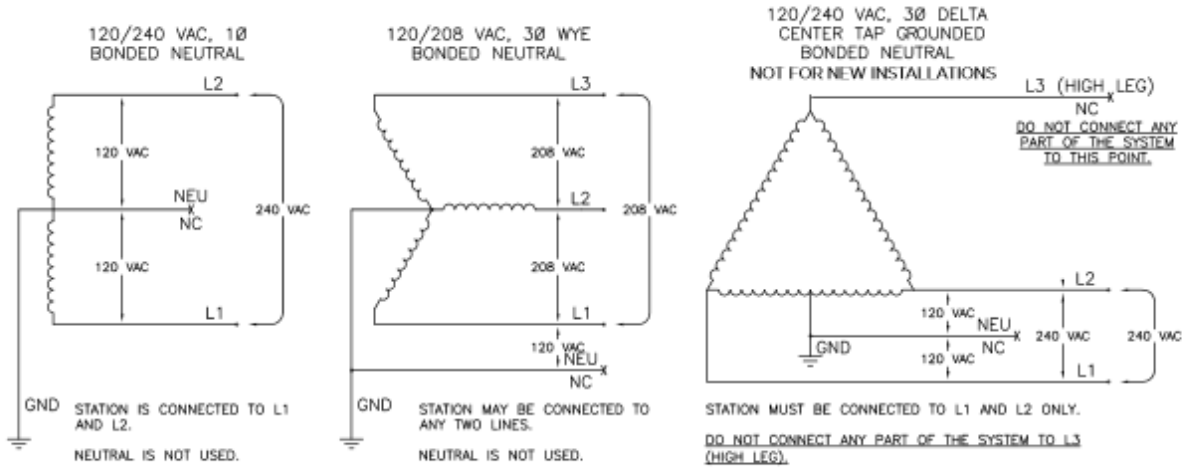
Grounding Requirements

The voltage of either line, relative to ground, must not fall below 80 volts or a Floating Line Connection error occurs (see page 5-3). Because the voltage of either line relative to ground must not be allowed to fluctuate, use only center-grounded systems. Neutral is not used to power the station but must be properly connected to ground, at the panel or transformer, to provide the necessary voltage reference relative to ground.

Connect to these systems

In a wye system, connect the station to ANY two lines, as shown below.

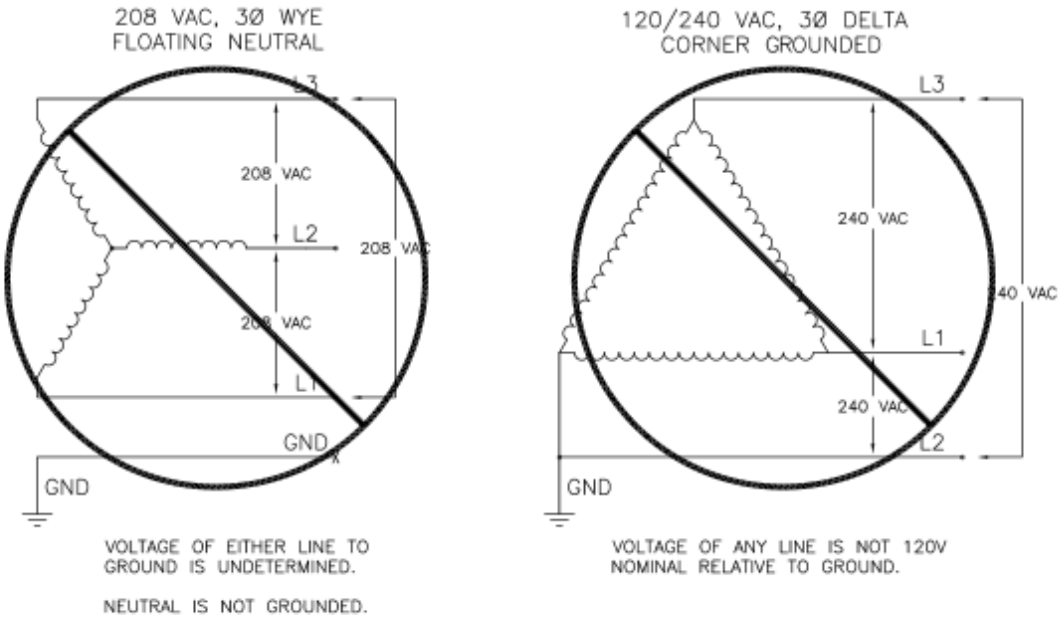
In a delta system, connect the station to a center-tapped secondary only, where the center tap is bonded and the station is connected to L1 and L3. This allows voltages to remain constant regardless of other loads that may be using the lines.



Do not connect to these systems

Do not connect ChargePoint stations to the following types of power sources:

- 120/208 VAC 3 phase wye, ungrounded
- 120/240 VAC 3 phase delta, corner-grounded
- Any system where the center point of the AC power source is not grounded



Preparing the Installation site for a Wall mount Station

When preparing the site for wall mounted stations, the conduit and wire must be brought to the location of the where the stations will be mounted. Below, are a couple images of sites showing how the conduit and wire was brought to the location where a wall mounted station will be installed. Flex conduit must be used to bring the wire to the station.

Preparing the Installation Site for a Bollard Mount

A

Before You Start

The ChargePoint® Charging Station's bollard mount can be installed either:

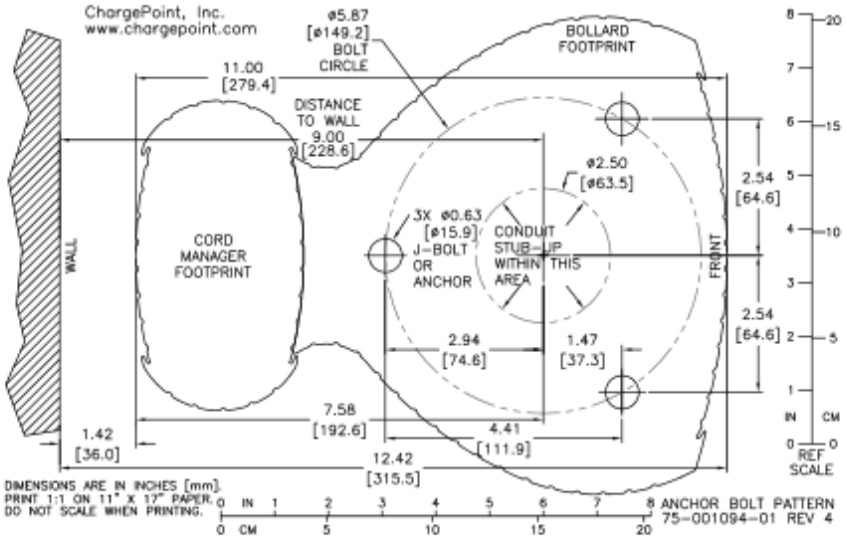
- into the ground
- onto an existing concrete surface (on an intermediate floor only)

The kit components you need to use, the tools required, and the installation steps vary depending on the type of installation. This appendix provides basic guidelines for both types of installations.

⚠ **IMPORTANT**: Always check local codes to ensure compliance. You may need to adjust the guidelines provided in this appendix to comply with codes that apply at your installation location.

Installation Overview

To install the CT4000 bollard mount into the ground, you will need the components shown below. These components can be purchased from ChargePoint by ordering a CT4000 Concrete Mount Kit.



***NOTE:** When installing onto an existing concrete surface, you will need only 6 Galvanised Hex Nuts and 6 Galvanised Washers. But you will need several consumables as described on page A-3.

Casting into New Concrete

Before casting into new concrete, review the site for suitability to install a CT4000. The CT4000's Clean Cord Technology requires space behind the power stub-up for the Cord Management Kit (CMK). To ensure adequate space, refer to the illustrations below and to the CT4000 Installation Template (75-001094-01) included in this installation kit.

IMPORTANT:

- Always check local codes to ensure compliance. You may need to adjust these instructions to comply with codes that apply at your installation location.
- The concrete block must measure at least 24" on all sides.
- The bolt threads must extend 3" above the concrete.
- The conduit must be at least 1 ½" in diameter and extend 12" to 24" above the concrete.
- Refer to the CT4000 Installation Guide for detailed installation instructions.

Kit Components Needed

You will need the entire contents of the CT4000 Concrete Mount Kit.

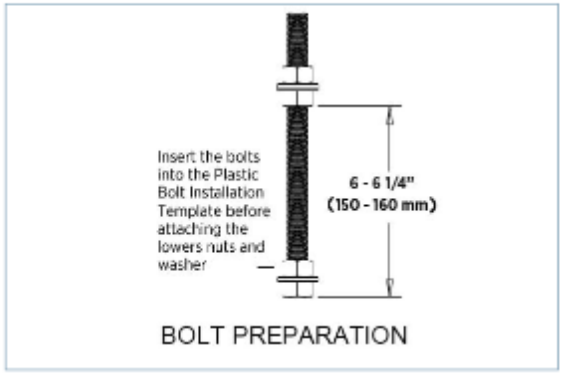
Follow These Steps

1. Install two nuts, with two washers captured between them, onto each of the three bolts, as illustrated. Lock them together so the lower end of the upper nut is located 6 - 6 ¼" from the bottom of the bolt. This sets the length of the exposed threads.
2. Insert the three bolts through the Plastic Bolt Installation Template. This ensures the relative position of the bolts and that the flange of the pole fits over the bolts.
3. On the bottom of each bolt, install a nut, a washer, and a nut. Lock the two nuts together so that the lower nut aligns to the bottom of the bolt.
4. Immediately after pouring the concrete, push the bolts into the concrete 6" deep, as illustrated. Ensure correct alignment and that the top 3" of the bolts remain exposed. Rotate the bolts as you insert them to draw concrete into the threads.

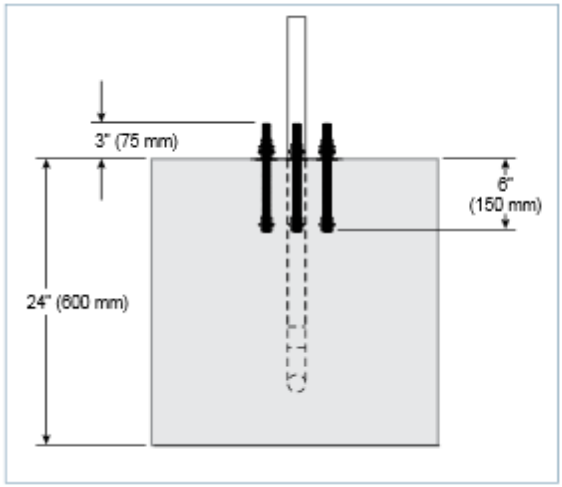
   NOTE:

   - It is important to rotate the bolts as you insert them. This allows the concrete to fully coat the threads of the bolts, reducing the amount of trapped air.
   - The Plastic Bolt Installation Template template can be left in place.
5. When the concrete is fully set, remove the upper nuts and one washer to install the bollard's mounting post.

You are now ready to install the CT4000's bollard mount. Refer to the CT4000 Installation Guide.



BOLT PREPARATION



Installing on Existing Concrete

If installing on existing concrete, perform the following tasks:

- Review the site for suitability to install a CT4000. The CT4000's Clean Cord Technology requires space behind the power stub-up for the Cord Management Kit (CMK). To ensure adequate space, reference the CT4000 Installation Template (75-001094-01) included in this installation kit.
- Review the dimensions of the existing concrete slab. To safely mount a CT4000 charging station, the concrete must be at least 6" thick. At this thickness, all of the CT4000's mounting bolts must be positioned at least 15" from the front edge, at least 12" from the side edges, and at least 6" from the rear edge of the concrete slab.
- If an existing charging station is already in place at the installation site, turn off all power to the station and disassemble according to the original manufacturer's instructions. Cut away any existing bolts or non-power conduit stub-up to ground level. You may need to plug cut-away conduits at the slab end, and disconnect wiring at the other end.

⚠ **IMPORTANT**: Always check local codes to ensure compliance. You may need to adjust these instructions to comply with codes that apply at your installation location.

Kit Components Needed

The CT4000 Concrete Mount Kit contains 12 Heavy Galvanized Hex Nuts and 9 Galvanized Washers. You will need only 6 of each.

Tools Required

Electric drill or Hammer drill (½" chuck may be required depending on drill bits used) (1)

Consumables Required

These consumables can be ordered online directly from McMaster (McMaster Product #s are included in the table below). Delete any items you already have, and change quantities to accommodate the number of stations you are installing.

NOTE: The consumption rate of these products will vary depending on conditions at the installation site.

Quantity	McMaster Product #	Description	Purpose
1*	7505A55	Epoxy Adhesive for Concrete, 9.3 Ounce Cartridge (includes two mixing nozzles)	Filling drilled holes.
1*	7505A56	Mixing Nozzles for 9.3 Ounce Epoxy Adhesive for Concrete	Filling drilled holes. NOTE: You may need extra mixing nozzles to accommodate delays of over three minutes when applying epoxy.
1	7622T23	Ratchet Rod Caulk Gun with Half-Barrel Frame for 10-13 Ounce Cartridge, 6:1 Thrust	Filling drilled holes. NOTE: Any standard caulk gun will work.
1	7437K35	Electrical Cleaning and Maintenance Aerosol, Any Angle Spray Duster, 8 Ounce Net Weight	Cleaning drilled holes.
1	2960A22	Slow Spiral Round-Shank Masonry Drill Bit, ¾" diameter, ½" Shank, 10" Drill Depth, 12" Length Overall	Drilling ¾" holes in concrete. NOTE: The holes must be at least 6" deep.
1	28655A25	Drill Bit for Concrete Embedded Rebar, Round, ¾" bit size, ½" Shank diameter, 12" Length Overall	Drilling ¾" hole through rebar.
1	7221T13	Nylon Loop-Handle Brush, ¾" Brush Diameter, 3" Length Brush, 8 ½" Length Overall	Cleaning drilled holes.
1	9753K47	Push-on Round Cap, fits ⅝" - 1 1/16" OD, ½" Inside Height, Packs of 100	Keeping the epoxy inside the drilled holes in situations where the slab is only 6" deep.

** Quantity based on installation of one charging station.*

Follow These Steps

1. Install two nuts with two washers captured between them. Lock them together so the lower end of the nut is located 6" from the bottom of the bolt. This sets the length of the exposed threads.
2. Use the Plastic Concrete Bolt Installation Template to mark the hole locations.
3. Remove the template and drill three ¾" diameter holes 6" deep into the concrete. When locating the template, consider the charging station's total footprint. For reference, a template for the CT4000 charging station with CMK is included in this kit.

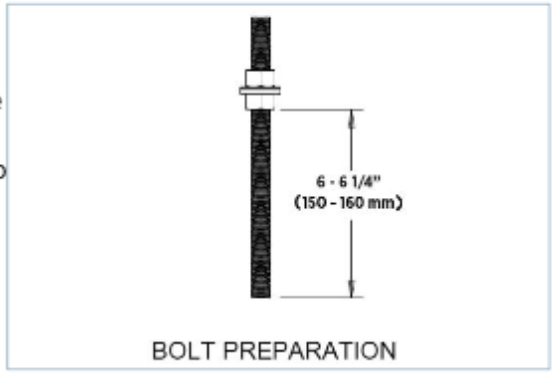
   NOTE:

   - It is important that the bolts are parallel after installation. Therefore, ensure the drill holes are plumb by using a bubble level to check the angle of the drill after drilling 1 to 1 ½" .
   - If installing over existing buried conduit, position the center of the template around the conduit stub-up.
   - You may need two drill bits - one for the concrete (with the pilot) and another for the rebar (without the pilot). Always start the hole using the standard drill bit, then switch to the rebar drill bit only if drilling through rebar.
4. Remove all dust from inside the drilled holes using compressed air, or a vacuum and/or a brush.
5. If the concrete slab is only 6" deep, insert a plug (McMaster Product #9753K56) in each hole to keep the epoxy in place until it hardens. Place the plug over the long end of a bolt and then use the bolt to push the plug to the bottom of the hole.
6. Fill each hole with epoxy to about 2 ½" to 3" below the top. Continue immediately to the next step because the epoxy sets within about eight minutes.

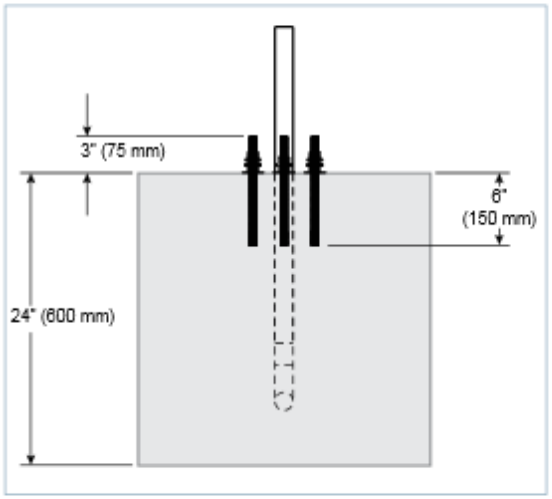
   NOTE: Inserting the threaded bolts displaces the epoxy, causing it to fill the holes to grade level. If the epoxy is below grade level, you can add more after the next step.
7. Place the Plastic Concrete Bolt Installation Template over the holes. This ensures the relative position of the bolts and that the flange of the pole fits over the bolts.
8. Insert the bolts through the template, into the holes. Rotate the bolts as you insert them to draw epoxy into the threads.

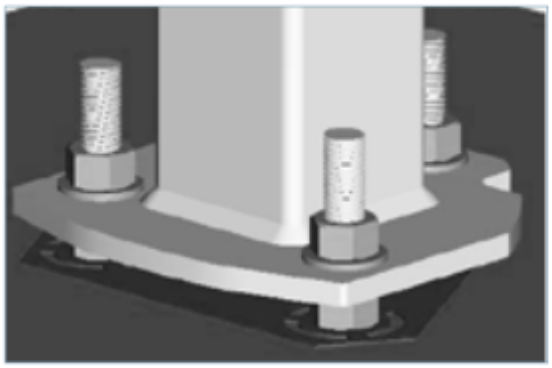
   IMPORTANT: The epoxy is very thick. Therefore, it is important to rotate the bolts as you insert them. This allows the epoxy to fully coat the threads of the bolts, reducing the amount of trapped air.

   NOTE: The installation template can be left in place.
9. If needed, top up the holes with epoxy to grade level.
10. Allow the epoxy to cure for at least 15 minutes* before removing the top nuts and washers.
11. Allow the epoxy to cure for 45 minutes* before applying torque to the nuts.



BOLT PREPARATION





**Epoxy cure times assume you are using epoxy ordered from McMaster (Product # 7505A55). If using a different type of epoxy, you may need to adjust these times. Refer to the cure times provided with the epoxy.*

You are now ready to install the CT4000's bollard mount (see Chapter 2).

(Proper concrete pad with anchor bolts and conduit stub-up)

Superseded By EB 15-031 Effective 9/28/15		*New York State Department of Transportation* **ENGINEERING INSTRUCTION**	**EI** **12-006**

Title: **STANDARD SPECIFICATIONS SECTION 698 *PRICE ADJUSTMENTS***

Target Audience:

☒ Manufacturers (18)
☒ Local Govt. (31)
☒ Agencies (32)
☒ Surveyors (33)
☒ Consultants (34)
☒ Contractors (39)
☐ _____( )

Approved:

J.F. Tynan, P.E. 3-14-12
James F. Tynan, P.E. Date
Deputy Chief Engineer (Construction)

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of 09/06/12.
- This EI does not supersede any other issuance.
- The revisions issued with this EI will be incorporated into the next update of the Standard Specifications.

PURPOSE: The purpose of this EI is to issue a revised Standard Specification Section 698 *Price Adjustments*.

TECHNICAL INFORMATION:

- The revised specification requires the Contractor to notify the Engineer within 30 calendar days after contract award of the items to which the Contractor wants to apply steel/iron price adjustments.
- All items that the Contractor does not "opt-in" for will be ineligible for steel/iron price adjustment.
- The Contractor's ability to opt-out of items containing minor amounts of steel will greatly reduce the administrative burden for both the construction industry and the inspection staff.
- The asphalt price adjustment was modified to increase the price change amount not covered by the adjustment to $15/ton or $15/metric ton from $10/ton. This represents approximately 3% of the current cost of Performance Graded Binder (PGB).
- The current fuel price change amount not covered is $0.10/gallon or $0.03/liter, which is approximately 3% of the posted price of fuel (bulk fuel without taxes).
- These changes will significantly reduce administrative costs for both the construction industry and for Department construction inspection staff.
- The use of price adjustment clauses reduces Contractor risk due to price increases, and reduces bid prices over the construction program. The Department is the party best able to assume the risks for material price increases.

IMPLEMENTATION:

- Main Office Design Quality Assurance Bureau will insert the standard specification revision into contract proposals beginning with projects submitted for the letting of 09/06/12.

TRANSMITTED MATERIALS: This EI transmits standard specification revision *Price Adjustments*. Both Metric and U.S. Customary revisions are attached.

BACKGROUND: The current steel price adjustment specification creates a significant administrative burden for both the construction industry and the inspection staff. The steel price adjustment was created as a safety valve to protect against dramatic material price increases, which reduces risk and results in lower bid prices across the construction program. This revision maintains the safety valve, while reducing unnecessary administrative burden.

CONTACT: Direct questions regarding this issuance to Brian DeWald of the Office of Construction at (518) 457-6472 or via e-mail at BDeWald@dot.state.ny.us

Make the following changes to the Standard Specifications dated May 4, 2006.
Page 714 **Delete** Section 698 *Price Adjustments* and **Replace** it with the following:

SECTION 698 PRICE ADJUSTMENTS

698-1 DESCRIPTION. This section will provide for additional compensation to the Contractor for increases, or repayment by the Contractor for decreases, in the price of asphalt, fuel, or steel/iron products.

698-1.01 Asphalt Price Adjustment. This item will enable the Department to make price adjustments to account for changes in asphalt prices. Price adjustments will be made for eligible work listed in the contract proposal.

698-1.02 Fuel Price Adjustment. This item will enable the Department to make price adjustments to account for changes in fuel prices. Price adjustments will be made for eligible work listed in the contract proposal.

698-1.03 Steel/Iron Price Adjustment. This item will enable the Department to make price adjustments to account for changes in steel/iron product prices for materials eligible and identified by the Contractor which will be permanently incorporated into the work.

698-2 MATERIALS. None specified.

698-3 CONSTRUCTION DETAILS. No adjustment will be provided for any new or additional work paid for by force account. Additional quantities of existing contract pay items at original bid prices will be considered eligible work. Additional work added by agreed price will be considered eligible work. Work performed by the Contractor at its own expense will not be eligible for price adjustment.

The monthly average asphalt prices, monthly average fuel prices, steel cost basis and steel index values will be posted in the Engineering Bulletin entitled *Fuel, Asphalt and Steel Price Adjustments.*

If eligible items are installed after the contract completion date, when an extension of time without the assessment of engineering charges is approved, the monthly average posted price or monthly steel index will be used to compute price adjustments.

If eligible items are installed after the contract completion date, when an extension of time was approved with the assessment of engineering charges and/or liquidated damages, the monthly average posted price or monthly steel index in effect on the last contract completion date without the assessment of engineering charges and/or liquidated damages, or the value for the month of installation/purchase, whichever is less, will be used to compute price adjustments.

698-3.01 Asphalt Price Adjustment. The asphalt price adjustment will be based solely on the price changes for asphalt as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $15.00 of the asphalt index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price.

A. Prices. The asphalt index price and the monthly average posted price are defined as follows:

1. Asphalt Index Price. A price per metric ton of Performance Graded Binder (PGB) used solely as a basis from which to compute asphalt price adjustments. The asphalt index price for original contract bid price items and additional work at the original contract bid price will be the monthly average posted price for the month of the bid letting. The asphalt index price for additional work at agreed price will be the monthly average posted price for the month the agreed price was submitted to the Engineer.

2. Monthly Average Posted Price. The average terminal price for unmodified PG 64-22 binder, without anti-stripping agent, determined by the Department, based on prices of approved primary sources of PGB.

B. Quantity. The quantity of asphalt in metric tons considered for adjustment will be determined by multiplying the quantity of eligible work completed by the conversion factors listed in the Special Note entitled *Asphalt Price Adjustment*.

C. Adjustment. Asphalt price adjustment will be based on the following formulas:

1. When price increases:
Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price - PGB Index Price - $15.00)

2. When price decreases:
Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price - PGB Index Price + $15.00)

698-3.02 Fuel Price Adjustment. The fuel price adjustment will be based solely on the price changes for fuel as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $0.03 per liter of the fuel index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price,

A. Prices. The fuel index price and the monthly average posted price are defined as follows:

1. Fuel Index Price. A price per liter of fuel used solely as a basis from which to compute fuel price adjustments. The fuel index price for original contract bid price items and additional work at the original contract bid price will be the monthly average posted price for the month of the bid letting. The fuel index price for additional work at agreed price will be the monthly average posted price for the month the agreed price was submitted to the Engineer.

2. Monthly Average Posted Price. An average refinery or terminal price based on prices for ultra low sulfur diesel (ULSD) and gasoline.

B. Quantity. The quantity of fuel in liters considered for adjustment will be determined by multiplying the quantity of eligible work completed by the fuel usage factor listed in the Special Note entitled *Fuel Price Adjustment*.

C. Adjustment. Fuel price adjustment will be based on the following formulas:

1. When price increases:
Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price - $0.03)

2. When price decreases:
Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price + $0.03)

698-3.03 Steel/Iron Price Adjustment. Within 30 calendar days after award, the Contractor shall provide the Engineer with a list of materials to which the Contractor opts to apply the steel price adjustment, identifying the materials by groups of similar material content within a core (3 digit) contract pay item (e.g. 564 *Structural Steel* or 603.05xxxx *Corrugated Steel Pipe*). For each material identified by the Contractor, the Contractor shall also identify the parties whose relationship establishes the invoice date. If the two parties are known, they shall be identified by name. If the two parties are not known by name, they shall be identified by role (Contractor, Subcontractor, Material Supplier, Fabricator, Manufacturer, Mill, etc.). Different parties may be identified for individual or groups of contract pay items for the purposes of establishing an invoice date. If the Contractor does not provide a list of materials to which to apply the steel price adjustment, no steel price adjustment will be made.

If the percentage change for a given month does not exceed 5% plus or minus, from the benchmark steel index, no adjustments will be made for materials invoiced that month. For lump sum or each items that are assembled from numerous components, such as overhead sign structures, the percentage change will be determined for the assembled contract pay item using the month that the largest value of materials were invoiced. For unit price items such as guiderail that are assembled from numerous components, the percentage change will be determined for a given quantity of the contract pay item using the month that the largest value of component materials for that quantity of the contract pay item were invoiced.

The weight of the steel and/or iron shall exclude minor appurtenances individually weighing less than 2 kg (i.e., nuts, bolts, washers, etc.). Precast or prestressed concrete items shall have total reinforcing steel weight listed on the approved shop drawings. The following sources shall be used, in declining order of precedence, to determine the weight of steel/iron: Department established weights of steel/iron by contract pay item per pay unit; approved shop drawings; verified shipping documents; contract documents; Standard Sheets; industry standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and manufacturer's data.

A. Indexes and Prices. Adjustments are based on the Producer Price Index (PPI) for *Semifinished Steel Mill Products* (WPU 101702). PPI values are published by the US Department of Labor, Bureau of Labor Statistics (BLS). Recent PPI values are posted on the Office of Construction website at www.dot.ny.gov. A complete listing of PPI values can be found on the BLS website at http://data.bls.gov/PDQ/outside.jsp?survey=wp. The Cost Basis, Benchmark Steel Index, Monthly Steel Index, and the Percentage Change are defined as follows:

1. Cost Basis (CB). An average price of steel products in dollars per metric ton used solely as a cost basis from which to compute steel/iron price adjustments. The cost basis for original contract bid price items and additional work at the original contract bid price will be the cost basis listed for the month of the bid letting. The cost basis for additional work at agreed price will be the value of the cost basis for the month the agreed price was submitted to the Engineer.

2. Benchmark Steel Index (BI). The benchmark steel index for original contract bid price items and additional work at the original contract bid price will be the value of the preliminary PPI for the month of the bid letting. The benchmark steel index for additional work at agreed price will be the value of the preliminary PPI for the month the agreed price was submitted to the Engineer.

3. Monthly Steel Index (MI). Value of the preliminary PPI for the month the material is invoiced. If a preliminary PPI is not posted for a given month, the value will be the average of the preceding and following months that are posted.

4. Percent Change. The percent change in any given month will be determined as follows:

$$Percentage\ Change = \left(\frac{MI - BI}{BI} \right) x\,100$$

B. Quantity. The quantity of steel and/or iron for adjustment for each core (3-digit) contract pay item number (e.g., 564 – *Structural Steel*) will be measured to the nearest 0.1 Metric Tons.

1. Percent Change Greater Than +5%. If the Percentage Change is greater than +5% from the benchmark steel index, Price Adjustments will be made for materials invoiced that month. The Contractor shall provide the Engineer a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the contract pay item, the weight of steel/iron, the month(s) of invoice, the source used to determine the weight, and if requested by the Engineer, copies of invoices to verify the month of invoice.

2. Percent Change -5% to +5%. If the Percentage Change is between -5% and +5%, inclusive, from the benchmark steel index, no adjustments will be made for materials invoiced that month.

3. Percent Change Lower Than -5%. If the Percentage Change is lower than -5% from the benchmark steel index, a Price Adjustment will be charged to the Contractor for materials invoiced that month. The Contractor shall provide the Engineer a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the contract pay item, the weight of steel/iron, the month(s) of invoice, the source used to determine the weight, and copies of invoices to verify the month of invoice.

C. Adjustment. Steel/Iron price adjustment will be made for the materials which the Contractor opted to apply the steel price adjustment, based on the following formulas:

1. When Price Increases:

$$Price\ Adjustment = \left[\left(\frac{MI - BI}{BI} \right) - 0.05 \right] (CB)\,Qty$$

2. When Price Decreases:

$$Price\ Adjustment = -\left[\left(\frac{MI - BI}{BI} \right) + 0.05 \right] (CB)\,Qty$$

698-4 METHOD OF MEASUREMENT.

698-4.01 Asphalt Price Adjustment. Asphalt price adjustments will be measured on a Dollar Cents basis.

698-4.02 Fuel Price Adjustment. Fuel price adjustments will be measured on a Dollar Cents basis.

698-4.03 Steel/Iron Price Adjustment. Steel/Iron price adjustments will be measured on a Dollar Cents basis.

698-5 BASIS OF PAYMENT. The unit price shown in the proposal will be considered the unit price bid, although actual payment will be calculated based on changes in posted material prices. Should the amount shown be altered, the altered figures will be disregarded and the original price will be used to determine the total contract bid amount.

If price adjustments are based on estimated material quantities, and a revision to the estimated material quantity is made in a subsequent or final estimate, an appropriate addition or deduction will be made to the price adjustment previously calculated. The addition or deduction will be based on the adjustment factors initially used to calculate the price adjustment. If the installation dates of the revised material quantity cannot be determined, the addition or deduction will be based on the adjustment factors in effect during the last month in which any portion of the material quantity was installed.

698-5.01 Asphalt Price Adjustment. The asphalt price adjustment will be based on the monthly average posted price in effect at the time the work is completed, calculated using the price adjustment formula described above.

698-5.02 Fuel Price Adjustment. The fuel price adjustment will be based on the monthly average posted price in effect at the time the work is completed, calculated using the price adjustment formula described above.

698-5.03 Steel/Iron Price Adjustment. The steel/iron price adjustment will be based on the monthly steel index in effect at the time of invoice between the two parties previously identified by the Contractor, calculated using the price adjustment formula described above.

Payment will be made under:

Item No.	**Item**	**Pay Unit**
698.04	Asphalt Price Adjustment	Dollars Cents
698.05	Fuel Price Adjustment	Dollars Cents
698.06	Steel/Iron Price Adjustment	Dollars Cents

PRICE ADJUSTMENTS

Make the following changes to the Standard Specifications dated May 1, 2008.
Page 749 **Delete** Section 698 *Price Adjustments* and **Replace** it with the following:

SECTION 698 PRICE ADJUSTMENTS

698-1 DESCRIPTION. This section will provide for additional compensation to the Contractor for increases, or repayment by the Contractor for decreases, in the price of asphalt, fuel, or steel/iron products.

698-1.01 Asphalt Price Adjustment. This item will enable the Department to make price adjustments to account for changes in asphalt prices. Price adjustments will be made for eligible work listed in the contract proposal.

698-1.02 Fuel Price Adjustment. This item will enable the Department to make price adjustments to account for changes in fuel prices. Price adjustments will be made for eligible work listed in the contract proposal.

698-1.03 Steel/Iron Price Adjustment. This item will enable the Department to make price adjustments to account for changes in steel/iron product prices for materials eligible and identified by the Contractor which will be permanently incorporated into the work.

698-2 MATERIALS. None specified.

698-3 CONSTRUCTION DETAILS. No adjustment will be provided for any new or additional work paid for by force account. Additional quantities of existing contract pay items at original bid prices will be considered eligible work. Additional work added by agreed price will be considered eligible work. Work performed by the Contractor at its own expense will not be eligible for price adjustment.

The monthly average asphalt prices, monthly average fuel prices, steel cost basis and steel index values will be posted in the Engineering Bulletin entitled *Fuel, Asphalt and Steel Price Adjustments.*

If eligible items are installed after the contract completion date, when an extension of time without the assessment of engineering charges and/or liquidated damages is approved, the monthly average posted price or monthly steel index value will be used to compute price adjustments.

If eligible items are installed after the contract completion date, when an extension of time was approved with the assessment of engineering charges and/or liquidated damages, the monthly average posted price or monthly steel index in effect on the last contract completion date without the assessment of engineering charges and/or liquidated damages, or the value for the month of installation/purchase, whichever is less, will be used to compute price adjustments.

698-3.01 Asphalt Price Adjustment. The asphalt price adjustment will be based solely on the price changes for asphalt as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $15.00 of the asphalt index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price.

A. Prices. The asphalt index price and the monthly average posted price are defined as follows:

1. Asphalt Index Price. The asphalt index price is a price per ton of Performance Graded Binder (PGB) used solely as a basis from which to compute asphalt price adjustments. The asphalt index price for original contract bid price items and additional work at the original contract bid price will be the monthly average posted price for the month of the bid letting. The asphalt index price for additional work at agreed price will be the monthly average posted price for the month the agreed price was submitted to the Engineer.

2. Monthly Average Posted Price. The average terminal price for unmodified PG 64-22 binder, without anti-stripping agent, determined by the Department, based on prices of approved primary sources of PGB.

B. Quantity. The quantity of asphalt in tons considered for adjustment will be determined by multiplying the quantity of eligible work completed by the conversion factors listed in the Special Note entitled *Asphalt Price Adjustment*.

C. Adjustment. Asphalt price adjustment will be based on the following formulas:

1. When price increases: Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price - PGB Index Price - $15.00)

2. When price decreases: Price Adjustment = (Quantity of Asphalt) x (Monthly Average Posted Price - PGB Index Price + $15.00)

698-3.02 Fuel Price Adjustment. The fuel price adjustment will be based solely on the price changes for fuel as determined by the formulas below. No adjustment will be made if the monthly average posted price is within $0.10 per gallon of the fuel index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price,

A. Prices. The fuel index price and the monthly average posted price are defined as follows:

1. Fuel Index Price. A price per gallon of fuel used solely as a basis from which to compute fuel price adjustments. The fuel index price for original contract bid price items and additional work at the original contract bid price will be the monthly average posted price for the month of the bid letting. The fuel index price for additional work at agreed price will be the monthly average posted price for the month the agreed price was submitted to the Engineer.

2. Monthly Average Posted Price. An average refinery or terminal price based on prices for ultra low sulfur diesel (ULSD) and gasoline.

B. Quantity. The quantity of fuel in gallons considered for adjustment will be determined by multiplying the quantity of eligible work completed by the fuel usage factor listed in the Special Note entitled *Fuel Price Adjustment*.

C. Adjustment. Fuel price adjustment will be based on the following formulas:

1. When price increases: Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price - $0.10)

2. When price decreases: Price Adjustment = (Quantity of Fuel) x (Monthly Average Posted Price - Fuel Index Price + $0.10)

698-3.03 Steel/Iron Price Adjustment. Within 30 calendar days after award, the Contractor shall provide the Engineer with a list of materials to which the Contractor opts to apply the steel price adjustment, identifying the materials by groups of similar material content within a core (3 digit) contract pay item (e.g. 564 *Structural Steel* or 603.05xxxx *Corrugated Steel Pipe*). For each material listed, the Contractor shall also identify the parties whose relationship establishes the invoice date. If the two parties are known, they shall be identified by name. If the two parties are not known, they shall be identified by

role (Contractor, Subcontractor, Material Supplier, Fabricator, Manufacturer, Mill, etc.). Different parties may be identified for individual or groups of contract pay items for the purposes of establishing an invoice date. If the Contractor does not provide a list of materials to which to apply the steel price adjustment, no steel price adjustment will be made.

If the percentage change for a given month does not exceed 5% plus or minus, from the benchmark steel index, no adjustments will be made for materials invoiced that month. For lump sum or each items that are assembled from numerous components, such as overhead sign structures, the percentage change will be determined for the assembled contract pay item using the month that the largest value of materials were invoiced. For unit price items such as guiderail that are assembled from numerous components, the percentage change will be determined for a given quantity of the contract pay item using the month that the largest value of component materials for that quantity of the contract pay item were invoiced.

The weight of the steel and/or iron shall exclude minor appurtenances individually weighing less than 5 lbs (i.e., nuts, bolts, washers, etc.). Precast or prestressed concrete items shall have total reinforcing steel weight listed on the approved shop drawings. The following sources shall be used, in declining order of precedence, to determine the weight of steel/iron: Department established weights of steel/iron by contract pay item per pay unit; approved shop drawings; verified shipping documents; contract documents; Standard Sheets; industry standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and manufacturer's data.

A. Indexes and Prices. Adjustments are based on the Producer Price Index (PPI) for *Semifinished Steel Mill Products* (WPU 101702). PPI values are published by the US Department of Labor, Bureau of Labor Statistics (BLS). Recent PPI values are posted on the Office of Construction website at www.dot.ny.gov. A complete listing of PPI values can be found on the BLS website at http://data.bls.gov/PDQ/outside.jsp?survey=wp. The Cost Basis, Benchmark Steel Index, Monthly Steel Index, and the Percentage Change are defined as follows:

1. Cost Basis (CB). An average price of steel products in dollars per ton used solely as a cost basis from which to compute steel/iron price adjustments. The cost basis for original contract bid price items and additional work at the original contract bid price will be the cost basis listed for the month of the bid letting. The cost basis for additional work at agreed price will be the value of the cost basis for the month the agreed price was submitted to the Engineer.

2. Benchmark Steel Index (BI). The benchmark steel index for original contract bid price items and additional work at the original contract bid price will be the value of the preliminary PPI for the month of the bid letting. The benchmark steel index for additional work at agreed price will be the value of the preliminary PPI for the month the agreed price was submitted to the Engineer.

3. Monthly Steel Index (MI). Value of the preliminary PPI for the month the material is invoiced. If a preliminary PPI is not posted for a given month, the value will be the average of the preceding and following months that are posted.

4. Percent Change. The percent change in any given month will be determined as follows:

$$Percentage\ Change = \left(\frac{MI - BI}{BI} \right) x\, 100$$

B. Quantity. The quantity of steel and/or iron for adjustment for each core (3-digit) contract pay item number (e.g., 564 – *Structural Steel*) will be measured to the nearest 0.1 Tons.

1. Percent Change Greater Than +5%. If the Percentage Change is greater than +5% from the benchmark steel index, Price Adjustments will be made for materials invoiced that month. The Contractor shall provide the Engineer a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the contract pay item, the weight of steel/iron, the month(s) of invoice, the source used to determine the weight, and if requested by the Engineer, copies of invoices to verify the month of invoice.

2. Percent Change -5% to +5%. If the Percentage Change is between -5% and +5%, inclusive, from the benchmark steel index, no adjustments will be made for materials invoiced that month.

3. Percent Change Lower Than -5%. If the Percentage Change is lower than -5% from the benchmark steel index, a Price Adjustment will be charged to the Contractor for materials invoiced that month. The Contractor shall provide the Engineer a detailed list of the weight of eligible materials within 60 calendar days after installation, including: the contract pay item, the weight of steel/iron, the month(s) of invoice, the source used to determine the weight, and copies of invoices to verify the month of invoice.

C. Adjustment. Steel/Iron price adjustment will be made for the materials which the Contractor opted to apply the steel price adjustment, based on the following formulas:

1. When price increases:

$$Price\ Adjustment = \left[\left(\frac{MI - BI}{BI}\right) - 0.05\right](CB)\,Qty$$

2. When price decreases:

$$Price\ Adjustment = -\left[\left(\frac{MI - BI}{BI}\right) + 0.05\right](CB)\,Qty$$

698-4 METHOD OF MEASUREMENT. 698-4.01 Asphalt Price Adjustment. Asphalt price adjustments will be measured on a Dollar Cents basis.

698-4.02 Fuel Price Adjustment. Fuel price adjustments will be measured on a Dollar Cents basis.

698-4.03 Steel/Iron Price Adjustment. Steel/Iron price adjustments will be measured on a Dollar Cents basis.

698-5 BASIS OF PAYMENT. The unit price shown in the itemized proposal will be considered the unit price bid, although actual payment will be calculated based on changes in posted material prices. Should the amount shown be altered, the altered figures will be disregarded and the original price will be used to determine the total contract bid amount.

If price adjustments are based on estimated material quantities, and a revision to the estimated material quantity is made in a subsequent or final estimate, an appropriate addition or deduction will be made to the price adjustment previously calculated. The addition or deduction will be based on the adjustment factors initially used to calculate the price adjustment. If the installation dates of the revised material quantity cannot be determined, the addition or deduction will be based on the adjustment factors in effect during the last month in which any portion of the material quantity was installed.

PRICE ADJUSTMENTS

698-5.01 Asphalt Price Adjustment. The asphalt price adjustment will be based on the monthly average posted price in effect at the time the work is completed, calculated using the price adjustment formula described above.

698-5.02 Fuel Price Adjustment. The fuel price adjustment will be based on the monthly average posted price in effect at the time the work is completed, calculated using the price adjustment formula described above.

698-5.03 Steel/Iron Price Adjustment. The steel/iron price adjustment will be based on the monthly steel index in effect at the time of invoice between the two parties previously identified by the Contractor, calculated using the price adjustment formula described above.

Payment will be made under:

Item No.	**Item**	**Pay Unit**
698.04	Asphalt Price Adjustment	Dollars Cents
698.05	Fuel Price Adjustment	Dollars Cents
698.06	Steel/Iron Price Adjustment	Dollars Cents