

Northern Arizona University
[FIELDHOUSE] MULTI PURPOSE CENTER

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1 PROJECT SUMMARY

The Fieldhouse (Building 30) will be renovated to support a multipurpose activity center with a seasonal ice rink. The renovation will include a restroom and mechanical room addition planned for during the Fieldhouse floor replacement, mechanical upgrades to the space in support of the occupant load and the ice rink venue and the activation of the refrigerated slab that was built during the floor replacement. This project will include selective demolition, mechanical, electrical and plumbing scopes.

Future planning and uses for this space were considered during the fieldhouse floor replacement scope in order to provide underground utilities and/or pathways in support of a multipurpose activity center with ice rink, mechanical room, and restrooms. The underground sanitary lines, underground electrical conduit, underground water lines and underground refrigeration mains associated with future ice rink were all capped and labeled above slab for connection during this scope.

The demolition work in this scope consists of the following: removal of an existing fire shutter along the main entry to the Fieldhouse that is no longer needed nor is active. Selective chipping of the existing slab to provide space for plumbing connections to stub outs provided in the floor replacement scope will be required. New openings in the north brick facade to support new mechanical system intake and exhaust functions. Site demolition associated with installation of new equipment yard enclosure.

The design team foresees the need for a prolonged shutdown associated with SES upgrades to the entire building that need to be accounted for in budgeting efforts.

The total project area is approximately 44,700 sq. ft.

PROJECT DATA

OCCUPANCY	A-3,A-4, B, S-1 (non-separated uses)	
CONSTRUCTION TYPE	I-B (Pre Ordinance Building appr. Equal to)	
FULLY SPRINKLERED	YES, per NFPA 14	
EXISTING BUILDING AREA	LEVEL 01	67,160 GSF
	LEVEL 02	22,460 GSF
	TOTAL EXISTING	89,620 G SF
	SCOPE OF WORK	
	LEVEL 01 FIELDHOUSE	44,700 GSF

2 ARCHITECTURAL NARRATIVE

ADDITIVE ALTERNATES

- PAINT:
 - Room 140
 - Base Option –Paint all new construction and wall areas affected by new construction
 - Additive Alternate Option 01 –Base Option plus paint all masonry walls and building structure to masonry wall height.
 - Additive Alternate Option 02– Option 01 plus paint all exposed roof structure.

- MECHANICAL:
 - Reference Mechanical Narrative

- ELECTRICAL:
 - Reference Electrical Narrative

- FFE ICE RINK:
 - Reference FFE Narrative

ITEMS TO ISOLATE IN PRICING EFFORTS

- ARCHITECTURAL:
 - All work associated with equipment yard including pad, enclosure, tree removal and replacement and earthwork associated with this work.

- ELECTRICAL:
 - SES upgrades
 - All work associated with providing power for ice rink chiller plant including panels and wiring.

- ICE SYSTEMS:
 - Ice Rink Chiller Plant
 - Piping that extends beyond building enclosure.

SHELL

SUPERSTRUCTURE

- Structure is existing
- Existing Fieldhouse Structure does not have fire-proofing. No fireproofing scope is assumed.

EXTERIOR ENCLOSURE

- Exterior enclosure is existing
- Exterior enclosure scope for this project will be limited to new openings for mechanical louvers. Masonry removed for each opening should be salvaged and re-used for repairs of new jambs and tooth-in as required.

INTERIORS

INTERIOR CONSTRUCTION

Interior Partitions

- Typical gypsum board and metal stud interior partitions will consist of non-rated assemblies with type IV finish. Reference partition types.

Interior Doors

- Hollow Metal Doors and Frames shall be commercial heavy-duty quality with 1¾" minimum door thickness. All frames shall be welded with wall anchors at 16" o.c. and be no lighter than 16 gauge. Doors shall have a minimum of 3 hinges and have a spray applied finish.
- Overhead Rolling Door shall be factory painted steel. Provide motorized operation with key on exterior side and push button on interior. Provide chain override.
- Grade one mortise, lever handle lock/latch sets and all other hardware required for proper operation of each door and as required by code.

Interior Wall Finishes

- General gypsum board wall areas will receive a paint finish – All areas are to receive a type IV finish. Paint is to be Benjamin Moore Ecospec (or equal to conform to VOC requirements and durability);

Interior Base Finishes

- Rubber base to be 4" x 1/8" (cove at resilient flooring, straight at carpet). All corners are to be pre-formed unless the return on a corner is less than 4". All base to be from manufacturers roll goods.

Interior Tile Finishes

- Tile products per plans per plan installed per TCNA Standards.
- Tile to be installed over 1/2" cement backer
- All grout to be Custom Prism or equal

Interior Specialties

- Fire extinguishers in all building area are classified according to the type of hazard that exists and shall be specified according to NFPA 10. Cabinets shall be semi-recessed, stainless-steel w/clear glass and ADA compliant;
- Corner guards to be Flush-Mount Stainless Steel, by InPro Corporation; to be provided at all exterior corners of brittle walls in public zones.

ROOM DESCRIPTION DATA

140

Floors: Existing Concrete
Base: N/A
Walls: Existing Masonry Painted White (Reference Additive Alternates)
Ceiling: Existing Concrete Painted White (Reference Additive Alternates)
Millwork: N/A
Specialty: N/A

140A

Floors: Existing Concrete coated with Clear Polyurethane Concrete Sealer
Base: New Concrete Curb coated with Clear Polyurethane Concrete Sealer

Walls: Tile per plans
Ceiling: Gypsum Board painted white
Plumbing Fixtures: Per Plumbing Plans
Specialty: Partitions and Dividers per Plans

140B

Floors: Existing Concrete coated with Clear Polyurethane Concrete Sealer
Base: New Concrete Curb coated with Clear Polyurethane Concrete Sealer
Walls: Gypsum Board painted white
Ceiling: Gypsum Board painted white
Plumbing Fixtures: Per Plumbing Plans
Specialty: N/A

140C

Floors: Existing Concrete coated with Clear Polyurethane Concrete Sealer
Base: New Concrete Curb coated with Clear Polyurethane Concrete Sealer
Walls: Tile per plans
Ceiling: Gypsum Board painted white
Plumbing Fixtures: Per Plumbing Plans
Specialty: Partitions and Dividers per Plans

140D

Floors: Existing Concrete
Base: New Concrete Curb
Walls: Gypsum Board painted white
Ceiling: Gypsum Board painted white
Plumbing Fixtures: N/A
Specialty: N/A

INTERIOR FINISHES

Interior Paint Finishes

- General gypsum board wall areas will receive a paint finish – All areas are to receive a type IV finish. Paint is to be Benjamin Moore Ecospec (or equal to conform to VOC requirements and durability);

Interior Base Finishes

- Rubber base to be 4" x 1/8" (cove at resilient flooring, straight at carpet). All corners are to be pre-formed unless the return on a corner is less than 4". All base to be from manufacturers roll goods.

Interior Tile Finishes

- Tile products per plans per plan installed per TCNA Standards.
- Tile to be installed over 1/2" cement backer
- All grout to be Custom Prism or equal

Interior Floor Finishes

- Polyurethane 250 High Performance Concrete Sealer with code compliant slip resistant factor

Interior Ceiling Finishes

- General gypsum board wall areas will receive a paint finish – All areas are to receive a type IV finish. Paint is to be Benjamin Moore Ecospec (or equal to conform to VOC requirements and durability);

EQUIPMENT AND FURNISHINGS

EQUIPMENT

- Owner Furnished/Owner Installed. Reference FFE Narrative

FURNISHINGS

- Owner Furnished/Owner Installed

AUDIO/VISUAL

- Owner furnished/ Owner installed

BUILDING SITEWORK

EARTHWORK

- As required for new equipment yard enclosure
- As required for new ice chiller plant pad

LANDSCAPE

- Removal and replanting of existing Spruce Tree. Replanting is preferred.

3 STRUCTURAL NARRATIVE

SEISMIC BRACING

- All systems required seismic bracing to be designed for risk category II exposure B

NEW OPENING IN EXISTING DOUBLE WYTHE MASONRY

- All new openings in existing brick face masonry walls will require steel lintels. Assume angle lintel exposed on interior only.
- Salvage brick removed during demolition to repair and tooth in face brick as needed to provide 'clean' jamb

FRAMING

- The restroom/mechanical space deck will not be rated for live loads or storage. Reference drawings for proposed deck structure. Ceiling framing and utilities to be supported from this deck.

UTILITIES

- All sub trades are responsible for providing any engineering required for their suspended utilities.

4 MECHANICAL, PLUMBING, FIRE PROTECTION SYSTEMS & ELECTRICAL SYSTEMS NARRATIVE

A. Project Description:

1. In order to support Phase 2 of the Northern Arizona University Fieldhouse Ice Rink project, IMEG Corp has prepared a series of Schematic Design options for third party cost estimation. The enclosed drawings and the schematic design MEP narrative were prepared to serve as pricing tools for Rough Order of Magnitude (ROM) pricing evaluation.
2. The following is a comprehensive list of the various options presented in the Schematic Design MEP package:

- a. Base Bid – Minimum Scope of Work required for all options. Pricing results from Base Bid documentation shall be applied to all total construction cost estimates for all options presented. Refer to the following sheet:

FP0.00 – FIRE PROTECTION COVERSHEET

FP0.01 – OVERALL FLOOR PLAN – FIRE PROTECTION

P0.00 – PLUMBING COVERSHEET

P1.00 – OVERALL FLOOR PLAN – PLUMBING

P2.00 – RESTROOM ENLARGED PLAN

P3.00 – PLUMBING DETAILS AND SCHEDULES

M0.00 – MECHANICAL COVER SHEET

MD1.00 – MECHANICAL DEMOLITION PLAN – BASE BID

M1.00 – MECHANICAL PLAN – BASE BID

M2.00 – HEATING PLANT UPGRADES – BASE BID

M3.00 – MECHANICAL DETAILS

M5.00 – MECHANICAL SCHEDULES

M5.01 – MECHANICAL SCHEDULES

IS0.00 – ICE SYSTEMS COVER SHEET

IS1.01 – ICE SYSTEMS PLAN

E0.00 – ELECTRICAL COVER SHEET

EL1.01 – ELECTRICAL LIGHTING PLAN – (Base bid area of work as noted)

EL5.01 – LUMINAIRE SCHEDULES (where applicable)

EP1.00 – ELECTRICAL POWER PLAN – BASE BID

EP2.00 – ENLARGED ELECTRICAL ROOM – BASE BID

E4.01 – ONE LINE DIAGRAM

b. Mechanical HVAC Option 1 – 900 occupant maximum design constraint.

M1.01 – MECHANICAL PLAN – OPTION 1

M5.00 – MECHANICAL SCHEDULES (where applicable)

M5.01 – MECHANICAL SCHEDULES (where applicable)

M6.00 – MECHANICAL CONTROLS

EP1.01 – ELECTRICAL POWER PLAN – OPTION 1

c. Mechanical HVAC Option 2 – 1500 occupant maximum design constraint.

M1.02 – MECHANICAL PLAN – OPTION 2

M5.00 – MECHANICAL SCHEDULES (where applicable)

M5.01 – MECHANICAL SCHEDULES (where applicable)

M6.00 – MECHANICAL CONTROLS

EP1.02 – ELECTRICAL POWER PLAN – OPTION 2

d. Electrical Lighting Option 1 – Supplement Existing Light Fixtures with new LED fixtures. Revise existing panel to add (2) lighting circuits for new lighting fixtures. Refer to the following sheets:

EL1.01 – ELECTRICAL LIGHTING PLAN – OPTION 1

EL5.01 – LUMINAIRE SCHEDULES (where applicable)

e. Electrical Lighting Option 2 – Retrofit Existing Light Fixtures with new LED fixtures Refer to the following sheets:

EL1.02 – ELECTRICAL LIGHTING PLAN – OPTION 2

EL5.01 – LUMINAIRE SCHEDULES (where applicable)

- f. Electrical Lighting Option 3 – Replace Existing Light Fixtures with all new LED fixtures. Refer to the following sheets:

EL1.03 – ELECTRICAL LIGHTING PLAN – OPTION 3

EL5.01 – LUMINAIRE SCHEDULES (where applicable)

B. General Building Design Criteria and Assumptions:

1. Applicable Building Codes:

2012 International Code Council (ICC)

National Electrical Code – 2011 version

Mechanical Code – 2012 International Code Council (ICC)

Plumbing Code – 2012 International Code Council (ICC)

Fire Protection Code – 2012 International Code Council (ICC) NFPA 13 and NFPA 14

Energy Conservation Code – 2012 International Energy Conservation Code (IECC)

Northern Arizona University Technical Standards – Current Edition

2. Outdoor Design Conditions

The outdoor design conditions governing the mechanical HVAC and Ice systems sizing criteria are predicated by a reduced ice hockey season occurring between October and March.

- a. Cooling Design Outdoor Air Conditions: 60°Fdb/52°Fwb (based on historical averages for Flagstaff, Arizona)
- b. Note: Cooling design capacity is limited to minimum requirement to support dehumidification only. Supplemental cooling to support full house during the cooling season is not desired by NAU at this time. Estimated maximum occupancy allowance at maximum ambient design temperatures are provided in the mechanical summary below.
- c. Design Dehumidification Outdoor Air Conditions: 65.6°Fdb/54.2°Fwb (based on ASHRAE 0.4% monthly design wet bulb and mean coincidental dry bulb design conditions.)
- d. Heating Design Outdoor Air Conditions: 0°F (based on ASHRAE 99.6% annual heating design conditions.)

3. Indoor Design Conditions

- a. Design Environmental Requirements: 60°F, 40%RH.

b. NHL/AHL design allowance: 64°F, 44%RH, high limit.

4. Envelope assumptions based on analysis of existing envelope construction:

	U-value (Btu/h*sf°F)	SHGF
Wall	0.249	NA
Roof	0.140	NA
Glazing	NA	NA
Slab	0.212	NA

C. Ice Systems Summary

1. All associated work will be considered Base Bid. A new 100-ton air-cooled ice making chiller package will be installed outside, north of the Fieldhouse. The unit will be installed on a concrete pad and hidden from public view by a screen wall enclosure. The package will include the following design features:
 - a. Approximate dimensions: 33ft x 8ft x 11ft tall
 - b. Refrigerant R407a
 - c. 2 circuits, 6 compressors
 - d. Pumping package with two 1000 gpm pumps (one is redundant)
 - e. Expansion tank
 - f. Receiver
 - g. Condenser fans
 - h. Unit mounted and remote control panels
2. New 8" glycol lines will be extended from the existing stub locations inside the Fieldhouse to the air-cooled chiller.
 - a. Sch. 40 steel with welded or flanged fittings.
 - b. Extruded polystyrene insulation, 2-layers of 1.5" thick each with vapor retarder film and aluminum weatherproof jacket.
3. Temperature sensor will be installed in an existing floor box just north of center ice. There is an existing pull-line in the conduit to facilitate wiring installation. Conduit will be extended to the chiller control panel.

4. Existing 200ft x 85ft refrigerated slab has 4" o.c. HDPE tube spacing and 8" center ice reverse return header configuration. Construction on the refrigerated slab was completed in 2017.
 - a. Flush existing refrigerated slab and new piping with water and fill with 50% ethylene glycol solution. Replace startup strainers.
 - b. Existing refrigerated slab does not have an underfloor heating system to prevent heaving and cannot be used year-round. The design will accommodate a standard October to April club hockey season.

5. The University is considering an option to feed glycol from the adjacent Central Utility Plan (CUP) ice storage system. The following are considerations for this approach:
 - a. Supply Temperature: capable of running down to 15 degrees F inlet at rink to support hockey. Figure skating supply temperatures may be as high as 20 degrees F.
 - b. Return Temperature: typically 3 degrees higher than supply temperature.
 - c. Flow Rate: 1000 gpm continuous. May run on VFD with scheduled control if budget allows. Overnight flow rates can be as low as 600 gpm.
 - d. System Fill: 50% ethylene glycol and water solution.
 - e. Load Profile:
 - 1) Flooding (initial ice making) – 100 tons continuous for up to 96 hours.
 - 2) Cutting (resurfacing) – 100 tons for 20 minutes. Once per hour for normal day-to-day operation.
 - 3) Games – 100 tons continuous during games.
 - 4) Practice, figure skating, public skates – 20 to 60 tons continuous depending on activity level.
 - 5) Unoccupied – 20 to 40 tons continuous depending on conditions inside the Fieldhouse.
 - 6) Increase these numbers by 20% if rink does not include a post cooling coil in the dehumidification unit.

- f. As plans are formulated for the CUP ice storage system, consideration should be given on to ensure the supply temperature is met at low rink load conditions, given the size of the ice storage chilling equipment. Additionally, we would expect, in order to satisfy the rink load, a compressor will need to run during the time of day where demand limiting is necessary, complicating the economic justification for such a combined rink and storage system. Further study of this option is suggested and IMEG is available to assist if requested by the University.

D. Mechanical HVAC Summary

1. All plumbing and fire protection scope of work shall be considered base bid. Mechanical HVAC scope of work excluding the installation of the dehumidifier shall also be considered base bid. Mechanical Option 1 and Mechanical Option 2 represent the installation of two similar custom dehumidification and air handling units of varying capacity to support different design occupancy goals. All mechanical work shall comply with NAU Technical Standards.
2. In general, to support the ice rink function within the Fieldhouse Multipurpose Center, a new custom, desiccant dehumidification unit capable of providing code minimum ventilation to the space will be required to maintain the rink design conditions as stated above. This new dehumidification unit will impose a higher heating water demand than the current infrastructure can support. In addition to the installation of a dehumidification unit, heating upgrades to the existing heating water system will be required. The existing heating water system generates 140F heating water with a maximum delivery flow rate of 200 GPM and operates on an assumed 40F delta T. A maximum increase to approximately 350 GPM is anticipated. As part of this project, one new heating water pump of similar size to the existing will be added and the piping will be reconfigured to allow for N+1 pumping redundancy. The heating water main piping will be increased from 4" diameter to 6" diameter to support the increased flowrate.

Through field investigation, examination of steam usage metering data and coordination with NAU's Director of Utilities, the two-existing shell and tube, steam-to-hot water heat exchangers currently have a peak utilization of 1500#/hr, with a maximum usable capacity of 3500#/hr per heat exchanger. It has been determined that the existing heat exchangers are capable of supporting the increased total demand of approximately 3000#/hr, and thus will be reused under this project. One existing shell and tube heat exchanger will remain fully redundant.

Chilled water cooling coils will be implemented in the dehumidification unit design to support pre-cooling of the conditioned air and supplemental post cooling to limit overheating of the space. The post-cooling chilled water coil will not be sized to accommodate a “full house” during the entire cooling season. It is estimated that the installed cooling capacity for DHU-900, under mechanical option 1, can support up to 500 occupants at maximum design ambient conditions. At or below 40F outdoor ambient temperature, it is estimated that the full load of 900 spectators can be supported. Similarly, it is estimated that the installed cooling capacity for DHU-1500, under mechanical option 2, can support up to 650 occupants at maximum design ambient conditions. At or below 30F outdoor ambient temperature, it is estimated that the full load of 1500 specators can be supported. As the design progresses these estimates will be evaluated further.

3. Plumbing scope of work shall include, but is not limited to the following:
 - a. Extension of domestic cold water distribution system to serve new restrooms and janitors closet.
 - b. Extension of domestic hot water and hot water circulation system from existing steam-hot water heaters located in the northeast mechanical room. Provide and install new hot water circulation pump dedicated for the new restrooms.
 - c. Above ground sanitary tie in to existing sanitary connection points as shown.
 - d. Sanitary vent system installation to support new plumbing fixtures.
 - e. New plumbing fixtures as scheduled in the plumbing material list.

4. Fire Protection scope of work shall include, but is not limited to the following:
 - a. Extension of existing automatic wet fire protection system to serve new restrooms, mechanical room, and janitors closet within the fieldhouse.
 - b. Sprinkler layout design, supporting hydraulic calculations and installation of new quick response sprinklers within the area work as shown on the drawings.

5. Mechanical scope of work shall include, but is not limited to the following:
 - a. Demolition of existing fin tube radiation and associated piping as shown on the drawings.
 - b. Replacement of existing 4” heating hot water main supply and return piping with new 6” heating water mains. All existing branch connections shall be reconnected and balanced to within the original flow.
 - c. Addition of new heating water pumps as shown on the drawings.
 - d. Piping reconfiguration of the existing heating water system to support N+1 heating redundancy.

- e. Extension of heating water supply and return to DHU coils and unit heater.
- f. Extension of chilled water supply and return to DHU coils.
- g. Installation of outside air, supply air, return air and exhaust air ductwork, accessories and outlets as shown on the drawings.
- h. Installation of new custom desiccant dehumidification air handling unit (DHU-900 or DHU-1500) as shown on the drawings.
- i. Direct Digital Control (DDC) integration with existing Alerton building automation system. All DHU controls shall be provided by the Temperature Controls Contractor. Equipment requiring DDC integration is as follows:
 - 1) Air Cooled Ice Making Chiller (ACCH-1)
 - 2) Custom Desiccant Dehumidification Unit (DHU-900 or DHU-1500)
 - 3) Exhaust fan (EF-1)
 - 4) Unit Heater (UH-1)
 - 5) Heating Water Pumps (HWP-1, 2, 3)
 - 6) Campus Metering Integration (Chilled Water & Heating Water)
- j. TAB Scope of work: Pre-balance and final balance of existing heating water pumps, existing shell and tube heat exchangers, and all new hydronic and airside equipment.

6. Basic Mechanical Specifications

- a. All hydronic heating water and chilled water piping 2" and smaller shall be Type L seamless hard drawn copper, wrought copper fittings and soldered joints (less than 0.2% lead alloy solder).
- b. All hydronic heating water and chilled water piping 2 ½" and larger shall be Type L seamless hard drawn copper, wrought copper fittings and 15% silver brazed joints.
- c. All domestic water piping 2" and smaller shall be minimum Type L copper, soldered-joint fittings, and soldered joints. CVPC, PVC or PEX tube will not be allowed.
- d. All domestic water piping 2 ½" and larger shall be minimum Type L copper with soldered-joint fittings, and brazed joints. CVPC, PVC or PEX tube will not be allowed.

- e. Above grade sanitary waste and vent piping shall be hubless, cast-iron soil pipe, service weight, and cast-iron hubless pipe couplings.
- f. Supply, Return, Outside Air and General Exhaust ductwork shall be ASTM A 527, G90 galvanized steel of lock forming quality and 2" pressure class rating.
- g. Heating Chilled water piping shall be insulated with 1 ½" thick fiberglass insulation.
- h. All VFDs shall be from the manufacturer ABB.
- i. All operators shall be electronic. No pneumatic operators will be used.
- j. All motors shall be of premium efficiency.

E. Electrical Summary

1. Electrical Service and Power Distribution:

- a. Electrical scope of work excluding the installation of the dehumidifier shall be considered base bid. Electrical Option 1 and Electrical Option 2 represent the electrical requirements based on the installation of two similar custom dehumidification and air handling units of varying capacity to support different design occupancy goals. All electrical work shall comply with NAU electrical standards.
- b. To support the proposed ice making chiller plant and HVAC upgrades indicated above, the existing 800A, 277/480V-3PH, 4W exterior electrical service entrance section located at the north-east corner of the Fieldhouse will be replaced with a new Square-D 1200A, 277/480V-3PH, 4W electrical service entrance section. The service upgrade will also require the existing adjacent 500 KVA 15KV utility transformer shall also be replaced with a new 1000 KVA utility transformer to comply with NAU standards 337300 with envirotemp FR3 insulating fluid. Both units will be installed on new concrete pads.
- c. The service replacement will require two existing electrical panel feeders be disconnected from the existing SES and be re-connected to the new SES. New electrical distribution equipment shall consist of a new 600-amp distribution panel, 75KVA 480-120/208V, 3PH, 4W transformer and 225A main circuit breaker 120/208V-3PH, 4W power panel installed within the new multi-purpose room. This equipment is being added for power feeds to the new ice plant, HVAC upgrades, power receptacles in new multi-purpose room, restrooms, EVS room, as well as power for ice rink area scoreboards, existing score keeper floor box, and Zamboni electric charging power receptacle.

2. Lighting Systems

- a. Lighting levels for this project will meet current Community Level Hockey Rink recommended lighting levels of 30 – 50 footcandles.
- b. 3500K is the anticipated color temperature for LED luminaires
- c. Emergency egress lighting will be LED type. Exit luminaires will be LED type for energy efficiency and long lamp life.
- d. Emergency lighting will be fed from the life safety branch of the emergency distribution system.
- e. Lighting design will comply with the ASHRAE 90.1 standards for allowable lighting watts per square foot.
- f. Electrical Lighting Controls Option 1 – Existing Lighting controls shall remain.
- g. Electrical Lighting Controls Option 2 – Existing Lighting controls shall remain.
- h. Electrical Lighting Controls Option 3 – Replace Existing Light Controls with low voltage controls.
Refer to the following sheets:

EL1.03 – ELECTRICAL LIGHTING PLAN – OPTION 3

5 LIGHTING CUTSHEETS

**E-HBA SERIES
T5 HIGH BAY LUMINAIRE - 26" WIDE**

EX

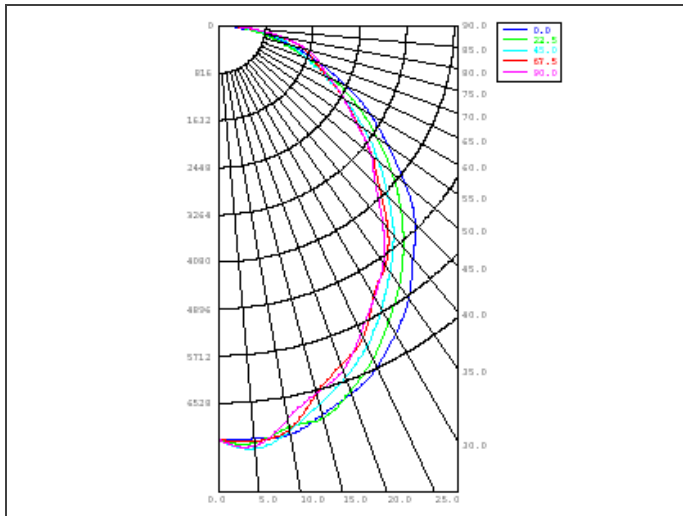
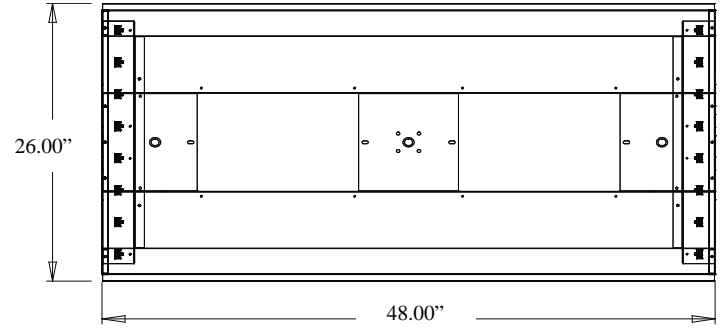
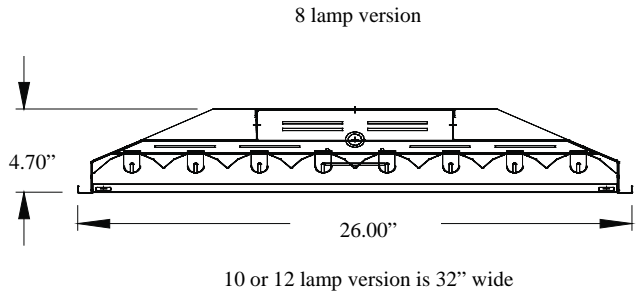


<p>Housing: 22GA steel. Finish: Baked white enamel, galvanized or post powdercoat steel. Construction: CNC formed and mechanically joined. Options: 11GA wireguard, prismatic or clear lens.</p>			<p>Mounting: Suspended. Distribution: Narrow to medium. Replacement for HID high bay. Electrical: Electronic Standard or High output options; Program Start Ballast is factory standard; <10% THD; Inherent thermal protection; Dimming & Emergency available. Labels: UL/CUL listed. Damp Location.</p>		
SPEC.	NOM.	DESCRIPTION	SPEC.	NOM.	DESCRIPTION
Finish	P	Powdercoat gloss white	Lens	---	Open - no designation needed
	G	Galvanized		WG	11 Gauge galvanized wireguard
W	Baked white enamel	AC		Clear acrylic lens .090" thick	
				PR	A12 prismatic acrylic .110" thick
Dimension	34	Nominal 26" wide (8lamp) or 32" wide (10 or 12 lamp) x 48" long	Voltage	U	Universal volt 120-277 (factory standard)
				H	347-480 volt
1	120 volt (specify with LED or dimming)				
2	277 volt (specify with LED or dimming)				
3	347 volt (specify with LED or dimming)				
4	480 volt (specify with LED or dimming)				
1B	Emergency Battery Back-up 120v				
2B	Emergency Battery Back-up 277v (T5 std = 500 lumens or T5HO = 825 lumens)				
Lamping	8 10 12 L	<p>T5 = 54W or 28W per lamp Lamps are not included unless otherwise noted (8) lamps in cross section (26" wide) (10) lamps in cross section (32" wide) (12) lamps in cross section (32" wide) LED – contact factory & specify voltage</p>	Reflector	E	Enhanced Aluminum 95% reflective
				W	White Aluminum 90%+ reflective
			Mounting	---	Chain Suspended (by others) - no designation needed
				SP	2.5" Single Point Box (stem mount)
Ballast	S5 H5 DS DH	<p>T5 Standard Electronic T5 28W High Output Electronic T5 54W Dimming Standard Electronic T5 28W - specify type & voltage Dimming High Output Electronic T5 54W - specify type & voltage</p>	Y	Y	8ft Powercord, black 18/3 wire
					Y-fit Gripple® Toggle 12" Y x 11' long
			Options	O	360° degree occupancy sensor
				A	Aisle occupancy sensor
	R	Relay			
	LDD	LED Dimming Transformer – contact factory	M	Multi-circuit wiring	

ORDERING NOMENCLATURE GUIDE

Standard Fixture: E-HBAW348H5UE										
Catalog # for a HBA Type Fixture – Baked White Enamel - Nominal 3 ft x 4 ft Long - 8 Lamps in cross section - High Output T5 Electronic Ballast - Open/No Lens - Universal Voltage - Enhanced Reflector - Standard Surface Mount - No Options.										
8E Product	Series	Finish	Dimension	Lamping	Ballast	Lens	Voltage	Reflector	Mounting	Options
E -	HBA	W	34	8	H5	WG/AC	U	E	Y	

**E-HBA SERIES
 T5 HIGH BAY LUMINAIRE - 26" WIDE**



PRODUCT NUMBER = E-HBAW348H5UE

FIXTURE EFFICIENCY = 94.6%

S.M.H. = 1.08

WATTAGE = 468W (BASED ON 277V)

RCR TABLE AVAILABLE

IES PHOTOMETRIC FILE AVAILABLE

SPECIFICATION CHARACTERISTICS

- **Narrow to Medium Distribution Utilizing Energy Efficient Components Throughout**
- **Highly Efficient Luminaire – Over 94%**
- **Replaces 750 - 1000 Watt HID High Bay**
- **Instant On, Long Life, Lower Energy Consumption, No Color Shift**
- **Uniform Illumination**
- **LED is Available – Contact Factory with Requirements**
- **Vented for Optimum Lamp Performance**
- **Dimming, Emergency, Occupancy Sensor or Light Level Sensor Options**
- **Multiple Mounting Options: Chain or Gripple Ready, Single Point Mounting Box or Cord**
- **Multiple Lens Options: Wire Guard, Prismatic, Clear Acrylic, or Clear Polycarbonate Lens**
- **Multiple Finish Options: Gloss White Post Powdercoated, Galvanized or Baked White Enamel Steel**
- **Short Lead Times**



createchange

FEATURES

- Optical design provides one-for-one replacement of metal halide and fluorescent high bays with substantial energy savings
- Three LED color choices and 84 CRI
- High efficacy LEDs provide up to 158 Lumens Per Watt
- Available in narrow or wide distribution
- Long-Life LEDs 60,000 hours at L80 with projected life over 200,000 hours for reduced life cycle maintenance costs
- Easy center driver cover allows tool-less access to electrical components for modular replaceability
- Drivers include 6kV surge protection
- Extremely low profile—only 2" overall height
- Quick and simple hanging systems include chain, tong or aircraft cable mounting
- Access cover in channel for easy wiring access
- "Plug and play" occupancy sensor, daylight sensor, cord and plug
- Wire guard and/or lens option
- ControlScope® compatible
- DesignLights Consortium® (DLC) qualified
- CSA listed and suitable for damp locations
- -20°C up to +65°C ambient operation; see table provided for details
- 5 Year Warranty

PROJECT INFORMATION

Project Name _____

Type _____

Catalog No. _____

Date _____

CONSTRUCTION

Code gauge steel construction for durability to withstand shipping and job site handling. End caps include hemmed edges for ease of handling. Fixture provides easy access to electrical components via removal of channel cover. Tool-less access with one quarter-turn fastener. Oversized access plate conveniently mounted on back of channel for easy access to wiring compartment.

REFLECTOR

Narrow version features multi-faceted specular aluminum reflector for aisle lighting and areas where tighter lighting beam spread is desired. Wide distribution model provides maximum light distribution for open areas. Reflector removal is not required to gain access to electrical components.

PERFORMANCE

VersaBay® LED provides high efficacy, reduced input wattage compared to HID or fluorescent, and the excellent lighting quality needed for task visibility, material characteristic and color differentiation.

FINISH

All metal parts processed with a phosphate bonding treatment. Pre-painted with high gloss baked white enamel, 86% reflective. Polyester powder coat paint after fabrication (PAF) option available for product housing and ends, reflectance 90%.

SHIELDING

Optional lens shielding is virgin acrylic or polycarbonate.

MOUNTING

Fixture to be suspended a minimum of 28" from solid surface. Mounting options include aircraft cable, tong hanger, pipe hanger, or chain.

CERTIFICATION

All luminaires are built to UL1598 and 2108 standard, and bear appropriate CSA labels. Damp location labeling is standard. Emergency equipped fixtures built to UL942. Adheres to LM79, LM80 and TM21 industry standards. DesignLights Consortium® (DLC) qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org.

WARRANTY

5 Year Warranty (Terms and Conditions apply).

ORDERING INFORMATION

EXAMPLE LLHV4-50H-WST-EU

LLHV	4	-	-	ST	-	-
MODEL	COLOR TEMP	REFLECTOR	DRIVER	OPTIONS		
LLHV VersaBay® LED High Bay	35 3500 40 4000 50 5000	N Narrow Distribution W Wide Distribution	E Fixed Output ED 0-10V Dimming	C6TL15 6' Cord and Twist-Lock™ Plug 15A (Add Voltage: 1=120, 2=277)	C6TL20 6' Cord and Twist-Lock™ Plug 20A (Add Voltage 1=120, 2=277)	C6P151 6' Cord and Straight Blade Plug 15A, 120V
SIZE	LUMEN OUTPUT	UPLIGHT	VOLTAGE	CA Clear Acrylic Lens ^{1,2}	CP Clear Polycarbonate Lens ^{1,2}	SFA Smooth Frosted Acrylic Lens ^{1,2}
4 4'	L Low Watt M Medium Lumen H High Lumen V Very High Lumen X Extra High Lumen U Ultra High Lumen Lumen output varies fixture width, see cross section drawings	ST Solid Top (no uplight)	U 120V-277V 347 347V ⁹ 480 480V ⁹	CAWG Clear Acrylic Lens and Flat Wire Guard ^{1,2,3}	CPWG Clear Polycarbonate Lens and Flat Wire Guard ^{1,2,3}	SFAWG Smooth Frosted Acrylic Lens with Flat Wire Guard ^{1,2,3}
ACCESSORIES (ORDER SEPARATELY)				WG Flat Wire Guard ^{1,3}	SP Side Panels Installed ^{1,4}	ELL14 Emergency Battery Pack, 1400 Lumens ^{5,6}
LHVTH Tong Hanger (Pair) for L, M, and H lumen outputs ¹⁰				F4C5 4-Conductor Cord	GLR Fast Blow Fuse	OS1360 Factory Installed Occupancy/Daylight, Sensor, 1-relay, 360° lens 120/277
LHVWTH Wide Tong Hanger (pair) for V, X, and U lumen outputs ¹⁰				OS2360 Factory Installed Dimming Occupancy/Daylight Sensor, 1-relay, 360° lens 120/277	OS1A Factory Installed Occupancy/Daylight Sensor, 1-relay, Aisle lens, 120/277	OS2A Factory Installed Occupancy/Daylight Sensor, 2-relay, Aisle lens, 120/277
LHVWG4-4 Wireguard, White for L, M, and H lumen outputs ³				OSD1360 Factory Installed Dimming Occupancy/Daylight Sensor, 1-relay, 360° lens 120/277	ODS1A Factory Installed Dimming Occupancy/Daylight Sensor, 1-relay, Aisle lens 120/277	NYC NYC Compliant
LHVWG4-6 Wireguard, White for V, X, and U lumen outputs ³				NYC NYC Compliant	ZRE ControlScope® compatible ⁸	LV Lutron Vive Enabled, 0-10V ^{11, 12}
LHVQMS Aircraft Cable, 5' (Pair)						
LHVQM10 Aircraft Cable, 10' (Pair)						
LHVSPMS Single Point Mounting, Includes Pair of 5' Aircraft Cables ⁷						
LHVSP Side Panels (Pair)						
LHVOS1360 Occupancy/Daylight Sensor, with a 360° lens, 120/277/347V						
LHVOS2360 Occupancy/Daylight Sensor, with a 360° lens, 120/277/347V						

ACCESSORIES (ORDER SEPARATELY)

- LHVTH Tong Hanger (Pair) for L, M, and H lumen outputs¹⁰
- LHVWTH Wide Tong Hanger (pair) for V, X, and U lumen outputs¹⁰
- LHVWG4-4 Wireguard, White for L, M, and H lumen outputs³
- LHVWG4-6 Wireguard, White for V, X, and U lumen outputs³
- LHVQMS Aircraft Cable, 5' (Pair)
- LHVQM10 Aircraft Cable, 10' (Pair)
- LHVSPMS Single Point Mounting, Includes Pair of 5' Aircraft Cables⁷
- LHVSP Side Panels (Pair)
- LHVOS1360 Occupancy/Daylight Sensor, with a 360° lens, 120/277/347V
- LHVOS2360 Occupancy/Daylight Sensor, with a 360° lens, 120/277/347V

¹ Side panels increase height to 27".
² Lens reduces max ambient operating temperature (see table).
³ Using a Wire Guard may cause shadowing.
⁴ Side panels only; does not include lens or wire guard options.
⁵ ELL14 reduces max ambient temperature (see table).
⁶ ELL14 not available with 347v or 480v.
⁷ For use only with L, M, H Lumen packages.
⁸ Registered trademark of Daintree Networks, used by permission.
⁹ Consult factory for V, X, U lumen packages.
¹⁰ Not available with ELL14.
¹¹ VIVE is a trademark of Lutron Electronics Co., Inc.
¹² Installations controlled solely by the Lutron Pico controller require accessing the LV (Lutron FCSJ) module for commissioning after the circuit has been energized.

PHOTOMETRIC DATA

LUMINAIRE DATA

Luminaire	LLHV4-50M-WST-EU LLHV VersaBay LED High Bay, Industrial 16" x 48" LED with white reflector
Ballast Driver	XI190C275V054BSG1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	20341
Watts	138.40
Mounting	Pendant
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.29 90° = 1.30
Luminous Opening in Feet	Length: 3.92 Width: 1.25 Height: 0.00

ENERGY DATA

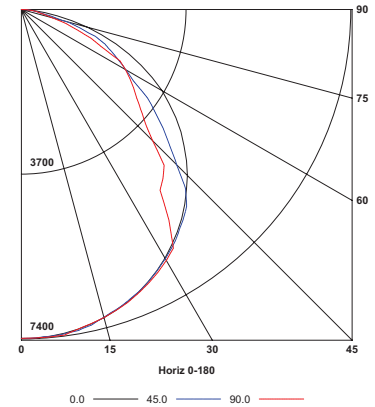
Total Luminaire Efficiency	100.0%
Total Lumens per Watt	147
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.63 based on 3000 hrs. and \$0.08 per KWH

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	5845	28.7	28.7
0-40	9617	47.3	47.3
0-60	16570	81.5	81.5
0-90	20341	100.0	100.0
0-180	20341	100.0	100.0

Test #16765 Test Date 8/5/2016

INDOOR CANDELA PLOT



LUMINAIRE DATA

Luminaire	LLHV4-50H-NST-EU LLHV VersaBay LED High Bay, Industrial 16" x 48" LED with specular reflector
Ballast Driver	XI095C275V054DNF1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	25952
Watts	194.50
Mounting	Pendant
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.30 90° = 1.20
Luminous Opening in Feet	Length: 3.92 Width: 1.25 Height: 0.00

ENERGY DATA

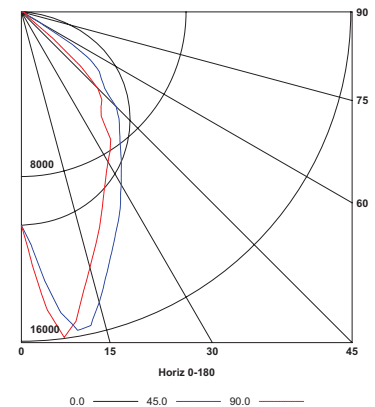
Total Luminaire Efficiency	100.0%
Total Lumens per Watt	133
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.79 based on 3000 hrs. and \$0.08 per KWH

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	10178	39.2	39.2
0-40	15640	60.3	60.3
0-60	23677	91.2	91.2
0-90	25952	100.0	100.0
0-180	25952	100.0	100.0

Test #16767 Test Date 8/15/2016

INDOOR CANDELA PLOT



LUMINAIRE DATA

Luminaire	LLHV4-50H-WST-EDU LLHV VersaBay LED High Bay, Industrial 16" x 48" LED with white reflector
Ballast Driver	XI095C275V054DNF1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	26838
Watts	194.80
Mounting	Pendant
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.29 90° = 1.30
Luminous Opening in Feet	Length: 3.92 Width: 1.25 Height: 0.00

ENERGY DATA

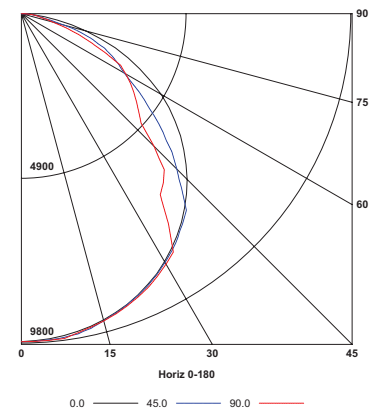
Total Luminaire Efficiency	100.0%
Total Lumens per Watt	138
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.74 based on 3000 hrs. and \$0.08 per KWH

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	7721	28.8	28.8
0-40	12705	47.3	47.3
0-60	21865	81.5	81.5
0-90	26838	100.0	100.0
0-180	26838	100.0	100.0

Test #16769 Test Date 8/5/2016

INDOOR CANDELA PLOT



PHOTOMETRIC DATA

LUMINAIRE DATA

Luminaire	LLHV4-50V-WST-EU LLHV VersaBay LED High Bay, Industrial 16" x 48" LED with white reflector
Ballast Driver	XI190C275V054BSG1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	34964
Watts	244.50
Mounting	Pendant
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.29 90° = 1.29
Luminous Opening in Feet	Length: 3.92 Width: 1.25 Height: 0.00

ENERGY DATA

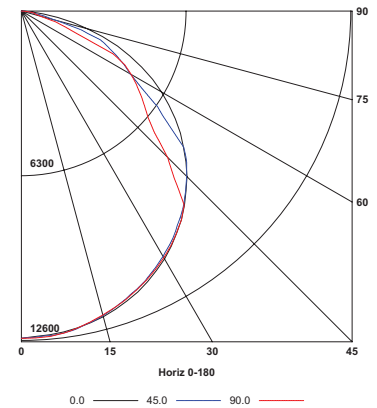
Total Luminaire Efficiency	100.0%
Total Lumens per Watt	143
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.68 based on 3000 hrs. and \$0.08 per KWH

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	9846	28.2	28.2
0-40	16304	46.6	46.6
0-60	28646	81.9	81.9
0-90	34964	100.0	100.0
0-180	34964	100.0	100.0

Test #16773 Test Date 8/12/2016

INDOOR CANDELA PLOT



LUMINAIRE DATA

Luminaire	LLHV4-50U-WST-EU LLHV VersaBay LED High Bay, Industrial 16" x 48" LED with white reflector
Ballast Driver	XI190C275V054BSG1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	52435
Watts	368.20
Mounting	Pendant
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.29 90° = 1.29
Luminous Opening in Feet	Length: 3.92 Width: 1.25 Height: 0.00

ENERGY DATA

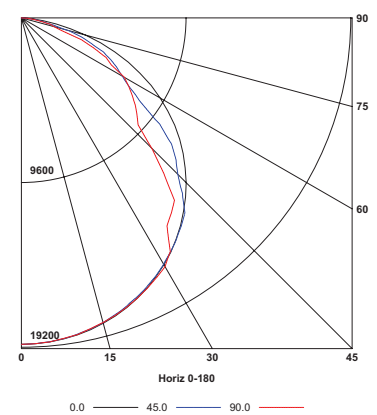
Total Luminaire Efficiency	100.0%
Total Lumens per Watt	142
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.69 based on 3000 hrs. and \$0.08 per KWH

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	14998	28.6	28.6
0-40	24736	47.2	47.2
0-60	42692	81.4	81.4
0-90	52435	100.0	100.0
0-180	52435	100.0	100.0

Test #17156 Test Date 8/9/2016

INDOOR CANDELA PLOT



CALCULATED HOURS	LLHV PREDICTED LIFE			LUMEN MAINTENANCE		
	LUMEN PACKAGE	NOMINAL LUMENS	AMBIENT OPERATING TEMP.	L70	L80	L90
	L	12,000	25	339,000	209,000	94,000
		233,000		144,000	65,000	
M	18,000	55	339,000	209,000	94,000	
			266,000	164,000	74,000	
H	24,000	25	339,000	209,000	94,000	
			217,000	134,000	60,000	
V	30,000	55	339,000	209,000	94,000	
			204,000	126,000	57,000	
X	36,000	25	339,000	209,000	94,000	
			186,000	111,000	45,000	
U	48,000	55	339,000	209,000	94,000	
			186,000	111,000	45,000	

DRIVER GENERATION COMPARISON		
OUTPUT	PREVIOUS DRIVER QTY	CURRENT DRIVER QTY
L	2	1
M	2	1
H	3	2
V	2	2
X	3	2
U	3	2

LUMEN PACKAGE	MAX. AMBIENT OPERATING TEMP.			
	NO LENS		LENS	
	No ELL14	ELL14	No ELL14	ELL14
L	65	45	60	45
M	55	45	50	45
H	55	45	50	45
V	55	45	50	45
X	55	45	50	45
U	55	45	50	45

ELL14: Factory installed emergency battery pack, 1400 lumens

LUMEN PACKAGE	MAX. AMBIENT OPERATING TEMP. (347V/480V)			
	NO LENS		LENS	
	No ELL14	ELL14	No ELL14	ELL14
L	55	NA	40	NA
M	45	NA	35	NA
H	45	NA	35	NA
V	C.F.*	NA	C.F.*	NA
X	C.F.*	NA	C.F.*	NA
U	C.F.*	NA	C.F.*	NA

ELL14: Factory installed emergency battery pack, 1400 lumens
*Consult Factory

Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces				
LLHV4-35L-NST-EU-CAWG	Low	35K	Narrow	Clear Acrylic	Wire Guard	10,898	88.6	123.0	150W - 250W Metal Halide, 2T5 HO, 4T8				
LLHV4-35L-NST-EU-CA				Clear Acrylic		11,433	88.6	129.0					
LLHV4-35L-NST-EU-CPWG				Clear Polycarbonate	Wire Guard	10,570	88.7	119.2					
LLHV4-35L-NST-EU-CP				Clear Polycarbonate		11,089	88.7	125.0					
LLHV4-35L-NST-EU-CP				Clear Polycarbonate		11,266	88.7	127.0					
LLHV4-35L-NST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	10,494	88.8	118.2					
LLHV4-35L-NST-EU-SFA				Smooth Frosted Acrylic		11,009	88.8	124.0					
LLHV4-35L-NST-EU-WG					Wire Guard	11,172	89.2	125.2					
LLHV4-35L-NST-EU						11,837	89	133.0					
LLHV4-40L-NST-EU-CAWG				40K	Wide	Wide	Clear Acrylic	Wire Guard		11,063	88.6	124.9	
LLHV4-40L-NST-EU-CA							Clear Acrylic			11,616	88.6	131.1	
LLHV4-40L-NST-EU-CPWG							Clear Polycarbonate	Wire Guard		10,730	88.7	121.0	
LLHV4-40L-NST-EU-CP							Clear Polycarbonate			12,264	88.7	138.3	
LLHV4-40L-NST-EU-SFAWG							Smooth Frosted Acrylic	Wire Guard		10,653	88.8	120.0	
LLHV4-40L-NST-EU-SFA							Smooth Frosted Acrylic			11,185	88.8	126.0	
LLHV4-40L-NST-EU-WG			Wire Guard				11,351	89.2		127.3			
LLHV4-40L-NST-EU							12,026	89		135.1			
LLHV4-40L-WST-EU-CAWG		50K	Wide				Wide	Clear Acrylic		Wire Guard	11,506	88.6	129.9
LLHV4-40L-WST-EU-CA								Clear Acrylic			12,082	88.6	136.4
LLHV4-40L-WST-EU-CPWG								Clear Polycarbonate		Wire Guard	11,159	88.7	125.8
LLHV4-40L-WST-EU-CP								Clear Polycarbonate			11,717	88.7	132.1
LLHV4-40L-WST-EU-SFAWG								Smooth Frosted Acrylic		Wire Guard	11,079	88.8	124.8
LLHV4-40L-WST-EU-SFA								Smooth Frosted Acrylic			11,632	88.8	131.0
LLHV4-40L-WST-EU-WG										Wire Guard	11,824	89.2	132.6
LLHV4-40L-WST-EU						12,453		89.2		139.6			
LLHV4-50L-NST-EU-CAWG				50K	Wide	Wide		Clear Acrylic		Wire Guard	12,043	88.6	135.9
LLHV4-50L-NST-EU-CA								Clear Acrylic			12,645	88.6	142.7
LLHV4-50L-NST-EU-CPWG								Clear Polycarbonate		Wire Guard	11,680	88.7	131.7
LLHV4-50L-NST-EU-SFAWG								Smooth Frosted Acrylic		Wire Guard	11,596	88.8	130.6
LLHV4-50L-NST-EU-SFA								Smooth Frosted Acrylic			12,176	88.8	137.1
LLHV4-50L-NST-EU-WG								Wire Guard	12,357	89.2	138.5		
LLHV4-50L-NST-EU									13,091	89	147.1		
LLHV4-50L-WST-EU-CAWG	50K	Wide	Wide				Clear Acrylic	Wire Guard	12,525	88.6	141.4		
LLHV4-50L-WST-EU-CA							Clear Acrylic		13,152	88.6	148.4		
LLHV4-50L-WST-EU-CPWG							Clear Polycarbonate	Wire Guard	12,148	88.7	137.0		
LLHV4-50L-WST-EU-CP							Clear Polycarbonate		12,755	88.7	143.8		
LLHV4-50L-WST-EU-SFAWG							Smooth Frosted Acrylic	Wire Guard	12,060	88.8	135.8		
LLHV4-50L-WST-EU-SFA							Smooth Frosted Acrylic		12,663	88.8	142.6		
LLHV4-50L-WST-EU-WG								Wire Guard	12,871	89.2	144.3		
LLHV4-50L-WST-EU									13,557	89.2	152.0		
LLHV4-35M-NST-EU-CAWG				Medium	35K	Narrow	Clear Acrylic	Wire Guard	15,254	138.4	110.2	250W - 400W Metal Halide, 4T5HO, 6T8	
LLHV4-35M-NST-EU-CA							Clear Acrylic		16,057	138.4	116.0		
LLHV4-35M-NST-EU-CPWG							Clear Polycarbonate	Wire Guard	14,583	138.4	105.4		
LLHV4-35M-NST-EU-CP							Clear Polycarbonate		15,351	138.4	110.9		
LLHV4-35M-NST-EU-SFAWG							Smooth Frosted Acrylic	Wire Guard	14,416	138.4	104.2		
LLHV4-35M-NST-EU-SFA							Smooth Frosted Acrylic		15,175	138.4	109.6		
LLHV4-35M-NST-EU-WG								Wire Guard	16,763	138.4	121.1		
LLHV4-35M-NST-EU			17,769				138.4	128.4					

Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces	
LLHV4-35M-WST-EU-CAWG	Medium	35K	Wide	Clear Acrylic	Wire Guard	15,890	138.4	114.8	250W - 400W Metal Halide, 4T5HO, 6T8	
LLHV4-35M-WST-EU-CA				Clear Acrylic		16,726	138.4	120.9		
LLHV4-35M-WST-EU-CPWG				Clear Polycarbonate	Wire Guard	15,191	138.4	109.8		
LLHV4-35M-WST-EU-CP				Clear Polycarbonate		15,991	138.4	115.5		
LLHV4-35M-WST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	15,017	138.4	108.5		
LLHV4-35M-WST-EU-SFA				Smooth Frosted Acrylic		15,807	138.4	114.2		
LLHV4-35M-WST-EU-WG						Wire Guard	17,461	138.4		126.2
LLHV4-35M-WST-EU							18,391	138.4		132.9
LLHV4-40M-NST-EU-CAWG			40K	Narrow	Clear Acrylic	Wire Guard	15,498	138.4		112.0
LLHV4-40M-NST-EU-CA					Clear Acrylic		16,314	138.4		117.9
LLHV4-40M-NST-EU-CPWG					Clear Polycarbonate	Wire Guard	14,817	138.4		107.1
LLHV4-40M-NST-EU-CP					Clear Polycarbonate		15,597	138.4		112.7
LLHV4-40M-NST-EU-SFAWG		Smooth Frosted Acrylic			Wire Guard	14,647	138.4	105.8		
LLHV4-40M-NST-EU-SFA		Smooth Frosted Acrylic				15,418	138.4	111.4		
LLHV4-40M-NST-EU-WG						Wire Guard	17,031	138.4		123.1
LLHV4-40M-NST-EU							18,053	138.4		130.4
LLHV4-40M-WST-EU-CAWG		Wide		Wide	Clear Acrylic	Wire Guard	16,144	138.4		116.6
LLHV4-40M-WST-EU-CA					Clear Acrylic		16,993	138.4		122.8
LLHV4-40M-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	15,435	138.4		111.5
LLHV4-40M-WST-EU-CP					Clear Polycarbonate		16,246	138.4		117.4
LLHV4-40M-WST-EU-SFAWG			Smooth Frosted Acrylic		Wire Guard	15,257	138.4	110.2		
LLHV4-40M-WST-EU-SFA			Smooth Frosted Acrylic			16,060	138.4	116.0		
LLHV4-40M-WST-EU-WG						Wire Guard	17,740	138.4		128.2
LLHV4-40M-WST-EU							18,685	138.4		135.0
LLHV4-50M-NST-EU-CAWG			50K	Narrow	Clear Acrylic	Wire Guard	16,871	138.4		121.9
LLHV4-50M-NST-EU-CA					Clear Acrylic		17,759	138.4		128.3
LLHV4-50M-NST-EU-CPWG					Clear Polycarbonate	Wire Guard	16,129	138.4		116.5
LLHV4-50M-NST-EU-CP					Clear Polycarbonate		16,979	138.4		122.7
LLHV4-50M-NST-EU-SFAWG		Smooth Frosted Acrylic			Wire Guard	15,944	138.4	115.2		
LLHV4-50M-NST-EU-SFA		Smooth Frosted Acrylic				16,783	138.4	121.3		
LLHV4-50M-NST-EU-WG						Wire Guard	18,539	138.4		134.0
LLHV4-50M-NST-EU							19,652	138.4		142.0
LLHV4-50M-WST-EU-CAWG		Wide		Wide	Clear Acrylic	Wire Guard	17,574	138.4		127.0
LLHV4-50M-WST-EU-CA					Clear Acrylic		18,499	138.4		133.7
LLHV4-50M-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	16,802	138.4		121.4
LLHV4-50M-WST-EU-CP					Clear Polycarbonate		17,686	138.4		127.8
LLHV4-50M-WST-EU-SFAWG	Smooth Frosted Acrylic		Wire Guard		16,608	138.4	120.0			
LLHV4-50M-WST-EU-SFA	Smooth Frosted Acrylic				17,482	138.4	126.3			
LLHV4-50M-WST-EU-WG				Wire Guard	19,312	138.4	139.5			
LLHV4-50M-WST-EU					20,340	138.4	147.0			
LLHV4-35H-NST-EU-CAWG	High	35K	Narrow	Clear Acrylic	Wire Guard	19,979	193.5	103.3	400W Metal Halide, 6T5 HO, 8T8	
LLHV4-35H-NST-EU-CA				Clear Acrylic		21,206	193.7	109.5		
LLHV4-35H-NST-EU-CP				Clear Polycarbonate		20,476	193.3	105.9		
LLHV4-35H-NST-EU-SFA				Smooth Frosted Acrylic		20,197	193.4	104.4		
LLHV4-35H-NST-EU-WG					Wire Guard	22,201	193.8	114.6		
LLHV4-35H-NST-EU						23,465	194.5	120.6		
LLHV4-35H-WST-EU-CAWG		Wide	Wide	Clear Acrylic	Wire Guard	20,827	193.5	107.6		
LLHV4-35H-WST-EU-CA				Clear Acrylic		22,105	193.7	114.1		

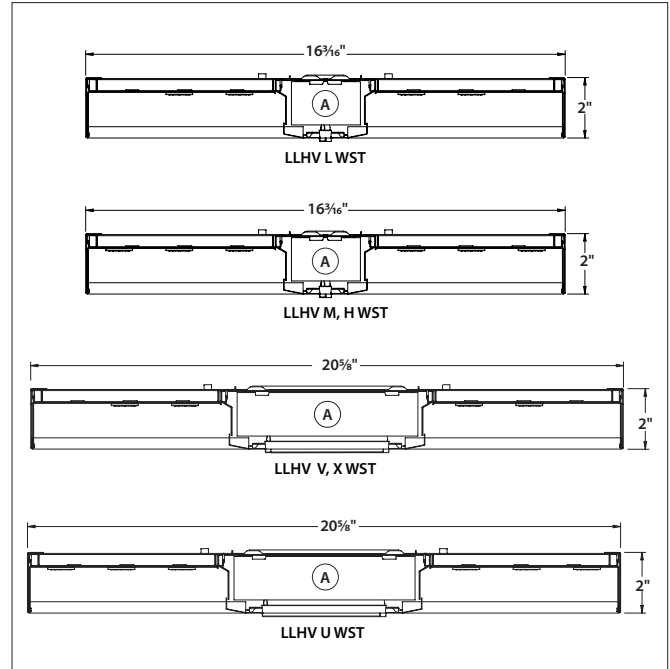
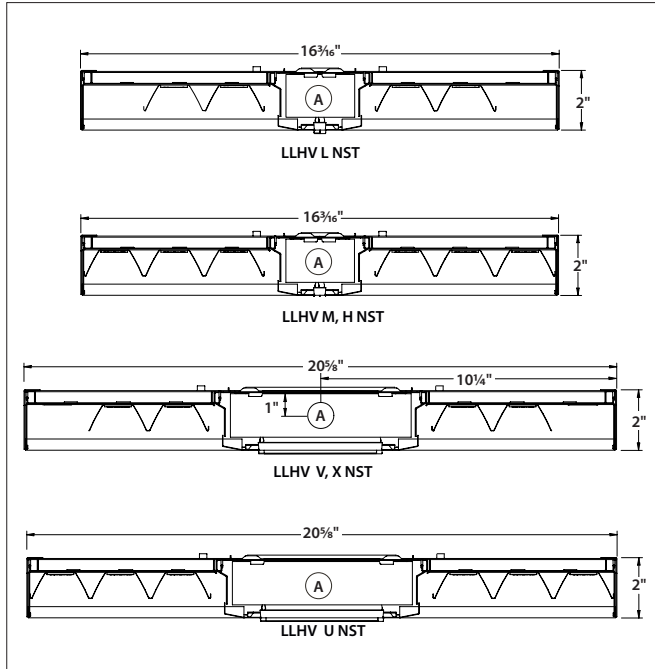
Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces			
LLHV4-35H-WST-EU-CA	High	35K	Wide	Clear Acrylic		30,651	193.7	158.2	400W Metal Halide, 6T5 HO, 8T8			
LLHV4-35H-WST-EU-CPWG				Clear Polycarbonate	Wire Guard	20,162	193.4	104.2				
LLHV4-35H-WST-EU-CP				Clear Polycarbonate		21,344	193.3	110.4				
LLHV4-35H-WST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	19,917	193.3	103.0				
LLHV4-35H-WST-EU-SFA				Smooth Frosted Acrylic		21,054	193.4	108.9				
LLHV4-35H-WST-EU-WG					Wire Guard		23,142	193.8		119.4		
LLHV4-35H-WST-EU							24,265	194.8		124.6		
LLHV4-40H-NST-EU-CAWG			40K	Narrow	Clear Acrylic	Wire Guard	20,298	193.5		104.9		
LLHV4-40H-NST-EU-CA					Clear Acrylic		21,546	193.7		111.2		
LLHV4-40H-NST-EU-CP					Clear Polycarbonate		20,803	193.3		107.6		
LLHV4-40H-NST-EU-SFA					Smooth Frosted Acrylic		20,521	193.4		106.1		
LLHV4-40H-NST-EU-WG						Wire Guard		22,556		193.8	116.4	
LLHV4-40H-NST-EU								23,840		194.5	122.6	
LLHV4-40H-WST-EU-CAWG				40K	Wide	Clear Acrylic	Wire Guard	21,144		193.5	109.3	
LLHV4-40H-WST-EU-CA						Clear Acrylic		22,443		193.7	115.9	
LLHV4-40H-WST-EU-CPWG						Clear Polycarbonate	Wire Guard	20,468		193.4	105.8	
LLHV4-40H-WST-EU-CP						Clear Polycarbonate		21,670		193.3	112.1	
LLHV4-40H-WST-EU-SFAWG						Smooth Frosted Acrylic	Wire Guard	20,220		193.3	104.6	
LLHV4-40H-WST-EU-SFA						Smooth Frosted Acrylic		21,376		193.4	110.5	
LLHV4-40H-WST-EU-WG					Wire Guard		23,496	193.8		121.2		
LLHV4-40H-WST-EU							24,653	194.8		126.6		
LLHV4-50H-NST-EU-CAWG					50K	Narrow	Clear Acrylic	Wire Guard		22,096	193.5	114.2
LLHV4-50H-NST-EU-CA							Clear Acrylic			23,454	193.7	121.1
LLHV4-50H-NST-EU-CPWG							Clear Polycarbonate	Wire Guard		21,390	193.4	110.6
LLHV4-50H-NST-EU-CP							Clear Polycarbonate			22,646	193.3	117.2
LLHV4-50H-NST-EU-SFAWG			Smooth Frosted Acrylic				Wire Guard	21,131		193.3	109.3	
LLHV4-50H-NST-EU-SFA			Smooth Frosted Acrylic					22,338		193.4	115.5	
LLHV4-50H-NST-EU-WG					Wire Guard		24,554	193.8		126.7		
LLHV4-50H-NST-EU							25,952	194.5		133.4		
LLHV4-50H-WST-EU-CAWG					50K	Wide	Clear Acrylic	Wire Guard		23,017	193.5	119.0
LLHV4-50H-WST-EU-CA	Clear Acrylic							24,432	193.7	126.1		
LLHV4-50H-WST-EU-CPWG	Clear Polycarbonate						Wire Guard	22,281	193.4	115.2		
LLHV4-50H-WST-EU-CP	Clear Polycarbonate							23,590	193.3	122.0		
LLHV4-50H-WST-EU-SFAWG	Smooth Frosted Acrylic						Wire Guard	22,012	193.3	113.9		
LLHV4-50H-WST-EU-SFA	Smooth Frosted Acrylic							23,269	193.4	120.3		
LLHV4-50H-WST-EU-WG		Wire Guard				25,577	193.8	132.0				
LLHV4-50H-WST-EU						26,837	194.8	137.8				
LLHV4-35V-NST-EU-CAWG	Very High	35K			Narrow	Clear Acrylic	Wire Guard	28,507	244.3	116.7		
LLHV4-35V-NST-EU-CA						Clear Acrylic		29,932	244.3	122.5		
LLHV4-35V-NST-EU-CPWG				Clear Polycarbonate		Wire Guard	27,578	244.3	112.9			
LLHV4-35V-NST-EU-CP				Clear Polycarbonate			28,957	244.3	118.5			
LLHV4-35V-NST-EU-SFAWG			Smooth Frosted Acrylic	Wire Guard		27,268	244.3	111.6				
LLHV4-35V-NST-EU-SFA			Smooth Frosted Acrylic			28,631	244.3	117.2				
LLHV4-35V-NST-EU-WG			Wire Guard		29,414	244.5	120.3					
LLHV4-35V-NST-EU					31,013	244.3	126.9					
LLHV4-35V-WST-EU-CAWG			35K	Wide	Clear Acrylic	Wire Guard	29,077	244.3	119.0			
LLHV4-35V-WST-EU-CA					Clear Acrylic		30,531	244.3	125.0			
LLHV4-35V-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	28,130	244.3	115.1			

Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces			
LLHV4-35V-WST-EU-CP	Very High	35K	Wide	Clear Polycarbonate		29,536	244.3	120.9	400W - 750W Metal Halide			
LLHV4-35V-WST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	27,813	244.3	113.8				
LLHV4-35V-WST-EU-SFA				Smooth Frosted Acrylic		29,204	244.3	119.5				
LLHV4-35V-WST-EU-WG					Wire Guard	30,014	244.5	122.8				
LLHV4-35V-WST-EU						31,613	244.5	129.3				
LLHV4-40V-NST-EU-CAWG				40K	Narrow	Narrow	Clear Acrylic	Wire Guard		28,963	244.3	118.6
LLHV4-40V-NST-EU-CA		Clear Acrylic					30,411	244.3		124.5		
LLHV4-40V-NST-EU-CPWG		Clear Polycarbonate	Wire Guard				28,019	244.3		114.7		
LLHV4-40V-NST-EU-CP		Clear Polycarbonate					29,420	244.3		120.4		
LLHV4-40V-NST-EU-SFAWG		Smooth Frosted Acrylic	Wire Guard				27,704	244.3		113.4		
LLHV4-40V-NST-EU-SFA		Smooth Frosted Acrylic					29,090	244.3		119.1		
LLHV4-40V-NST-EU-WG			Wire Guard		29,884	244.5	122.2					
LLHV4-40V-NST-EU					31,509	244.3	129.0					
LLHV4-40V-WST-EU-CAWG		Wide	Wide		Wide	Clear Acrylic	Wire Guard	29,542		244.3	120.9	
LLHV4-40V-WST-EU-CA						Clear Acrylic		31,019		244.3	127.0	
LLHV4-40V-WST-EU-CPWG						Clear Polycarbonate	Wire Guard	28,580		244.3	117.0	
LLHV4-40V-WST-EU-CP						Clear Polycarbonate		30,009		244.3	122.8	
LLHV4-40V-WST-EU-SFAWG						Smooth Frosted Acrylic	Wire Guard	28,258		244.3	115.7	
LLHV4-40V-WST-EU-SFA						Smooth Frosted Acrylic		29,671		244.3	121.5	
LLHV4-40V-WST-EU-WG					Wire Guard	30,495	244.5	124.7				
LLHV4-40V-WST-EU						34,964	244.5	143.0				
LLHV4-50V-NST-EU-CAWG			50K		Narrow	Narrow	Clear Acrylic	Wire Guard		31,529	244.3	129.1
LLHV4-50V-NST-EU-CA							Clear Acrylic			33,105	244.3	135.5
LLHV4-50V-NST-EU-CPWG				Clear Polycarbonate			Wire Guard	30,501		244.3	124.9	
LLHV4-50V-NST-EU-CP				Clear Polycarbonate				32,026		244.3	131.1	
LLHV4-50V-NST-EU-SFAWG		Smooth Frosted Acrylic		Wire Guard			30,158	244.3		123.4		
LLHV4-50V-NST-EU-SFA		Smooth Frosted Acrylic					31,666	244.3		129.6		
LLHV4-50V-NST-EU-WG				Wire Guard	32,532	244.5	133.1					
LLHV4-50V-NST-EU					34,301	244.3	140.4					
LLHV4-50V-WST-EU-CAWG		Wide		Wide	Wide	Clear Acrylic	Wire Guard	32,159		244.3	131.6	
LLHV4-50V-WST-EU-CA						Clear Acrylic		33,767		244.3	138.2	
LLHV4-50V-WST-EU-CPWG						Clear Polycarbonate	Wire Guard	31,111		244.3	127.3	
LLHV4-50V-WST-EU-CP						Clear Polycarbonate		32,667		244.3	133.7	
LLHV4-50V-WST-EU-SFAWG						Smooth Frosted Acrylic	Wire Guard	30,762		244.3	125.9	
LLHV4-50V-WST-EU-SFA						Smooth Frosted Acrylic		32,299		244.3	132.2	
LLHV4-50V-WST-EU-WG					Wire Guard	33,196	244.5	135.8				
LLHV4-50V-WST-EU					34,964	244.5	143.0					
LLHV4-35X-NST-EU-CAWG	Extra High			35K	Narrow	Clear Acrylic	Wire Guard	32,502	285.9	113.7		
LLHV4-35X-NST-EU-CA						Clear Acrylic		34,127	285.9	119.4		
LLHV4-35X-NST-EU-CPWG			Clear Polycarbonate			Wire Guard	31,442	285.9	110.0			
LLHV4-35X-NST-EU-CP			Clear Polycarbonate				33,014	285.9	115.5			
LLHV4-35X-NST-EU-SFAWG		Smooth Frosted Acrylic	Wire Guard			31,089	285.9	108.7				
LLHV4-35X-NST-EU-SFA		Smooth Frosted Acrylic				32,643	285.9	114.2				
LLHV4-35X-NST-EU-WG			Wire Guard	33,356	286.7	116.3						
LLHV4-35X-NST-EU				35,359	285.9	123.7						
LLHV4-35X-WST-EU-CAWG		Wide	Wide	Wide	Clear Acrylic	Wire Guard	33,152	285.9	116.0			
LLHV4-35X-WST-EU-CA					Clear Acrylic		34,810	285.9	121.8			
LLHV4-35X-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	32,071	285.9	112.2			

Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces					
LLHV4-35X-WST-EU-CP	Extra High	35K	Wide	Clear Polycarbonate		33,674	285.9	117.8	750W - 1,000W Metal Halide					
LLHV4-35X-WST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	31,711	285.9	110.9						
LLHV4-35X-WST-EU-SFA				Smooth Frosted Acrylic		33,296	285.9	116.5						
LLHV4-35X-WST-EU-WG					Wire Guard	34,037	286.7	118.7						
LLHV4-35X-WST-EU						35,850	286.7	125.0						
LLHV4-40X-NST-EU-CAWG		Extra High	40K	Narrow	Clear Acrylic	Wire Guard	33,022	285.9		115.5				
LLHV4-40X-NST-EU-CA					Clear Acrylic		34,673	285.9		121.3				
LLHV4-40X-NST-EU-CPWG					Clear Polycarbonate	Wire Guard	31,945	285.9		111.7				
LLHV4-40X-NST-EU-CP					Clear Polycarbonate		33,542	285.9		117.3				
LLHV4-40X-NST-EU-SFAWG					Smooth Frosted Acrylic	Wire Guard	31,586	285.9		110.5				
LLHV4-40X-NST-EU-SFA					Smooth Frosted Acrylic		33,166	285.9		116.0				
LLHV4-40X-NST-EU-WG						Wire Guard	33,890	286.7		118.2				
LLHV4-40X-NST-EU							35,925	285.9		125.7				
LLHV4-40X-WST-EU-CAWG					Wide	Wide		Clear Acrylic		Wire Guard	33,682	285.9	117.8	
LLHV4-40X-WST-EU-CA								Clear Acrylic			35,367	285.9	123.7	
LLHV4-40X-WST-EU-CPWG								Clear Polycarbonate		Wire Guard	32,584	285.9	114.0	
LLHV4-40X-WST-EU-CP								Clear Polycarbonate			34,213	285.9	119.7	
LLHV4-40X-WST-EU-SFAWG								Smooth Frosted Acrylic		Wire Guard	32,218	285.9	112.7	
LLHV4-40X-WST-EU-SFA								Smooth Frosted Acrylic			33,829	285.9	118.3	
LLHV4-40X-WST-EU-WG										Wire Guard	34,581	286.7	120.6	
LLHV4-40X-WST-EU								36,423		286.7	127.0			
LLHV4-50X-NST-EU-CAWG			50K	Narrow						Clear Acrylic	Wire Guard	35,947	285.9	125.7
LLHV4-50X-NST-EU-CA										Clear Acrylic		37,745	285.9	132.0
LLHV4-50X-NST-EU-CPWG										Clear Polycarbonate	Wire Guard	34,775	285.9	121.6
LLHV4-50X-NST-EU-CP										Clear Polycarbonate		36,514	285.9	127.7
LLHV4-50X-NST-EU-SFAWG										Smooth Frosted Acrylic	Wire Guard	34,384	285.9	120.3
LLHV4-50X-NST-EU-SFA										Smooth Frosted Acrylic		36,104	285.9	126.3
LLHV4-50X-NST-EU-WG											Wire Guard	36,892	286.7	128.7
LLHV4-50X-NST-EU							39,107			285.9	136.8			
LLHV4-50X-WST-EU-CAWG					Wide	Wide				Clear Acrylic	Wire Guard	36,666	285.9	128.2
LLHV4-50X-WST-EU-CA										Clear Acrylic		38,499	285.9	134.7
LLHV4-50X-WST-EU-CPWG				Clear Polycarbonate				Wire Guard		35,470	285.9	124.1		
LLHV4-50X-WST-EU-CP				Clear Polycarbonate						37,244	285.9	130.3		
LLHV4-50X-WST-EU-SFAWG				Smooth Frosted Acrylic				Wire Guard		35,072	285.9	122.7		
LLHV4-50X-WST-EU-SFA				Smooth Frosted Acrylic						36,825	285.9	128.8		
LLHV4-50X-WST-EU-WG								Wire Guard		37,644	286.7	131.3		
LLHV4-50X-WST-EU					39,650	286.7	138.3							
LLHV4-35U-NST-EU-CAWG			Ultra High	35K	Narrow	Clear Acrylic	Wire Guard	40,141		368.1	109.0			
LLHV4-35U-NST-EU-CA						Clear Acrylic		42,254		368.1	114.8			
LLHV4-35U-NST-EU-CPWG						Clear Polycarbonate	Wire Guard	38,377		368.1	104.3			
LLHV4-35U-NST-EU-CP	Clear Polycarbonate						40,397	368.1	109.7					
LLHV4-35U-NST-EU-SFAWG	Smooth Frosted Acrylic					Wire Guard	37,936	368.1	103.1					
LLHV4-35U-NST-EU-SFA	Smooth Frosted Acrylic						39,932	368.1	108.5					
LLHV4-35U-NST-EU-WG						Wire Guard	44,111	368.1	119.8					
LLHV4-35U-NST-EU							46,659	368.4	126.7					
LLHV4-35U-WST-EU-CAWG	Wide	Wide			Clear Acrylic	Wire Guard	40,960	368.1	111.3					
LLHV4-35U-WST-EU-CA					Clear Acrylic		43,116	368.1	117.1					
LLHV4-35U-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	39,160	368.1	106.4					

Lumen Package	Output	Color	Distribution	Lens	Wire Guard	Lumens	Watts	LPW	Typically Replaces		
LLHV4-35U-WST-EU-CP	Ultra High	35K	Wide	Clear Polycarbonate		41,221	368.1	112.0	1,000W Metal Halide		
LLHV4-35U-WST-EU-SFAWG				Smooth Frosted Acrylic	Wire Guard	38,710	368.1	105.2			
LLHV4-35U-WST-EU-SFA				Smooth Frosted Acrylic		40,747	368.1	110.7			
LLHV4-35U-WST-EU-WG					Wire Guard	45,011	368.1	122.3			
LLHV4-35U-WST-EU						47,409	368.2	128.8			
LLHV4-40U-NST-EU-CAWG		Ultra High	40K	Narrow	Clear Acrylic	Wire Guard	40,784	368.1		110.8	
LLHV4-40U-NST-EU-CA					Clear Acrylic		42,930	368.1		116.6	
LLHV4-40U-NST-EU-CPWG					Clear Polycarbonate	Wire Guard	38,991	368.1		105.9	
LLHV4-40U-NST-EU-CP					Clear Polycarbonate		41,043	368.1		111.5	
LLHV4-40U-NST-EU-SFAWG					Smooth Frosted Acrylic	Wire Guard	38,543	368.1		104.7	
LLHV4-40U-NST-EU-SFA					Smooth Frosted Acrylic		40,571	368.1		110.2	
LLHV4-40U-NST-EU-WG					Wire Guard	44,817	368.1	121.8			
LLHV4-40U-NST-EU						47,405	368.4	128.7			
LLHV4-40U-WST-EU-CAWG				Wide	Wide	Clear Acrylic	Wire Guard	41,616		368.1	113.1
LLHV4-40U-WST-EU-CA						Clear Acrylic		43,806		368.1	119.0
LLHV4-40U-WST-EU-CPWG						Clear Polycarbonate	Wire Guard	39,787		268.1	148.4
LLHV4-40U-WST-EU-CP						Clear Polycarbonate		41,880		368.1	113.8
LLHV4-40U-WST-EU-SFAWG			Smooth Frosted Acrylic			Wire Guard	39,329	368.1		106.8	
LLHV4-40U-WST-EU-SFA			Smooth Frosted Acrylic				41,399	368.1		112.5	
LLHV4-40U-WST-EU-WG					Wire Guard	45,730	368.1	124.2			
LLHV4-40U-WST-EU						48,168	368.2	130.8			
LLHV4-50U-NST-EU-CAWG			50K		Narrow	Clear Acrylic	Wire Guard	44,396		368.1	120.6
LLHV4-50U-NST-EU-CA						Clear Acrylic		46,733		368.1	127.0
LLHV4-50U-NST-EU-CPWG						Clear Polycarbonate	Wire Guard	42,445		368.1	115.3
LLHV4-50U-NST-EU-CP						Clear Polycarbonate		44,679		368.1	121.4
LLHV4-50U-NST-EU-SFAWG				Smooth Frosted Acrylic		Wire Guard	41,957	368.1		114.0	
LLHV4-50U-NST-EU-SFA				Smooth Frosted Acrylic			44,165	368.1		120.0	
LLHV4-50U-NST-EU-WG						Wire Guard	48,787	368.1		132.5	
LLHV4-50U-NST-EU							51,604	368.4		140.1	
LLHV4-50U-WST-EU-CAWG				Wide		Clear Acrylic	Wire Guard	45,302		368.1	123.1
LLHV4-50U-WST-EU-CA					Clear Acrylic		47,686	368.1		129.5	
LLHV4-50U-WST-EU-CPWG					Clear Polycarbonate	Wire Guard	43,311	368.1		117.7	
LLHV4-50U-WST-EU-CP					Clear Polycarbonate		45,590	368.1		123.9	
LLHV4-50U-WST-EU-SFAWG	Smooth Frosted Acrylic				Wire Guard	42,813	368.1	116.3			
LLHV4-50U-WST-EU-SFA	Smooth Frosted Acrylic					45,066	368.1	122.4			
LLHV4-50U-WST-EU-WG					Wire Guard	49,782	368.1	135.2			
LLHV4-50U-WST-EU						52,434	368.2	142.4			

DIMENSIONAL DATA



A: 7/8" Knock-out. Typically used for optional sensor feed and placement.

L1b - OPTION 2



S9910

25T5/LED/46-840/DR
 25 watt T5 LED; Miniature bi-pin base; 4000K; 50000 average rated hours; 3500 lumens



Features

- Direct Replacement - for use on Electronic ballasts with no rewiring required*
- Replaces F54T5/HO linear fluorescent lamps
- High efficacy
- Long life
- Approved for enclosed luminaires
- DLC Qualified
- 5 year Limited warranty

S9910

*May not be compatible with all rapid start ballasts.

Ballast required

View:

[Ballast Compatibility Chart](#)

Item Number	UPC	Watts	Lamp Shape	Base	ANSI Base	Lamp Code	Finish
S9910	045923099106	25	T5	Miniature Bi-Pin	G5	25T5/LED/46-840/DR	White
MOL In Inches	Initial Lumens	Average Rated Hours	Kelvin Temp	Color	CRI	Beam Spread Deg	Pack
48"	3500	50000	4000	Cool White	82	185	10
DLC ID:	RoHS Compliant	UL or ETL Listed	UL Classification		Warranty		
P64M3Q86; PQ27DQKH DLC Search	Yes	Yes	cULus Classified - Damp Location Rated		5 Year Limited		



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Brentwood, NY 11717
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Fax 631.243.2027





LED T5 Ballast Compatibility Chart

Ballast Brand*	Part Number	# Of Lamps	Start Method	Lamp Connection	1 Lamp		2 Lamps		3 Lamps		4 Lamps	
					120V	277V	120V	277V	120V	277V	120V	277V
Eiko	PM-4X54T5 UNV PS	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Eiko	PM-2X54T5 UNV PS	2	PS	Series	✓	P	✓	✓	-	-	-	-
Espen	VE254MVHRP	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Espen	VE254MVHRP(11101)	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Espen	VE454MVHRP(11100)	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Espen	VE454MVHRP(11047)	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Fulham	RHA-UNV-254-LT5	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Fulham	RHA-UNV-454-LT5	4	PS	Series	-	-	-	-	✓	✓	✓	✓
General Electric	GE454MVPS90-F	4	PS	Parallel	-	-	-	-	✓	✓	✓	✓
General Electric	GE254MVPS90-A	2	PS	Parallel	✓	✓	✓	✓	-	-	-	-
General Electric	GE454MVPS90-E-S	4	PS	Parallel	-	-	-	-	✓	✓	✓	✓
Howard Industries	EP2/54HO/PRS/MV/W/MC	2	PRS	Series	✓	✓	✓	✓	-	-	-	-
Howard Industries	EP2/54HO/PRS/MV/W/SC	2	PRS	Series	✓	P	✓	✓	-	-	-	-
Howard Industries	EP4/54HO/PRS/MV	4	PRS	Series	-	-	-	-	✓	✓	✓	✓
Keystone	KTEB-254HO-UV-TP-PS	2	PS	Parallel	✓	P	✓	✓	-	-	-	-
Keystone	KTEB-254HO-UV-PS-SL	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Keystone	KTEB-454HO-UV-PS	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Lumapro	4KGE7A EB-454PRS-U	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Maxlite	SKEU542HOP	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Osram	QTP 4x54T5HO/UNV PSN HT W	4	PRS	Series	-	-	-	-	✓	P	✓	P
Osram	QHE 4x54T5HO/347-480 PSN HT SCL	4	PRS	Series	-	-	-	-	347V✓	480V✓	347V,NC	480V,NC
Osram Sylvania	QHE 2x54T5HO/UNV PSN	2	PRS	Series	✓	P	✓	✓	-	-	-	-
Osram Sylvania	QTP 4x54T5HO/UNV PSN HT W	4	PRS	Series	-	-	-	-	✓	P	✓	P
Osram Sylvania	QTP 2x54T5HO/347-480 PSN HT	2	PRS	Series	347V✓	480V✓	347V✓	480V✓	-	-	-	-
Osram Sylvania	QHE 2x54T5HO/347-480 PSN HT MCL	2	PRS	Series	347V✓	480V✓	347V,NC	480V,NC	-	-	-	-
Osram Sylvania	QHE 2x54T5HO/UNV PSN HT	2	PRS	Series	✓	P	✓	✓	-	-	-	-
Osram Sylvania	QHE 2x54T5HO/UNV PSN	2	PRS	Series	✓	P	✓	✓	-	-	-	-
Osram Sylvania	QTP 1x54T5HO/UNV PSN	1	PRS	NA	✓	✓	-	-	-	-	-	-
Osram Sylvania	QHE 4x54T5HO/UNV PSN HT SCL	4	PRS	Series	-	-	-	-	✓	✓	✓	✓
Osram Sylvania	QS 2x54T5HO/UNV PS80-SC	2	PRS	Series	NC	NC	NC	NC	-	-	-	-
Philips-Advance	ICN-2554-90C-N	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Philips-Advance	ICN-2554-90C-T	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Philips-Advance	ICN-4554-90C-2LS-G	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Philips-Advance	HCN-2554-90C-WL	2	PS	Series	347V✓	480V✓	347V✓	480V✓	-	-	-	-
Philips-Advance	ICN-2554-T	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Philips-Advance	HCN-4554-90C-2LS-G	4	PS	Series	-	-	-	-	347V,F	480V,F	347V,F	480V,F
Philips-Advance	ICN-2554-N	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Philips-Advance	ICRP-4PSP54-90C	4	PS	Series	-	-	-	-	NC	NC	NC	NC
Plusrite	BAF254PS/MV	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Plusrite	BAF454PS/MV	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Robertson	PST154T5MVV	1	PS	NA	✓	✓	-	-	-	-	-	-
Robertson	PSL254T5MV	2	PS	Series	✓	P	✓	✓	-	-	-	-
Robertson	PSY454T5MVEL(3P20147)	4	PS	Series	-	-	-	-	✓	✓	✓	✓
Sunpark	U-2/54T5HO	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Tcp	E2P54PRUNVE	2	PS	Series	✓	✓	NC	✓	-	-	-	-
Ultrasave	ER254120MHT-W	2	PS	Series	F	F	✓	✓	-	-	-	-
Universal Lighting Technologies	B254PUNVHB-D	2	PS	Series	NC	NC	NC	NC	-	-	-	-
Universal Lighting Technologies	B454PUNVHB-E	4	PRS	Series	-	-	-	-	NC	NC	NC	NC
Universal Lighting Technologies	B454PUNV-E	4	PRS	Series	-	-	-	-	NC	NC	NC	NC
Universal Lighting Technologies	B254PUNV-D	2	PS	Series	NC	NC	NC	NC	-	-	-	-
Watran	DB-254HO-MV-TP-PS-SL	2	PS	Series	✓	✓	✓	✓	-	-	-	-
Watran	DB-4M54-PS-MV-90	4	PS	Series	-	-	-	-	✓	P	✓	✓

F Flicker after >2s start-up
N Acoustic noise >20dB
P PF <0.85
T THD >25%
NC Not compatible
NA Not applicable

Ballast Factors:
 L - Low
 N - Normal
 H - High

Applies to the following Satco products: **S9710, S9711, S9712**
S9910, S9911, S9912

This list is current as of May, 2017. We are continuously testing for compatible ballasts. Please check back for updates.

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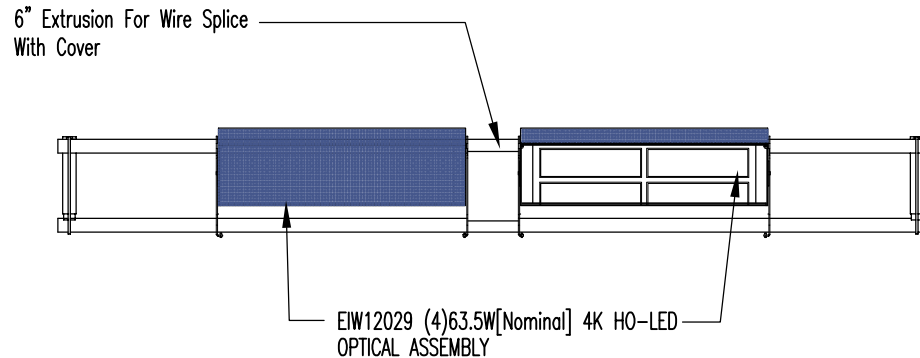
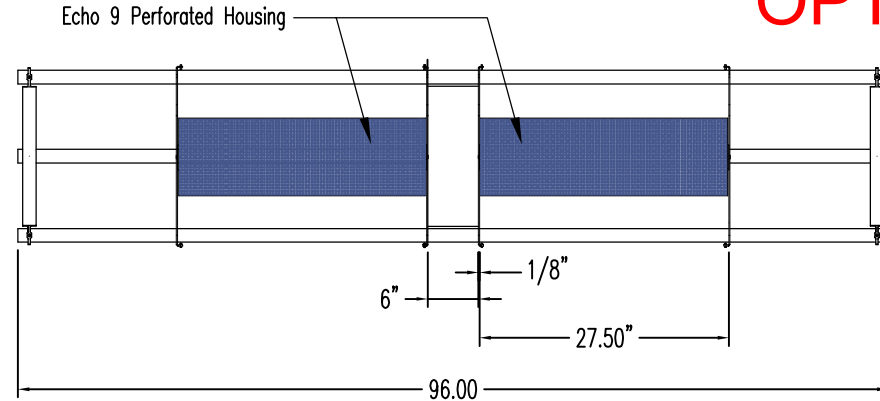
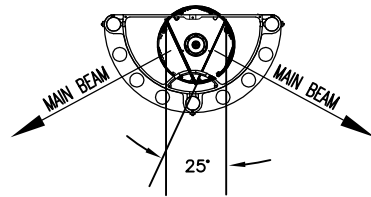
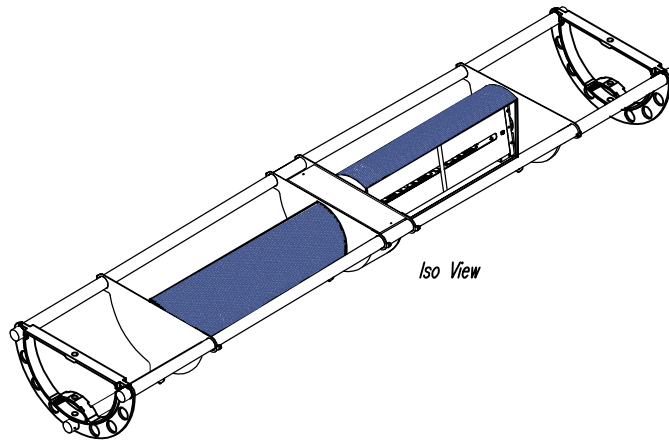
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LT-Modified (2)EIW12029-L254W WW(Wall-Wash) Section -- SPECIFICATION SUBMITTAL

L1c
L1Ec
OPTION 3

CATALOG NO.	OPTICAL	LENS	WATTS/KELVIN/TYPE	LIGHT SOURCE	LIGHT DISTRIBUTION
LT XXXXXX	(2)LT(MOD)--EIW12029 4M WW	Acrylic-Satin Ice	(2)L254W/4000K/HO-LED	LED	DIRECT - FORWARD THROW



HOUSING: Constructed of powder coated aluminum with corrosive resistant material. Six Inch Extrusion for wire splice also composed of Aluminum.

LENS: Constructed of a diffuse acrylic material.

***Per Optic**
LAMPING: Provisions for (4), 63.5[Nominal] watt LED modules, IP68 rated, 60 degree flood but aimed at 35 degrees 4000k, 80CRI, & with an IP68 rated connector.

***Per Optic**
POWER SUPPLY: Provided with (2), 150 watt power supplies, integrally mounted, encased and potted, thermally protected, 120 thru 277 option on voltage.
Manufacturer: Philips X1150C105V140CNF1 (1 or 2 Modules)

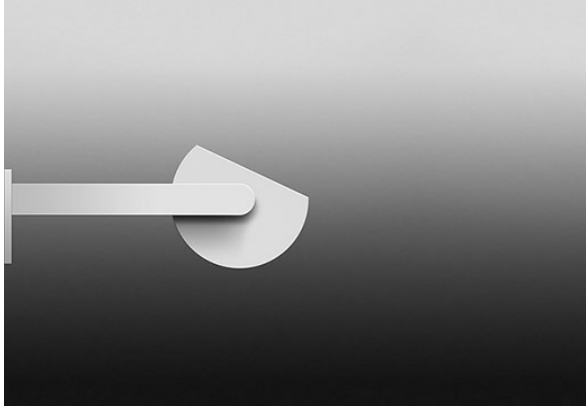
FINISH: All surface materials are thoroughly cleaned and treated prior to being coated with a 2 mil thickness of thermoset powder coat polyester paint. Specify painted color when ordering.

ECHO ROUND 9.0 LED INTERIOR WALL
EIW12055

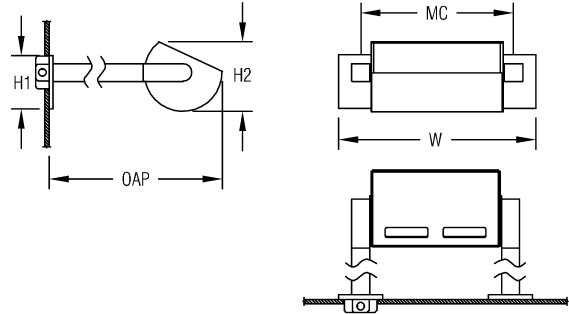
JOB NAME

L1Wc
L1WEc
OPTION 3

TYPE



Echo Round 9.0, now available in LED, is designed to address large, high-ceiling spaces such as atriums, gymnasiums, libraries, natoriums and open office spaces. A vast lamping range with various lumen packages available, up to 40,000 lumens, the Echo 9.0 delivers premium indirect lighting with a smooth, uniform, forward throw output. The Echo Round 9.0 LED is designed with a solid aluminum housing, encompassing the latest technology in a traditional shape to seamlessly integrate into the space.



Dimensions

W	OAP	MC	H1	H2
22.5 in	22.5 in	17.5 in	6.0 in	7.8 in
57.2 cm	57.2 cm	44.4 cm	15.2 cm	19.8 cm

Weight

Shipping weight: 25.0 lb (11.4 kg).

Features

- TL (top lens) standard with any LED module.
- IP68 light engines, connectors and fully potted drivers stand up to harsh natorium environments
- Extruded aluminum construction provides durable protection for internal components and is recyclable.
- Cast aluminum end caps protect internal components and are recyclable.
- All visible fasteners are flush mounted, providing a clean design.
- Field adjustable housing locks into position, enabling precise fixture alignment for high-quality design performance.
- Standard with LED.
- Standard thermoset polyester powder coat paint provides durable protection in a palette of color options. Custom colors available upon request.

Technical Notes

Electrical

- SPI uses strict quality guidelines in LED selection to ensure the White LED's we use meet or exceed ANSI Binning Standards (ANSI C78.733)
- ETL listed to UL standards (US & Canada) for use in damp locations; not recommended for exterior applications
- 0-10v dimmable power supply standard with white LEDs.

Finish

- Housing and mounting components painted to match, unless otherwise specified.

Lamping/lamp

- L70 life=50,000+ hours
- Max Ambient Operating temp = 28°C (82°F).
- Delivered lumens shown are at 4000K CCT; apply multiplier for delivered lumens at other CCT

Mounting

- For indirect use only.
- Aluminum cover fits over a standard 4" octagonal junction box.

Stem

- Horizontal stem versions include 1 1/2" aluminum stems and square canopies.

Additional Documents

[Color Chart \(http://www.spilighting.com/PDFs/SPI_Color_Chart.pdf\)](http://www.spilighting.com/PDFs/SPI_Color_Chart.pdf)

MODEL NUMBER	LIGHT SOURCE	FINISH	VOLTAGE	LAMP OPTIONS	OPTIONS
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Not all options are available in all configurations, consult factory for details.

Light Source	Photometry	Voltage	Options
L127W	White 127W LED Light Engine Delivered Lumens: 12,430	ECHO 9 16IN LED	120-277V Universal Voltage
		Lamp Options	CS Cut-Off Shield
		3500K ¹ 3500K CCT	F Fusing
		4000K 4000K CCT	

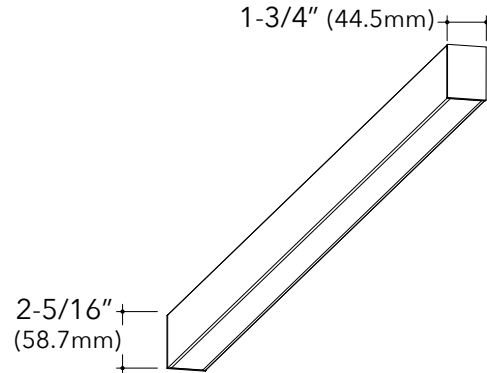
¹ Apply .91 multiplier for delivered lumens

Painted Finishes

PT01 Super White	PT07 Light Taupe	PT13 Warm Gray	PT19 Blue	PT29 Red Brass	PT42 Sky Blue	PT48 Brass
PT02 White	PT08 Medium Taupe	PT14 Light Gray	PT20 Dark Green	PT31 Medium Bronze	PT43 Teal	PT49 Bronze
PT03 Morning Light	PT09 Medium Gray	PT15 Sage	PT21 Pearl White	PT32 Dark Bronze	PT44 Green	PT51 Matte White
PT04 Warm White	PT10 Dark Gray	PT16 Spruce	PT22 Platinum	PT33 Dark Blue	PT45 Purple	
PT05 Putty	PT11 Black	PT17 Red	PT27 Deep Copper	PT40 Yellow	PT46 Aluminum	
PT06 Warm Beige	PT12 Dark Chocolate	PT18 Deep Red	PT28 Dark Stainless	PT41 Orange	PT47 Deep Red Brass	



SUSPENDED DIRECT LINEAR LUMINAIRE



- 6063-T5 Extruded aluminum housing
- Requires a remote driver
- Highly reflective die-formed white painted reflector
- Requires a remote mounted driver
- 5-year limited warranty covers LED, driver and fixture
- UL and cUL listed
- Approved for dry/damp location unless otherwise noted
- Maximum weight is 10 lbs. for a standard 4' fixture
- Buy American Act compliant





Approvals & Certifications

Construction: 6063-T5 Extruded aluminum housing. Highly reflective die-formed white painted reflector.

Shielding: Diffuse snap-in acrylic lens with matte finish, removable for maintenance.

Mounting: Aircraft cable and wall mount available. Straight aircraft cable mounts on 4'-0" (1219.2mm) and 8'-0" (2438.4mm) centers Aircraft Cable supplied with 5" (127mm) power and 2" (50.8mm) non-power canopies. Refer to installation instructions for appropriate ceiling detail. Canopies are painted white unless otherwise specified. Maximum fixture weight is 10 lbs for a standard 4' fixture.

LED: 25°C test environment. Lumen output/wattage has a margin of +/- 5%. All luminaire configurations tested in accordance with IES LM-79. Diodes tested in accordance with IES LM-80. Minimum lifetime greater than 60,000 hours. L70 = 124,900 hours and L90 = 37,200 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output: Two lumen packages available. Standard and High (HO). Custom outputs are available. Specify custom lumens or watts between standard offering listed on CRI, CCT & Output page. 80 CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 80 CRI = R9≥19 and 90 CRI = R9≥61.

Voltage: Universal (U), 120 volt (1), 277 volt (2) and 347 volt (3) options available. Must specify OL3 in Driver section when 347 volt (3) is selected. Some EX configurations will not accommodate all voltage options; consult with factory.

Driver: Standard Remote Driver Option is Osram 0-10V, 10% = OL1. Requires remote mounted driver (enclosure provided). Distance from remote box to fixture cannot exceed 10 ft; consult factory for details. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 50,000 hours at 25°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 96°F/35°C. For more driver options, see Pinnacle Resource Guide. Some EX configurations will not accommodate all driver options.

Circuiting: Select from single circuit (1), Emergency circuit (E) or Night Light circuit (N). Some EX configurations will not accommodate all circuiting options; consult with factory.

Battery & Emergency: Select remote battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test button is remote to fixture. For more Battery options, see

Pinnacle Resource Guide.

Finish: Standard powder-coat textured white, metallic silver, graphite, textured black or bronze painted finish; consult factory for chip of standard paint finishes. Canopies painted white unless specified differently in the options section of the part number. Contact factory for additional custom color and finish options.

Controls: Consult factory.

Labels: UL and cUL Listed. Standard and HO lumen packages are approved for dry/damp location unless otherwise noted.

Fixture Weight: Maximum fixture weight is 10 lbs for a standard 4' fixture.

Buy American Act Compliant

Warranty: EX LED offered with a 5-year limited warranty. Covers LED, driver and fixture.



create**change**

FEATURES

- LED technology in a lensed striplight
- Long life 50,000 hour LEDs at L80 for reduced maintenance
- Up to 144 lumens per watt
- Choice of four LED color temperatures
- Superior color consistency within a 3-step MacAdam ellipse and greater than 80 CRI
- Choice of four lumen packages per size
- Available in 2', 4' or 8' lengths
- Optional integral emergency battery pack
- Heavy die-formed steel channel with 100% acrylic formed diffuser
- Fully assembled fixture for quick installation
- LED boards and driver accessible for future maintenance or upgrades
- Modular replaceable LED components
- Surface mount, wall mount or suspended
- Maximum temperature 35°C on all lumen packages up to HL
- DesignLights Consortium® (DLC) qualified with many configurations qualifying for DLC Premium
- Five year warranty

PROJECT INFORMATION

Project Name _____

Type _____

Catalog No. _____

Date _____

CONSTRUCTION

Housing, wireway, and ends are formed from code-gauge steel. Housing components act as heat sink for LED heat dissipation. Knockouts are provided for electrical access and mounting. Shielded with 100% frosted prismatic acrylic lens.

FINISH

White painted parts are treated with a five-stage phosphate bonding process and finished with high reflectance baked enamel. For a post-painted housing finish select PAF option.

ELECTRICAL

Long-life LEDs are rated for 50,000 hours at L80 lumen maintenance. Driver options include fixed output for on/off function, step dimming (high/low/off) or continuous 0-10V dimming.

CERTIFICATION

All luminaires are built to UL 1598 and 2108 standards, and bear appropriate CSA c/US labels. Damp location labeling is standard. Emergency equipped fixtures labeled UL924. Adheres to LM70, LM80, and TM21 industry standards. DesignLights Consortium®(DLC) and DLC Premium qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org.

WARRANTY

Five year warranty (Terms and Conditions apply).

ORDERING INFORMATION

EXAMPLE LCL4-40HL-EU

LCL							-		-		-	
MODEL	SIZE	COLOR TEMP	LUMEN OUTPUT	DRIVER	VOLTAGE	OPTIONS						
LCL LED Striplight	2 2'	30 3000K	LW Low Watt	E Fixed Output	U 120V-277V	ELL14 Emergency Battery Pack, 1400 Lumens ^{1,2} GLR Fast Blow Fuse PAF Paint After Fabrication NYC NYC Compliant						
	4 4'	35 3500K	ML Medium Lumen	ESD Step Dimming ⁴	347 347V (E,ED,ED1 only)							
	8 8'	40 4000K	HL High Lumen	ED 0-10V Dimming								
		50 5000K	VL Very High Lumen See Product Availability Table below.	ED1 0-10V 1% Dimming								
				LUTH Hi-lume 1% EcoSystem LED driver with Soft-on, Fade-to-Black dimming technology ³								
				LUTS 5-Series EcoSystem LED driver ³								

ACCESSORIES (ORDER SEPARATELY)

S18 18" Stem, Canopy

SS18 18" Swivel Stem—45° Swivel

CSHC Chain Hanger Assembly

LCLWG4 4' Wire Guard, 2 Required for 8' Fixture

¹ For compatibility with Dual-Lite LiteGear® inverters in lieu of installed battery pack, contact Hubbell Lighting representative.

² Not available in 2 ft size.

³ Not available in VL packages.

⁴ Only available in 4' ML, HL & VL packages.

Product Availability			
Lumen Package	Lumens	Watts	LPW
LCL2-30ML-EU	2713	24	115
LCL2-35ML-EU	2805	24	119
LCL2-40ML-EU	2849	24	121
LCL2-50ML-EU	2925	24	124
LCL4-30LW-EU	2491	19	133
LCL4-35LW-EU	2576	19	138
LCL4-40LW-EU	2616	19	140
LCL4-50LW-EU	2686	19	144
LCL4-30ML-EU	5154	42	123
LCL4-35ML-EU	5329	42	127
LCL4-40ML-EU	5411	42	129
LCL4-50ML-EU	5556	42	132
LCL4-30HL-EU	6185	52	119
LCL4-35HL-EU	6395	52	123
LCL4-40HL-EU	6494	52	125
LCL4-50HL-EU	6667	52	128
LCL4-30VL-EU	9904	85	116
LCL4-35VL-EU	10241	85	120
LCL4-40VL-EU	10400	85	122
LCL4-50VL-EU	10677	85	125
LCL8-30LW-EU	4983	38	131
LCL8-35LW-EU	5152	38	138
LCL8-40LW-EU	5232	38	140
LCL8-50LW-EU	5371	38	144
LCL8-30ML-EU	10308	84	123
LCL8-35ML-EU	10658	84	127
LCL8-40ML-EU	10823	84	129
LCL8-50ML-EU	11111	84	132
LCL8-30HL-EU	12369	104	119
LCL8-35HL-EU	12790	104	123
LCL8-40HL-EU	12988	104	125
LCL8-50HL-EU	13334	104	128
LCL8-30VL-EU	19809	170	116
LCL8-35VL-EU	20482	170	120
LCL8-40VL-EU	20799	170	122
LCL8-50VL-EU	21354	170	125

Lumens vary according to color temperature and other factors.
See specific photometric test(s).

Test #17788 Test Date 12/14/2016

PHOTOMETRIC DATA

LUMINAIRE DATA

Luminaire	LCL4-40HL-EU LCL LED Lensed Utility Channel, Industrial 48" x 4½ x 3¼" LED with frosted linear prisms lens
Ballast	XI054C150V054BST1
Ballast Factor	1.00
Lamp	LED
Fixture Lumens	6494
Watts	51.90
Shielding Angle	0° = 90 90° = 90
Spacing Criterion	0° = 1.20 90° = 1.28
Luminous Opening in Feet	Length: 4.00 Width: 0.38 Height: 0.15

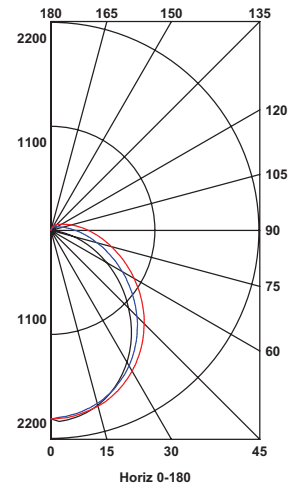
ZONAL LUMEN SUMMARY

Zone	Lumens	Lamp	Fixt.
0-30	1535	23.6	23.6
0-40	2500	38.5	38.5
0-60	4385	67.5	67.5
0-90	5944	91.5	91.5
0-180	6494	100.0	100.0

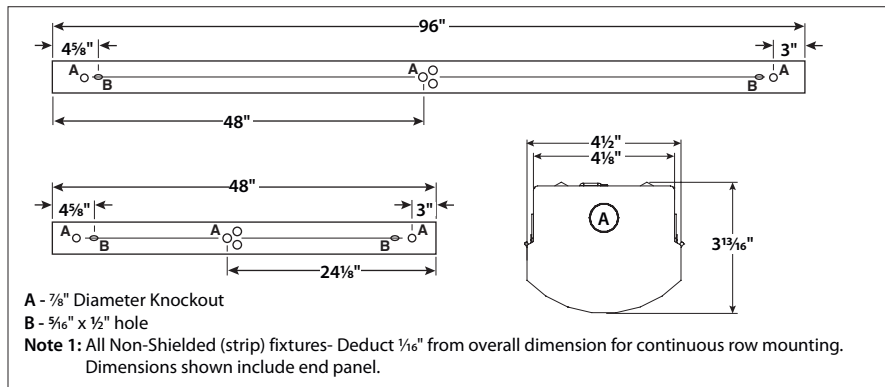
ENERGY DATA

Total Luminaire Efficiency	100.0
Total Lumens per Watt	125
ANSI/IESNA RP-1-2004 Compliance	Noncompliant
Comparative Yearly Lighting Energy Cost per 1000 Lumens	\$1.92 based on 3000 hrs. and \$0.08 per KWH

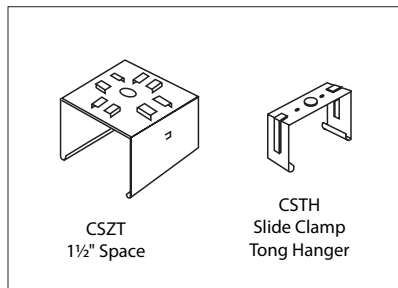
INDOOR CANDELA PLOT



DIMENSIONAL DATA



MOUNTING ACCESSORIES



NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

SLING SERIES SG

Cat.#	
Job	Type



Approvals

SPECIFICATIONS

Intended Use:

Slender wallpack/floodlight available in two sizes for a variety of applications including building perimeter/security lighting, entrances, stairways, loading docks or facades for schools, apartments or commercial buildings.

Construction:

Rugged die-cast aluminum housing with corrosion resistant powder coat finish both protects and provides architectural appearance. Heat dissipating fins provide superior thermal performance extending the life of the electronic components.

Electrical:

- 120-277V, 50/60Hz electronic drivers
- 347V and 480V available in larger SG2 housing
- 10KA surge protection included

LED(s) Optics, CCT:

- 3000K, 4000K and 5000K CCT nominal with 70 CRI
- Smaller SG1 housing has 2 LEDs, larger SG2 housing has 3 LEDs, see page 2 for electrical and photometric data

Lenses:

- Impact resistant tempered glass offers zero uplight
- Comfort lens available as an option or accessory to reduce glare (7-10% lumen reduction) and provide better uniformity

Installation:

- Side hinge allows for easy installation and wiring.
- Side movement avoids damage to the lens and helps prevent injury common in drop down hinge designs.
- Mounts to 4" junction box and includes a gasket to help seal electrical connections.
- Four ½" threaded conduit hubs for surface conduit provided

Options/Controls

- Button photocontrol for dusk to dawn energy savings. Stock versions include 120V-277V PC with a cover which provides a choice to engage photocontrol or not. PC is installed in top hub.
- Occupancy sensor available for on/off and dimming control in larger SG2 housing.
- SiteSync™ wireless lighting control delivers flexible control strategies for reducing power consumption and minimizing maintenance costs while delivering the right light levels with a simple and affordable wireless solution. See ordering information or visit www.hubbellighting.com/sitesync for more details.
- Battery backup options available in larger SG2 housing rated for either 0° C or -30° C. Performance exceeds NEC requirement providing 1 fc minimum over 10'x10' at 11' mounting height
- Diffused comfort lens provides glare control and improved uniformity. Available as an option or accessory

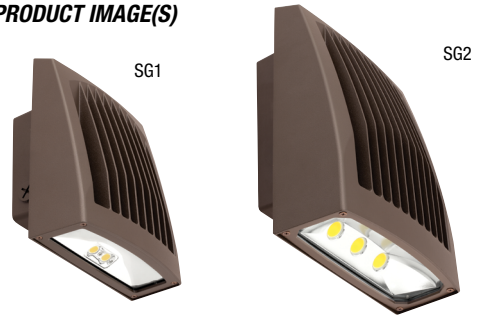
Listings

- DesignLights Consortium® (DLC) qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org
- Listed to UL1598 for use in wet location, listed for -40C to 40C applications
- IDA approved with zero uplight for 3000K and warmer CCTs
- IP65

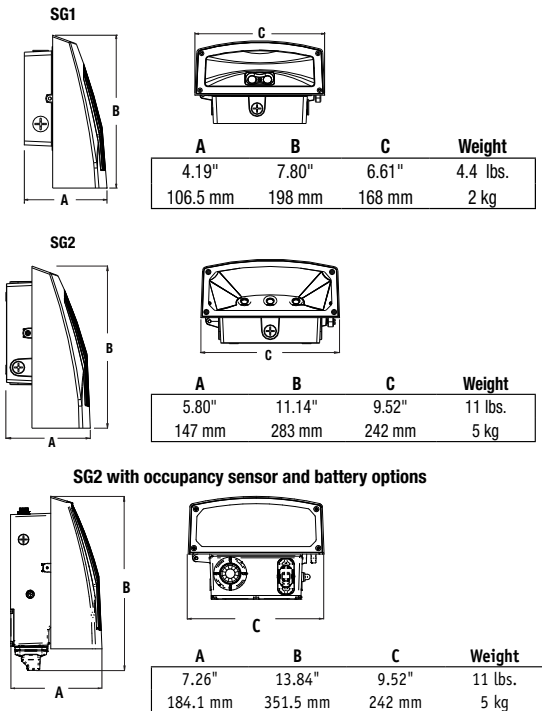
Warranty:

Five year limited warranty (for more information visit: <http://www.hubbellighting.com/resources/warranty/>)

PRODUCT IMAGE(S)



DIMENSIONS



CERTIFICATIONS/LISTINGS

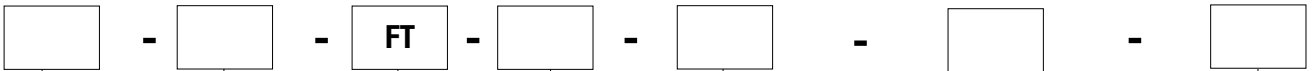


tradeSELECT®

SHIPPING INFORMATION

Catalog Number	G.W(kg)/CTN	Carton Dimensions			Carton Qty. per Master Pack
		Length Inch (cm)	Width Inch (cm)	Height Inch (cm)	
SG1	4.35lbs (2 kg)	9.5 (24)	8.25 (21)	5.25 (13.32)	6
SG2	11lbs (5 kg)	14 (35.5)	11.5 (29.2)	8 (20.3)	2

ORDERING INFORMATION – ORDERING EXAMPLE: SG1-20-4K7-FT-UNV-DB



FAMILY	CCT/CRI	DISTRIBUTION	VOLTAGE	COLOR/FINISH	CONTROL OPTIONS	OPTIONS
SG1-20 Size 1, 20w	3K7 3000K, 70 CRI	FT Fwd Throw	UNV 120V-277V	DB Textured Dark Bronze	PCU Button Photocontrol 120-277V	CS Comfort lens
SG1-30 Size 1, 30w	4K7 4000K, 70 CRI		120 ¹ 120V	BL Textured Black	SCO ^{1,2} Sensor Control, on/off	E ^{1,2} Battery 0°C
SG2-50 Size 2, 50w	5K7 5000K, 70 CRI		277 ¹ 277V	WH Textured White	SCP ^{1,2,3} Sensor Control, Programmable	EH ^{1,2} Battery w/ heater -20°C
SG2-80 Size 2, 80w			UHV ¹ 347V-480V	GYS Smooth Gray	SWP ^{1,2} SiteSync, Precommission	
				PS Smooth Plat. Silver	SWPM ^{1,2} SiteSync, Precommission, Motion	
				CC Custom Color	Specify MTG HT for SCO/SCP & SWPM	
					8F Up to 8'	
					20F Up to 20'	

¹ Available in SG2 only, UHV available in SG2-50 only
² Sensor controls & battery backup can not be used with flood accessory or kit or for inverted/up mounting.
³ 120-277V only for SCO/SCP, 120 or 277 only for SWP, SWPM, E & EH
⁴ Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, 120-277V only

FALL 2017 E/EH Battery backup
SCO/SCP/SWP/SWPM SiteSync



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ORDERING INFORMATION - Stock Versions

Catalog Number	CCT/CRI	Wattage	Mounting Height	Voltage	Color	Lumens	LPW	Weight lbs. (kg)
SG1-20-PCU	5000K/70	21w	8-12ft	120-277V	Dark Bronze	2263	108	4.3 (2)
SG1-20-4K-PCU	4000K/70					2310	110	
SG1-30-PCU	5000K/70	29w	10-15ft			3270	113	
SG1-30-4K-PCU	4000K/70					3060	105	
Catalog Number	CCT/CRI	Wattage	Mounting Height	Voltage	Color	Lumens	LPW	Weight lbs. (kg)
SG2-50-PCU	5000K/70	51w	12-18ft	120-277V	Dark Bronze	5548	110	11 (5)
SG2-50-4K-PCU	4000K/70					5526	109	
SG2-80-PCU	5000K/70	80w	15-25ft			8061	101	
SG2-80-4K-PCU	4000K/70					8079	101	

PERFORMANCE DATA

Catalog number	# of LEDs	Drive Current	System Watts	5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 80 CRI)				
				Lumens	LPW ¹	B	U	G	Lumens	LPW ¹	B	U	G	Lumens	LPW ¹	B	U	G
SG1-20	2	250mA	21	2449	115	1	0	0	2310	110	1	0	0	2054	95	1	0	0
SG1-30		350mA	29	3332	117	2	0	0	3060	106	1	0	0	2913	100	1	0	0
SG2-50	3	415mA	51	5548	110	2	0	0	5526	109	2	0	0	4700	92	2	0	0
SG2-80		650mA	80	8182	102	2	0	1	8453	108	2	0	1	7334	94	2	0	1

1. Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

ELECTRICAL DATA

Configurable Versions

Catalog number	# of Drivers	Input Voltage	Current (Amps)	System Power
SG1-20	1	120	0.18	21.0
		277	0.08	21.0
SG1-30	1	120	0.24	28.9
		277	0.10	28.9
SG2-50	1	120	0.42	50.6
		277	0.18	50.6
SG2-80	1	120	0.68	79.8
		277	0.29	79.8

PROJECTED LUMEN MAINTENANCE

Ambient Temp.	OPERATING HOURS					
	0	25,000	50,000	TM-21-11' L96 60,000	100,000	L70 (hours)
25°C / 77°F	1.00	0.98	0.97	0.96	0.95	>791,000
40°C / 104°F	0.99	0.98	0.96	0.96	0.94	>635,000

1. Projected per IESNA TM-21-11 * (Nichia 219B, 700mA, 85°C Ts, 10,000hrs) Data references the extrapolated performance projections for the LNC-12LU-5K base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

AMBIENT TEMPERATURE	LUMEN MULTIPLIER	
0° C	32° F	1.02
10° C	50° F	1.01
20° C	68° F	1.00
25° C	77° F	1.00
30° C	86° F	1.00
40° C	104° F	0.99
50° C	122° F	0.96

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).



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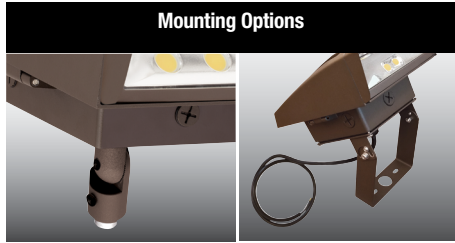
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OPTIONS AND ACCESSORIES



Acrylic comfort lens provides glare control, improved visual comfort and better uniformity



Flood mounting accessories - 3/4" threaded knuckle or yoke (includes grommet and 3' SO cord)



Visor accessory included with mounting accessory kits



Photocontrol option available for energy-saving dusk-to-dawn operation



Side hinged for easy installation and wiring access, single screw secures housing closure

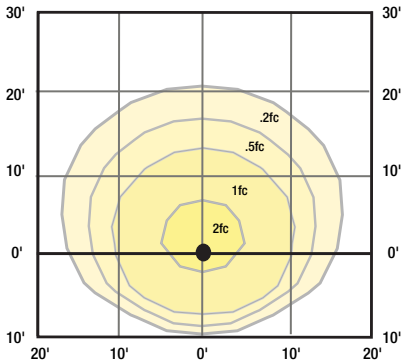
Catalog Number	Description	Weight lbs. (kg)
SG1-CS	Acrylic comfort lens for SG1	1 (.45)
SG2-CS	Acrylic comfort lens for SG2	1 (.45)
SG1-YOKE	SG1 Series Yoke/Floodlight mount kit, includes visor	2.0 (1.0)
SG1-KNUCKLE	SG1 Series Knuckle/Floodlight mount kit, includes visor	2.0 (1.0)
SG2-YOKE	SG2 Series Yoke/Floodlight mount kit, includes visor	2.0 (1.0)
SG2-KNUCKLE	SG2 Series Knuckle/Floodlight mount kit, includes visor	2.0 (1.0)
SCP-REMOTE*	Remote control for SCP option. Order at least one per project to program and control fixtures	1 (.45)

*Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, 120V or 277V only



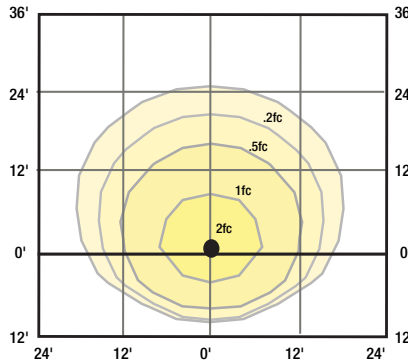
SiteSync™ Lighting Control delivers flexible control strategies for reducing power consumption and minimizing maintenance costs while delivering the right light levels with a simple and affordable wireless solution.

PHOTOMETRICS



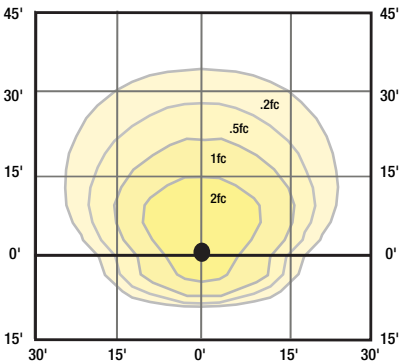
SG1-20

Mounting Height 10ft



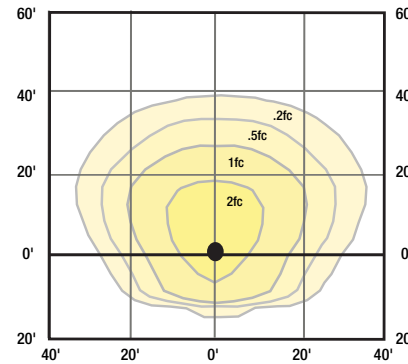
SG1-30

Mounting Height 12ft



SG2-50

Mounting Height 15ft



SG2-80

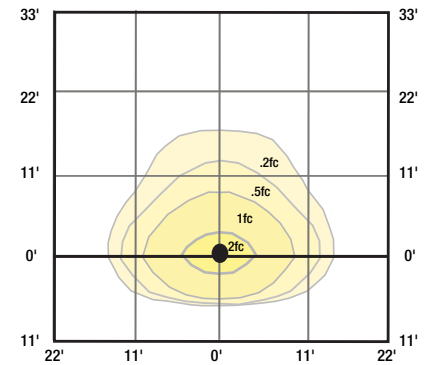
Mounting Height 20ft



Battery back up feature with side indicator.

Exceeds Life Safety Code average illuminance of 1.0 fc. at 12ft mounting height. Assumes open space with no obstructions.

Diagrams for illustration purposes only, please consult factory for application layout.



SG2 in E or EH Emergency mode

Mounting Height 11ft



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6 ICE RINK FFE

BASE OPTION (RINK ONLY)

DASHER FRAMING & POLYETHYLENE FACING, CAP RAIL & KICKPLATE

Rink Size: 200' x 85' x 28' radius – 522 lineal feet of 42" high 6"

aluminum framed dasher boards (**Ring only** – see option for boxes) 1/2" white high-density polyethylene dasher facing

1/2" x 8" high yellow high-density polyethylene

kick plate 3/4" blue high-density polyethylene

cap rail

All panels pre-assembled

Use existing 5/8" cast in place anchors with brass plugs for anchors (Off season use)

GATES

One 10'-0" radius double leaf equipment gate complete with heavy duty adjustable hinges, slide bar, cane bolts and heavy duty casters

Four 2'-6" player box gates with heavy duty hinges and lift latches

Two 2'-6" penalty box gates with heavy duty hinges and ice side push button latches

Two 3'-0" straight access gates with heavy duty hinges and ice side push button latches

One 3'-0" radius access gate with heavy duty hinges and ice side push button latches 1" thick high-density polyethylene thresholds on player, penalty and access gates

BACKER

438 lineal feet of 3/8" white high-density polyethylene full height Quick Release Backer for the entire perimeter of the dasher board system. Backer panels are designed to match the existing design of the dasher board system

FFE ADDITIVE ALTERNATE 01 (PLAYER, PENALTY & TIMEKEEPER BOXES, TEMPERED GLASS & NETTING DASHER FRAMING & POLYETHYLENE FACING & CAP RAIL)

DASHER FRAMING & POLYETHYLENE FACING, CAP RAIL

96 lineal feet of 42" X6" aluminum framed dasher boards

(Box Divider panels and back walls only)

1/2" white high-density polyethylene
dasher facing 3/4" blue high-density
polyethylene cap rail

All panels pre-assembled

Drilled in 5/8" epoxy anchors for box divider panels and back walls

PLAYER PENALTY AND TIMEKEEPER BOXES

Player boxes – Two each 6' deep x 30' long with side divider panels with backwalls
Penalty boxes – Two each 6' deep x 8' long with side divider panels with backwalls

Timekeeper box – One each 6' deep x 8' long with ½ depth side divider panels with back walls – one
2'–6" access gate with heavy duty hinges and push button latch in back wall

504 square feet of aluminum framed elevated flooring in the player boxes only complete with
3/8" solid black Stamina protective matting in player, penalty and timekeeper boxes

60 lineal feet of 7" high x 18" wide aluminum framed elevated coach's walkway in the player's boxes
– 30 lineal feet in each player box

64 lineal feet of 9–1/2" wide recycled plastic lumber (Blank or Blue seat planks) benches with
steel frames and supports in the player and penalty boxes (24' in each player box & 8' in each
penalty box)

One each 1" thick x 18" wide x 96" long solid natural polyethylene timekeeper table

84 lineal feet of 3/8" thick white high-density polyethylene backer sheet in the player, penalty
and timekeeper boxes complete with built-in shelving in the player boxes

TEMPERED GLASS SHIELDING

242 lineal feet of 15mm (5/8") x 6'–0" high tempered glass shielding for the ends and radius
corners of the rink complete with two-piece anodized aluminum shield supports

340 lineal feet of 12mm (1/2") x 6'–0" high tempered glass shielding for the sides of the rink,
divider panels and back walls complete with two-piece anodized aluminum shield supports
Shield termination padding

PROTECTIVE NETTING

Two each 14' high x 121' long black nylon puck control nets for the ends and radius corners of the rink and two each 14' high x 144' long nylon puck control nets for the sides of the rink – netting is removable on both top and bottom. Materials including all cable, conduit frame and hardware for complete installation

FFE ADDITIVE ALTERNATE 02 (QUICK RELEASE BACKER “BOX AREA”)

Furnish and install the following:

96 lineal feet of 3/8" white high-density polyethylene full height Quick Release Backer for the entire perimeter of the dasher board system. Backer panels are designed to match the existing design of the dasher board system

FFE ADDITIVE ALTERNATE 03 (SUPPLY ONLY WALL MOUNTED SCOREBOARDS)

Two (2) OES MODEL 6225 Hockey Score board 18' wide x 3'-10" high x 4' deep wit ad space on each end at 1'-9" wide x 2'-9" high. 14" white LED digits time & score with 10" white LED digits for period and penalty. Includes controller & antenna

FFE ADDITIVE ALTERNATE 04 (SUPPLY ONLY PROFESSIONAL HOCKEY GOAL FRAME PACKAGE)

Professional Goal Frame Package – one pair: (Nets, pads, skirts, twine)
Net Tie on Service

FFE ADDITIVE ALTERNATE 05 (SUPPLY & INSTALL INTERLOCKING RUBBER FLOORING)

Interlocking Stamina or equal with Color Fleck –3/8" thick x 4' x 6' nominal (20.46 square feet of coverage per mat). Reference plans for area

FFE ADDITIVE ALTERNATE 06 (SUPPLY & INSTALL LOCKER ROOM BENCHING)

66 lineal feet of wall mounted locker room benching (33 lineal feet in each of two rooms) per information provided to include: 66 lineal feet of 2" x 10" (1-1/2" x 9-3/8") recycled plastic lumber seat plank, zinc plate wall mount brackets, epoxy screen anchors and all required hardware for installation.