

**SECTION 26 00 00
ELECTRICAL**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: Provide complete electrical service and distribution system with equipment and materials where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
1. New electrical distribution equipment;
 2. Grounding and Bonding;
 3. Branch circuit wiring, for lighting, receptacles, motors and equipment;
 4. Wiring devices and related equipment;
 5. Lighting fixtures and lamps;
 6. Lighting Control Systems;
 7. Trenching and backfilling for new underground electrical feeders by the Electrical Trade;
 9. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and equipment;
 10. Other items and services required to complete the electrical systems.
- B. Related Work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications;
- C. Work of Other Sections:
1. Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC trades.

1.02 GENERAL PROVISIONS

- A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.
- B. In addition to the electrical plans, see General Plans of the building, as all electrical work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, the said work detailed on the electrical plans.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.
- C. Reference Standard: The following standards are imposed, as applicable to the work:

ASTM	American Society of Testing and Materials
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriters Laboratories
UL 50	Standards for enclosures for electrical equipment
UL 67	Standards for panelboards
UL 489	Standards for molded-case circuit breakers
NEMA AB 1	Standards for molded case circuit breakers
NEMA PB 1	Standards for panelboards

1.04 CODES AND PERMITS

- A. The Contractor must comply with national, state of Wisconsin and city of Madison building and electrical codes and other ordinances in force where the building is located as far as same apply to his work.
- B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the requirements of these Specifications.
- C. One (1) copy of all permits must be furnished to the Owner.

1.05 COORDINATION

- A. Cooperate and coordinate with other trades to assure that all systems in the electrical work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.
- B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel with primary lines of building construction.
- C. Locate operating and control equipment properly to provide easy access, and install entire electrical systems with adequate access for operation and maintenance.
- D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK

- A. Line Voltage Wiring: The Electrical Contractor shall make all line voltage (100 volts and greater) electrical wiring, final connections and motor wiring for Mechanical equipment.
- B. Control Wiring: Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical work shall be by the Mechanical Contractor in strict accordance with the applicable sections of the Electrical Specifications.
- C. Motors, Starters, and Disconnects: All motors starter and disconnects shall be provided by the Electrical Contractor, unless provided with the equipment or indicated otherwise.
 - 1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and requirements for electrical connections, along with wiring diagrams.

1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS

- A. The General Contractor will be required to leave openings in new construction ceiling, floors, walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the Drawings. The Electrical Contractor is responsible for correct size and location of openings.

- B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings and partitions are to be made in advance of construction of such parts of the building.
- C. The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the Drawings.
- D. Pack annular space between sleeves and conduit with fiberglass insulation and seal with caulk. Where penetrations through fire rated walls or floors, seal openings with UL approved fire-stopping sealant/caulk assembly.

1.08 CUTTING AND PATCHING

- A. General: Refer to Division 1 General Requirements.
- B. Perform all cutting and patching required for complete installation of the Electrical systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
 - 1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.
- C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.
 - 1. All patching work in existing areas shall match existing work in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

1.09 TRENCHING AND BACKFILLING

- A. Comply with pertinent provisions of Division 1.
- B. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of the Specifications.

1.10 SUBMITTALS

- A. Comply with pertinent provisions of Division 1.
- B. Shop Drawing Submittals: Submit electronic shop drawings to the Architect for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:
 - 1. Light Fixtures.
 - 2. Electrical Devices.
 - 3. Lighting Controls.
 - 4. Electric Distribution Equipment.
 - 5. Electrical Boxes and Raceways.
- C. Shop Drawings:
 - 1. The Electrical Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the electrical work without approved shop drawings that have the Architect/Engineers final approval.
 - 2. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities. Incomplete drawings will be disapproved.
 - 3. This Contractor will be responsible for all figures, quantities and dimensions shown on the shop drawings.

4. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from responsibility of resubmitting equipment that will meet the space requirements.
- D. O & M Manual: Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Division 1 of these Specifications. Include the following within the bound O&M manual:
1. Copy of the approved Record Documents for this portion of the Work;
 2. Copies of all circuit directories;
 3. Copies of all warranties and guaranties.
 4. As-built drawings.
- E. As-built Drawings: Record installation as-built on a set of drawings prints in red during construction. Plan shall represent actual locations, materials and circuiting of equipment installed.

1.11 PRODUCT HANDLING

- A. Comply with pertinent provisions of Division 1.

1.12 WARRANTY

- A. In addition to standard one year warranty on all labor and materials, provide an additional warranty on ballasts for all new fluorescent and HID lighting fixtures as specified.

1.13 HOUSEKEEPING AND CLEAN-UP

- A. Periodically as work progresses and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.14 TEMPORARY SERVICES

- A. This Contractor shall provide temporary lighting and power as required throughout the construction period.
- B. Arrange for temporary electrical utility with local electrical utility. Electrical Contractor shall pay all temporary electrical service and usage fees.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.

2.02 BEDDING AND COVER MATERIAL

- A. Bedding and cover material shall be approved bedding sand with 100% of material passing a 3/8" sieve. No native material from trench shall be used for bedding or cover material. Unwashed bank run sand and crushed bank run gravel will be considered generally acceptable cover material.

2.03 BACKFILL MATERIALS

- A. Contractor shall backfill and compact trenches outside structure and structures zone of influence (ZOI) with excavated material, as long as it is free of cinders, ashes, refuse, rocks, boulders, or other such unsuitable materials and in the opinion of the Engineer is considered suitable.
- B. Contractor shall backfill and compact trenches within structure and structures ZOI with Low Frost Susceptibility Granular Fill consisting of granular material having less than 5 percent passing a No. 200 U.S. standard sieve or ¾ inch clear stone.

2.04 GROUNDING SYSTEM

- A. Ground all equipment, including switches, transformers, conduit systems, motors, and other apparatus, by conduit or conductor to cold water main and to independent electrode, using ground clamps manufactured by Burndy or T&B, and approved by the Engineer.
- B. Provide new service ground. Add additional ground rods and foundation rebar grounding electrodes, as required by NEC 250.
- C. Provide grounding conductor from service ground to solid ground buss bar at all distribution panelboards.
- D. Provide grounding jumper from electrical devices to the metallic device boxes.
- E. GFI receptacles shall be provided with separate insulated ground wire conductor to the main service or distribution panelboard ground bar.
- F. Ground all motor and equipment connections with dedicated ground conductor.

2.05 IDENTIFICATION

- A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following junction and pull boxes shall be identified using a coded system. Coding shall be submitted to Engineer for approval.
 - 1. Light and Power - 120/208V.
 - 2. Light and Power - 277/480V
- B. Label circuit numbers for all accessible line voltage power distribution raceways and junction boxes.
- C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.
 - 1. Each section of main distribution switchboards and panelboards. Mount one next to each protection device to identify load served by each circuit breaker.
- D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel frame with plastic cover contained on the inside of panel door. These directories shall indicate load served and rooms served by each protective device in the respective panel.
- E. Identify all conductors per NEC:
 - 120/208V -Phase A - Black
 - Phase B - Red
 - Phase C - Blue
 - Neutral - White
 - Ground - Green
 - 277/480V - Phase A - Yellow
 - Phase B - Brown
 - Phase C - Orange

- Neutral - Gray
- Ground - Green with two yellow stripes

F. Label all receptacle plates with self-adhesive clear labeling tape and black letters indicating panel # and circuit # serving device.

2.06 WIRING DEVICES

A. General:

1. Devices shall be provided at each location shown on the plans or called for in the Specifications.
2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour or Hubbell.
3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.

B. Receptacles:

2. Duplex Receptacles: Industrial-specification grade, nylon face and base, ivory color, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Use of self-grounding option not permitted.
3. NEMA 5-15R, 15A - Leviton 5262A.
4. NEMA 5-20R, 20A - Leviton 5362A.
5. NEMA 5-15R, 15A GFCI Receptacle: Specification grade with lock-out action, indicator light and feed through. Equal to Leviton 8598-HG.

C. Switches:

1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade ivory color.
2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
3. Switches to be back and side wired, silent or quiet type.
4. The following catalog numbers refer to Leviton, Inc.:
 - a. single pole – 1221-2I
 - b. three way – 1223-2
 - c. four way – 1224-2
 - d. Single pole with pilot light – 1221-PLR(red)

D. Plates:

1. Provide as required for each outlet, single or multiple gang.
2. Provide blank covers on all empty boxes or outlets.
3. Plates shall be 204 stainless steel construction in all finished areas.
4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.
5. Provide single-gang die-cast or impact resistant thermoplastic covers and gasketed bases NEMA-3R rated "while-in-use" equal to Leviton 5976-GY(vertical) or 5996-GY(horizontal) on receptacles in damp or exterior locations.

2.07 PANELBOARDS

A. Approved Manufacturers: Square D, Cutler Hammer, Siemens or approved equal.

B. See plans for panelboard capacity, voltage ratings, and branch circuit breaker units.

1. Provide sub-feed lugs and circuit breakers where indicated.

- C. All panelboards to be of the circuit breaker type with plug-on circuit breakers.
- D. Branch circuit breakers shall be thermal magnetic; quick-make and quick break. Multi-pole breakers to have common trip. Handle ties of any sort not allowed.
- E. Panelboards shall be Square 'D' type NQOD with bolt-on branch circuit breakers.
- F. Each panel shall be provided with a typewritten directory mounted on inside of panel door and covered with clear plastic. This directory shall indicate the load supplied by each branch circuit breaker in panel. Room numbers shall be actual room numbers.
- G. Each panelboard shall be securely attached to the building structure on 3/4" AC plywood backer board with non-metallic painted surface.
- H. All panelboards shall be equipped with an equipment grounding bar that is separate from the solid neutral bar.

2.08 RACEWAY SYSTEM

- A. Steel Conduit. Galvanized or sheradized steel intermediate(IMC) or rigid metal conduit(RMC), or electrical metallic tubing (EMT) with steel compression ring or steel set screw type fittings.
 1. Provide steel conduits concealed in the walls, above the ceilings, or exposed in the work areas.
 2. Indented or cast fittings are not acceptable.
 3. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel(RMC) conduit with PVC interior coating or PVC coated steel conduit.
 4. Provide liquid-tight rigid metal conduit(RMC) or Intermediate metal conduit(IMC) at exterior locations above grade.
- B. Rigid Non-Metallic Conduit. Schedule 80 PVC with solvent welded fittings.
 1. Below grade installation only.
 2. Encase in concrete below drives and roadways.
 3. ENT flexible non-metallic conduit may be used in concealed masonry areas above grade.
- C. Outlets, Junction Boxes and Switch Boxes:
 1. Provide standard one-piece units, galvanized or sheradized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires without crowding.
 2. Provide deep boxes with 1" and larger conduit.
 3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.
 4. For switches and receptacles, provide boxes 4" square by 1-1/2" deep minimum with rings and covers as required.
 5. Provide cast liquid-tight boxes with gaskets at exterior locations.
- D. For pull boxes, provide galvanized code-gauge sheet units with screw-on covers, of size and shape required to accommodate wires without crowding and to suit the location.
- E. Provide sleeves and chases where conduits pass through floors and walls.
- F. Handhold Splice Boxes: Provide flush at grade splice boxes constructed of fiberglass polymer concrete reinforced with removable access cover labeled "ELECTRIC" and stainless steel cover fasteners. Cover shall be cast iron, bronze or fiberglass polymer UV rated.

1. Highline CHA101512(10"x15"x12"high) or approved equal.
2. Cover assembly shall be load tested per ANSI/SCTE 77 for 12,000 lbs.
3. Mount splice box on 6" compacted gravel base and pour 6" concrete collar(4"deep) around top for protection.

2.09 CONDUCTORS

- A. Wire and Cable (600 Volt): Provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by governmental agencies having jurisdiction. Use only copper wires and cables.
1. With conductors No. 4 and larger, provide insulating bushings.
 2. Interior wire and cable shall be THHN or THWN.
 3. Exterior wire and cable shall be XHHW-2.
 4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be stranded wire.
 5. Wire in conduits subjected to direct sunlight shall be THWN or XHWN.
 6. Identify feeder neutrals with white tape or white paint.
- B. Armored Cable (AC) or Metal-Clad Cable (MC):
1. Limit AC and MC usage to concealed only locations, branch-circuit wiring after the first junction box from the panelboards; where approved by NEC, state and local electrical inspecting authorities.
 2. Not allowed for Panelboard feeders or service conduit.
 3. Provide and install per NEC Articles 333 and 334 with grounding conductor.
- C. Below grade conductor splices:
1. Compression type inline splice connectors, watertight assembly, dual rated AL9CU for stranded copper or aluminum conductors.
 2. UL 486B listed.
 3. Burndy "UNITAP" BISR, BIBD or BISR series or approved equal.

2.10 MOTOR WIRING

- A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with the contractor that is furnishing the motor driven equipment.
- B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes. Verify all these requirements with contractor concerned and install accordingly under this contract.
- C. Install disconnect means where required by code for motors out of sight of controller. These shall be fusible safety switches, fusetron box cover unit, or non-fused switch as indicated on plans. All switches shall be horsepower rated.
- D. All motors will be furnished and installed by others, unless noted otherwise.
- E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise herein or on the plans. See Motor Schedule.
- F. All final connections to motors to be made by this Contractor.
- G. All motors to be connected using flexible metallic conduits extending from motor box to outlet box. Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit shall be

stranded. Grounding wires shall be in all cases installed in flexible conduit and not wrapped around the outside of the conduit.

2.11 MOTOR STARTERS

A. General:

1. Indoor - NEMA Type 1.
2. Outdoors or where exposed to moisture - NEMA Type 3R, raintight.
3. Units shall open all ungrounded conductors simultaneously.
4. All starters shall be from a single manufacturer.

B. Manual Starters:

1. For single-phase starters, provide units of tumbler switch type that clearly indicate ON, OFF and TRIPPED positions.
2. For three-phase starters, provide pushbutton operated units with START, STOP-RESET button on the enclosure cover.

C. Magnetic Starters:

1. Provide units with operating coils designed to operate on line voltage or any other auxiliary voltage indicated on the Drawings.
2. For starters with line voltage operating coils, provide built-in under-voltage release.
3. Provide units with the accessories and auxiliary contacts needed for automatic or remote operation as shown on the Drawings.
4. Provide "H-O-A" control switch and "green" run light on unit cover.
5. Provide thermal overload protection in each phase which if any phase trips causes the starter to drop out.

2.12 SAFETY SWITCHES

- A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.
- B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:
1. Indoor: NEMA type 1.
 2. Outdoor: NEMA type 3R, raintight.
- C. Approved Manufacturers: Square D.

2.14 LIGHTING FIXTURES

- A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.
- B. Light Fixtures:
1. Provide units having a UL label.
 2. Provide local label in addition if so required by governmental agencies having jurisdiction.
 3. Verify all ceiling types as shown on final architectural plans and be responsible for ordering proper fixtures and accessories for the proper ceiling.
- C. LED Lighting:

1. The manufacturer of the LED lighting fixture shall utilize high-brightness LEDs and high-efficiency electronic LED drivers, dimmed or no dimmed as required.

2. The LED fixture shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the fixture is to be installed.
3. Light output of the LED system shall be the absolute photometry following IESNA LM-79 and IESNA LM-80 requirements and guidelines.
4. Minimum power factor of 0.90.
5. LED lighting fixture shall be mercury-free, lead-free and RoHS compliant.
6. The LED lighting fixture shall maintain 70% lumen output for a minimum of 50,000 hours.
7. All components of the LED lighting fixture shall be replaceable.
8. The LED lighting fixture shall carry a limited 3-year warranty minimum.

D. Acceptable Lighting Fixture Manufacturers:

1. Refer to **Fixture Schedule**. Engineer has final decision on whether submitted fixture is equal.
2. Acceptable manufacturers as approved to submit fixtures equal to the fixture submitted are as follows:
3. Other fixture manufacturers who consider their products equal to those specified are required to request approval for bidding as base bid in accord with Instructions to Bidders section.
4. Approval of products will be considered subject to the following:
 - a. Equal manufacturers are required to nominally meet specifications of specified fixtures and lenses in regard to ceiling opening size and shape, housing, and trim/door appearance and construction, general overall appearance, efficiency, thickness, brightness control and lamp hiding characteristics.

2.15 OCCUPANCY SENSOR CONTROLS

- A. Occupancy Sensors shall be equal to System Sensor or approved equal. Refer to the Drawing Occupancy Sensor Schedules and Drawings for further requirements.
- B. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
- C. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
- D. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
- E. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.
- F. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
- G. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.
- H. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
- I. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
- J. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
- K. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within $\pm 0.005\%$ tolerance, 32 kHz

within $\pm 0.002\%$ tolerance, or 40 kHz $\pm 0.002\%$ tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

- L. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.
- M. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- N. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
- O. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

2.16 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Coordination:
 1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
 2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total Work.
 3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.
- B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.
- C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.
- D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.
- E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.03 INSTALLATION OF ELECTRIC SERVICE

- A. Coordinate installation with local utility as required for a complete electric service installation.
- B. Installation shall be approved by the local utilities.

3.04 TRENCHING AND BACKFILLING

- A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of these Specifications.
- B. Cut bottom of trench to grade, make trench 12" wider than the widest dimension of the pipe.
- C. Bedding:
 - 1. Do not start backfill operations until underground plumbing work has been properly inspected and approved by governing authorities.
 - 2. Provide four (4) inches of bedding and six (6) inches of cover over all underground conduits.
- D. Backfilling:
 - 1. Disturbed areas outside of structure shall be returned to existing grade with six (6) inches of topsoil.
 - 2. Compaction of backfill material outside the structure and structure's ZOI shall meet 90% Modified Proctor, the standard specification of ASTM D-1557.
 - 3. Compaction of Low Frost Susceptibility Granular Fill within the structure and structures ZOI shall meet 95% Modified Proctor, the standard specification or ASTM D-1557.

3.05 INSTALLATION OF RACEWAYS AND FITTINGS

- A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide rigid galvanized conduit or electrical metallic tubing with compression type fittings.
 - 1. Seal joints to prevent entrance of water.
 - 2. Provide ground wire of proper size per NEC 250.
 - 3. Use nylon (rather than steel) fish tape.
- B. Use flexible conduit only for short motor connections, or where subject to vibration.
- C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting in connection with the Work.
- D. Where conduit is exposed, run parallel to or at right angle with lines of the building.
- E. Securely and rigidly support conduits throughout the work.

3.06 INSTALLATION OF CONDUIT

- A. Provide for the proper application, installation and location of inserts, supports and anchor bolts, for a satisfactory raceway system. Replace any damaged components of the raceway system.
- B. Run conduits concealed. Conduits may be exposed only when it is impossible or impractical to conceal. Mechanical rooms may use exposed conduit.
- C. All conduits that protrude through slabs shall be PVC coated rigid conduit.
- D. Conduit seals shall be provided where conduits pass from interior walls to exterior walls in accordance with NEC.

- E. All conduits installed below grade shall be buried a minimum of 2 feet.

3.07 INSTALLATION OF OUTLETS, LIGHT SWITCHES, AND PULL AND JUNCTION BOXES

- A. Outlets and light switch timers shall be installed at the locations and heights indicated on the Drawings.
- B. Pull and junction boxes shall be located in accessible locations as approved by Engineer.
- C. Outlets, light switches, and pull and junction boxes shall be supported independently from conduit.
- D. All outlets, light switches, and pull and junction boxes shall be recessed; secure boxes to walls to provide for flush cover finish.

3.08 INSTALLATION OF LIGHTING FIXTURES

- A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.
- B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.
- C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.
- D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the fixture is supported, either directly or indirectly, by a safe and sound structural member of the building, using adequate number and type of fastenings to assure safe installation.
 - 1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.
 - 2. Install T-bar hold-down clips on all light fixtures.

3.09 INSTALLATION OF POWER EQUIPMENT

- A. Provide power and control wiring for motor starters and safety switches as shown on the Drawings.

3.10 INSTALLATION OF CONDUCTORS

- A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100 feet, use larger wires to limit voltage drops.
- B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.
 - 1. Make splices electrically and mechanically secure with pressure-type connectors.
 - 2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6 AWG and smaller.
 - 3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a mechanical tool and die equipment for wire sizes 4 AWG and larger,.
 - 4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-plastic electrical tape where insulation is required.

3.11 INSTALLATION OF HAND HOLD SPLICE BOXES

- A. Install boxes on 6" of compacted gravel and backfill to within 6" of the surface. Pour 6" wide x 4" deep concrete apron around the top of the splice box top and finish backfilling.

3.12 INSTALLATION OF PANELBOARDS

- A. Unless otherwise shown on the Drawings, install panels with the top of the trim 6'-3" above the finished floor.
- B. Mount a typewritten directory behind plastic on the inside of each panel door and on the directory, showing the circuit number and complete description of all outlets on each circuit.
- C. Provide two (2) spare 1" conduits, stubbed out of the top of each flush-mounted panel and terminated in accessible ceiling space, with each conduit tagged with panel description.

3.13 TESTING AND INSPECTION

- A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.
- B. Make written notice to the Architect adequately in advance of each of the following stages of construction:
 - 1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
 - 2. Immediately submit to the Architect a report of maximum and minimum voltages and a copy of the recording volt-meter chart.
 - 3. Also measure voltages between phases and between phase wires and neutrals and report these voltages to the Architect.

3.14 PROJECT COMPLETION

- A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.
- B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under Article 1.3 of this Section of these Specifications.

END OF SECTION

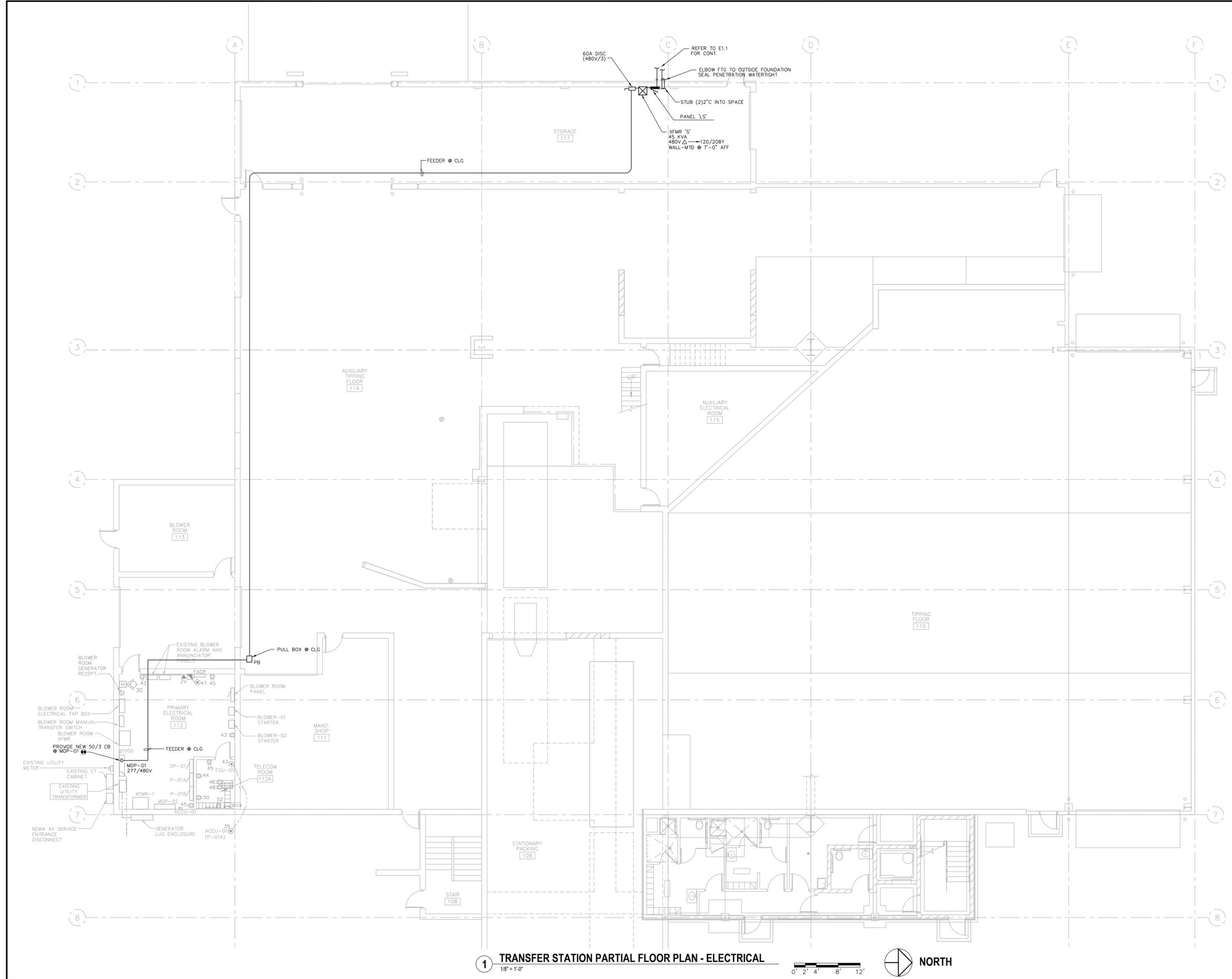


Olin Avenue Waste Transfer Station
City Of Madison
Dane County, Wisconsin

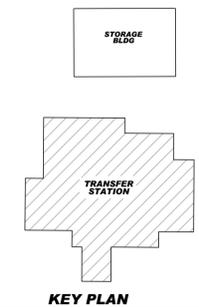
TRANSFER STATION PARTIAL FLOOR PLAN - ELECTRICAL

Revisions:		
No.	Date:	Description:

Job Number	H1618
Date Issued	7/11/2016
Sheet	E1.0



1 TRANSFER STATION PARTIAL FLOOR PLAN - ELECTRICAL
1/8" = 1'-0" 0' 2' 4' 8' 12' NORTH



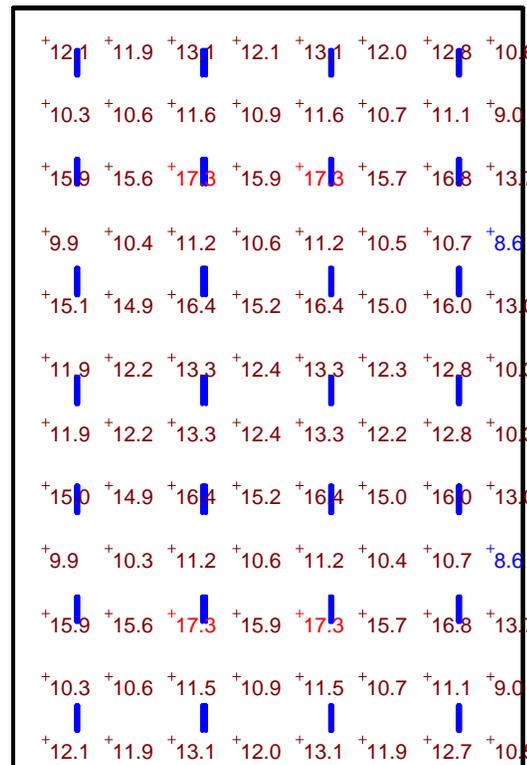
STATISTICS

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Workplane	+	12.8 fc	17.3 fc	8.6 fc	2.0:1	1.5:1



LUMINAIRE SCHEDULE

Symbol	Label	Qty	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
⏏	LM-1	28	VAP 6000lm FST WD XX GZ10 40K 80CRI	LED ARCHWAY PASSAGE FROSTED POLYCARBONATE ENCLOSURE 4000K 80CRI 6000lm WIDE DISTRIBUTION	NICHIA 757 DR	VAP_6000lm_ FST_WD_XX_ GZ10_40K_80 CRI.ies	Absolute	0.95	64



Plan View

Scale 1" = 30'

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for use in applications where smart, energy-efficient fixtures are desired. Typical applications include parking garages, canopies, transportation, schools, hospitals, cold storage and exterior retail environments where moisture or dust is a concern. Polycarbonate enclosure protects fixture while remaining easy to service and clean.

CONSTRUCTION — UV-stabilized, injection-molded, impact-resistant, frosted polycarbonate housing with continuous poured-in-place, closed-cell gasket. 20-gauge steel channel and channel cover. Aluminum sheet metal board plate for thermal conduction and support. Captive, tamper-resistant, polycarbonate latches standard (8 Torx T-20 tamper-resistant screws included). Stainless steel latches also available. Fixture design allows for approximately 4% up-light.

OPTICS — UV-stabilized, injection-molded, impact-resistant, clear transparent and frosted, polycarbonate lens with aesthetic rib detail (.080" thick). Miro 5 aluminum reflector used to achieve wide distribution.

ELECTRICAL — Utilizes high-output LEDs integrated on a two-layer circuit board, ensuring cool-running operation. Electronic LED driver rated for 44 input watts and is standard 0-10V dimming. Integral 6kV/3kA surge protection, tested in accordance to IEEE/ANSI standards. L85 at 60,000 hours.

INSTALLATION — Stainless steel surface spring-mounting brackets standard (2 included) allows for ceiling or suspended mount. A variety of stainless steel mounting options also available: J-box mounting and mounting brackets for suspension with aircraft cable (cable not included). Optional stainless steel V-hooks available for chain hanging (chain not included). Surface conduit entry on each end and on top. For horizontal and vertical mounting on a wall, application must be under a covered ceiling and QMB option recommended. 1/2" - 3/4" KO. When wall mounted the product will be rated for damp location only.

LISTINGS — CSA Certified to UL and C-UL standards. For use in ambient temperatures ranging from -20°F (-29°C) to 104°F (40°C). VAP LED is wet location listed for covered ceiling applications. IP65 and IP66 rated. VAP LED is NSF Splash Zone rated when suspended or ceiling mounted. When wall mounted the product will be rated for damp location only. DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org to confirm which versions are qualified.

WARRANTY — 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomResources/Terms_and_conditions.aspx

For installed Rough Service Product(s), Acuity warrants that, for the lifetime of the product(s), the polycarbonate lens and/or polycarbonate housing will withstand breakage resulting from occasional physical abuse and rough handling (the "Rough Service Warranty"), notwithstanding the vandalism exclusion set forth at www.acuitybrands.com/CustomResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

Catalog Number
Notes
Type

ARCHWAY™
PASSAGE™

Rough Service Fixture

VAP LED



CEILING/
SUSPEND MOUNT



Specifications

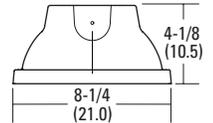
Length: 54-3/4 (139.1)

Width: 8-1/4 (21.0)

Depth: 4-1/8 (10.5)

Weight: 13.5 lbs. (5.9 kg)

All dimensions are shown in inches (centimeters) unless otherwise noted.



ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: VAP 4000LM FST MD MVOLT GZ10 40K 80CRI

VAP Series	Nominal lumens	Diffuser	Distribution	Voltage	Driver	Color temperature	CRI
VAP	4000LM 4,000 lumens 6000LM 6,000 lumens 12000LM 12,000 lumens ¹	FST Frosted polycarbonate lens PCL Clear polycarbonate lens	MD Medium WD Wide	MVOLT MVOLT 120 120V 277 277V 347 347V ² 480 480V ²	GZ10 0-10V dimming	30K 3000K 35K 3500K 40K 4000K 50K 5000K	80CRI 80 CRI 90CRI 90 CRI

Options³

SF	Single fuse ⁴	STSL	Stainless steel tamper resistant latches	MSI10XAWL10M DSCXAWL	Xpoint wireless integral motion sensor, On/Off operation for motion sensing, override Off due to daylight ⁴
BSL722	Bodine® emergency LED battery pack for 0°C and up ^{4,5,6}	QMB	Quick-mount ceiling bracket	MSI10NWL	Low mount 360 integral motion sensor, wet location, On/Off operation ⁴
BSL722C	Bodine® emergency LED battery pack for -20°C and up ^{4,5,6}	CMB	Chain-mount suspension bracket	MSI102L3VWL	Low mount 360 integral motion sensor, wet location, High/Low operation (bi-level) ⁴
WLF	Wet location fitting (two outboard, top) ⁷	JSB	Junction box snap-bracket	MSI10NWL DSCNWL	Low mount 360 integral motion sensor, wet location, On/Off operation for motion sensing, override Off due to daylight ⁴
WLFIN	Wet location fitting (two inboard, top) ⁷	LSC	Lens safety clip	XAD	XPoint™ wireless controller ,0-10V dimming ¹⁰
WLFEND	Wet location fitting (one end) ⁷	DL	Damp location ⁹		
WLFEND2	Wet location fitting (both ends) ^{7,8}	L/SP	Less surge protection device		
CS89	6' white cord, 16/3, no plug, wet location				
CS88	6' Brad Harrison 16/3 cord and straight blade plug set ⁴				
CS88L12	12' Brad Harrison 16/3 cord and straight blade plug set ⁴				

Accessories: Order as separate catalog number. (Ships separately)

VAPSMB	Surface spring-mount bracket	RK1 T20BIT	Hex base driver bit, Torx T20.
VAPQMB	Quick-mount ceiling bracket		Tamper resistant screws with center reject pin
VAPCMB	Chain-mount bracket	RK1 T20DRV	Torx T20 screwdriver for use with tamper resistant screws with center reject pin
VAPJSB	Junction box snap bracket		
HC36	Wire hook and 36" chain set ^{11,12}		

Notes

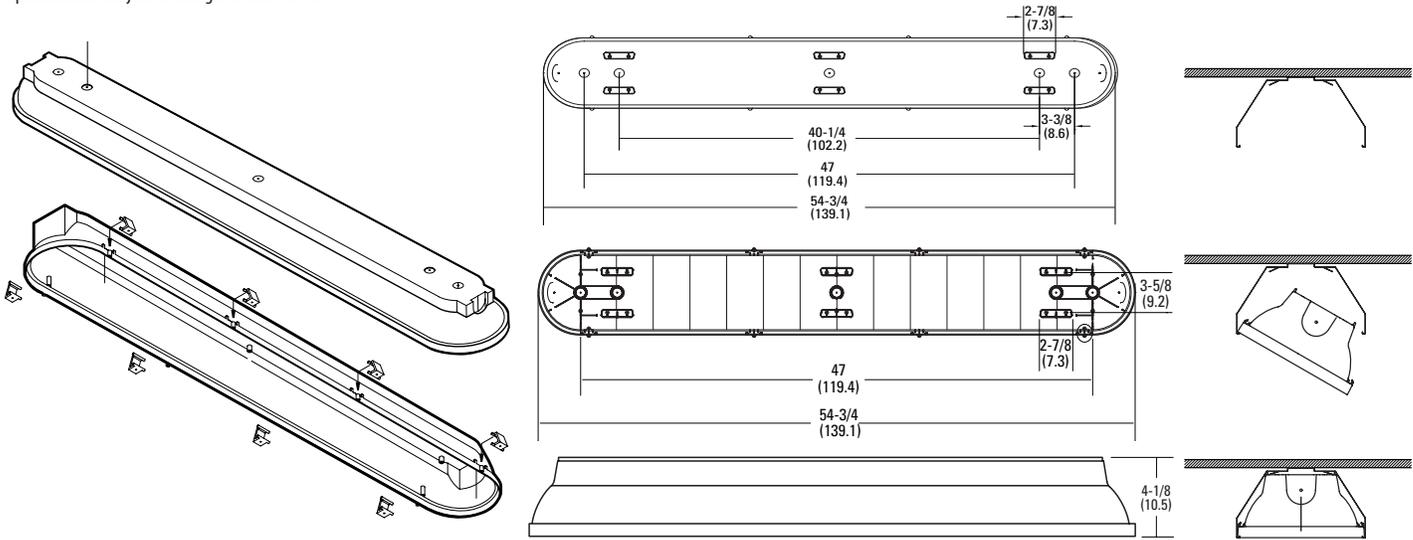
- Not available with BSL722 or BSL722C options.
- 347V and 480V utilize a step-down transformer. Available 60HZ only.
- For additional options, consult factory.
- Must specify voltage.
- Not available with 12000LM lumen package. Maximum ambient temperature 30 C.
- Available in 120-277V only.
- 5/8" long NPT threaded hub.
- Not available with cord, sensor, or photocell options.
- Required when using battery packs or cord sets that are not rated for wet locations.
- Not available with BSL722 and BSL722C option.
- Requires CMB (chain mount bracket) option.
- For stainless steel, specify STS (example: HC36 STS).

VAP Linear Rough Service, LED

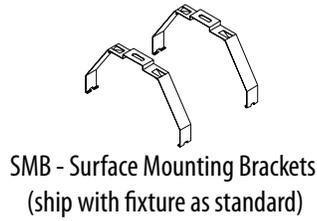
DIMENSIONS

All dimensions are shown in inches (centimeters) unless otherwise noted.

Specifications subject to change without notice.



MOUNTING ACCESSORIES



ARCHWAY™ PASSAGE™ LED Specification Matrix								
Nominal lumens	Initial delivered lumens @ 80CRI with clear polycarbonate lens			Initial delivered lumens @ 80CRI with frosted polycarbonate lens			Wattage @ 120V	Comparable source
	3500K	4000K	5000K	3500K	4000K	5000K		
4000LM	5,200	5,208	5,672	4,420	4,428	4,822	42	2-lamp 32W T8, 1-lamp 54W T5HO, 70W HID
6000LM	6,630	6,643	7,234	5,637	5,648	6,150	62	3-lamp 32W T8, 2-lamp 54W T5HO, 100W HID
12000LM	11,034	11,056	12,040	9,380	9,400	10,236	107	4-lamp 32W T8, 2-lamp 54W T5HO, 150W HID

Operating hours	0	10,000	20,000	25,000	35,000	50,000	60,000	75,000	100,000
Lumen Maintenance Factor	1	.95	.92	.91	.89	.86	.84	.81	.77



D-Series Size 1 LED Wall Luminaire



Catalog
Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

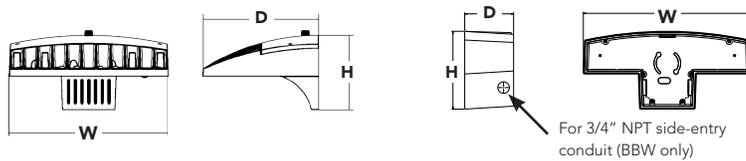
d#series

Specifications Luminaire

Width:	13-3/4" (34.9 cm)	Weight:	12 lbs (5.4 kg)
Depth:	10" (25.4 cm)		
Height:	6-3/8" (16.2 cm)		

Back Box (BBW, ELCW)

Width:	13-3/4" (34.9 cm)	BBW Weight:	5 lbs (2.3 kg)
Depth:	4" (10.2 cm)	ELCW Weight:	10 lbs (4.5 kg)
Height:	6-3/8" (16.2 cm)		



Introduction

The D-Series Wall luminaire is a stylish, fully integrated LED solution for building-mount applications. It features a sleek, modern design and is carefully engineered to provide long-lasting, energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years of nighttime use and up to 74% in energy savings over comparable 250W metal halide luminaires, the D-Series Wall is a reliable, low-maintenance lighting solution that produces sites that are exceptionally illuminated.

Ordering Information

EXAMPLE: DSXW1 LED 20C 1000 40K T3M MVOLT DBTxD

Series	LEDs	Drive Current	Color temperature	Distribution	Voltage	Mounting	Control Options
DSXW1 LED	10C 10 LEDs (one engine) 20C 20 LEDs (two engines)	350 350 mA 530 530 mA 700 700 mA 1000 1000 mA (1 A)	30K 3000 K 40K 4000 K 50K 5000 K AMBPC Amber phosphor converted	T2S Type II Short T2M Type II Medium T3S Type III Short T3M Type III Medium T4M Type IV Medium TFTM Forward Throw Medium ASYDF Asymmetric diffuse	MVOLT ¹ 120 ¹ 208 ¹ 240 ¹ 277 ¹ 347 ² 480 ²	Shipped included (blank) Surface mounting bracket BBW Surface-mounted back box (for conduit entry) ³	Shipped installed PE Photoelectric cell, button type ⁴ DMG 0-10V dimming driver (no controls) PIR 180° motion/ambient light sensor, <15' mtg ht ⁵ PIRH 180° motion/ambient light sensor, 15-30' mtg ht ⁵ PIR1FC3V Motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc ⁵ PIRH1FC3V Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc ⁵ ELCW Emergency battery backup (includes external component enclosure) ⁶

Other Options

Finish (required)

Shipped installed

SF	Single fuse (120, 277 or 347V) ⁷
DF	Double fuse (208, 240 or 480V) ⁷
HS	House-side shield ⁸
SPD	Separate surge protection ⁹

Shipped separately⁸

BSW	Bird-deterrent spikes
WG	Wire guard
VG	Vandal guard
DDL	Diffused drop lens

DDBXD	Dark bronze	DSSXD	Sandstone
DBLXD	Black	DBTxD	Textured dark bronze
DNAXD	Natural aluminum	DBLBXD	Textured black
DWHXD	White	DNATXD	Textured natural aluminum

DWHGXD	Textured white
DSSTXD	Textured sandstone

Accessories

Ordered and shipped separately.

DSXWHS U	House-side shield (one per light engine)
DSXWBSW U	Bird-deterrent spikes
DSXW1WG U	Wire guard accessory
DSXW1VG U	Vandal guard accessory

NOTES

- MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120, 208, 240 or 277 options only when ordering with fusing (SF, DF options), or photocontrol (PE option).
- Only available with 20C, 700mA or 1000mA. Not available with PIR or PIRH.
- Back box ships installed on fixture. Cannot be field installed. Cannot be ordered as an accessory.
- Photocontrol (PE) requires 120, 208, 240, 277 or 347 voltage option. Not available with motion/ambient light sensors (PIR or PIRH).
- PIR and PIR1FC3V specifies the [Sensor Switch SBGR-10-ODP](#) control; PIRH specifies the [Sensor Switch SBGR-6-ODP](#) control; see [Motion Sensor Guide](#) for details. Includes ambient light sensor. Not available with "PE" option (button type photocell). Dimming driver standard. Not available with 20 LED/1000 mA configuration (DSXW1 LED 20C 1000).
- Cold weather (-20C) rated. Not compatible with conduit entry applications. Not available with BBW mounting option. Not available with fusing. Not available with 347 or 480 voltage options. Emergency components located in back box housing. Emergency mode IES files located on product page at www.lithonia.com
- Single fuse (SF) requires 120, 277 or 347 voltage option. Double fuse (DF) requires 208, 240 or 480 voltage option. Not available with ELCW.
- Also available as a separate accessory; see Accessories information.
- See the electrical section on page 3 for more details.



Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K					40K					50K					AMBER				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
(10 LEDs)	350mA	14W	T2S	1,415	0	0	1	101	1,520	0	0	1	109	1,529	0	0	1	109	894	0	0	1	64
			T2M	1,349	0	0	1	96	1,449	0	0	1	104	1,458	0	0	1	104	852	0	0	1	61
			T3S	1,400	0	0	1	100	1,503	0	0	1	107	1,512	0	0	1	108	884	0	0	1	63
			T3M	1,386	0	0	1	99	1,488	0	0	1	106	1,497	0	0	1	107	876	0	0	1	63
			T4M	1,358	0	0	1	97	1,458	0	0	1	104	1,467	0	0	1	105	858	0	0	1	61
			TFTM	1,411	0	0	1	101	1,515	0	0	1	108	1,525	0	0	1	109	892	0	0	1	64
	530 mA	20W	ASYDF	1,262	0	0	1	90	1,355	1	0	1	97	1,363	1	0	1	97	797	0	0	1	57
			T2S	2,054	1	0	1	103	2,205	1	0	1	110	2,219	1	0	1	111	1,264	0	0	1	63
			T2M	1,957	1	0	1	98	2,102	1	0	1	105	2,115	1	0	1	106	1,205	0	0	1	60
			T3S	2,031	0	0	1	102	2,181	0	0	1	109	2,195	0	0	1	110	1,250	0	0	1	63
			T3M	2,010	1	0	1	101	2,159	1	0	1	108	2,172	1	0	1	109	1,237	0	0	1	62
			T4M	1,970	1	0	1	99	2,115	1	0	1	106	2,128	0	0	1	106	1,212	0	0	1	61
	700 mA	27W	TFTM	2,047	0	0	1	102	2,198	0	0	1	110	2,212	0	0	1	111	1,260	0	0	1	63
			ASYDF	1,830	1	0	1	92	1,966	1	0	1	98	1,978	1	0	1	99	1,127	0	0	1	56
			T2S	2,623	1	0	1	97	2,816	1	0	1	104	2,834	1	0	1	105	1,544	0	0	1	57
			T2M	2,499	1	0	1	93	2,684	1	0	1	99	2,701	1	0	1	100	1,472	0	0	1	55
			T3S	2,593	1	0	1	96	2,785	1	0	1	103	2,802	1	0	1	104	1,527	0	0	1	57
			T3M	2,567	1	0	1	95	2,757	1	0	1	102	2,774	1	0	1	103	1,512	0	0	1	56
	1000 mA	40W	T4M	2,515	1	0	1	93	2,701	1	0	1	100	2,718	1	0	1	101	1,481	0	0	1	55
			TFTM	2,614	1	0	1	97	2,807	1	0	1	104	2,825	1	0	1	105	1,539	0	0	1	57
			ASYDF	2,337	1	0	1	87	2,510	1	0	1	93	2,526	1	0	1	94	1,376	0	0	1	51
			T2S	3,685	1	0	1	92	3,957	1	0	1	99	3,982	1	0	1	100	2,235	1	0	1	58
			T2M	3,512	1	0	1	88	3,771	1	0	1	94	3,795	1	0	1	95	2,130	1	0	2	55
			T3S	3,644	1	0	1	91	3,913	1	0	1	98	3,938	1	0	1	98	2,210	1	0	2	57
(20 LEDs)	350mA	24W	T3M	3,607	1	0	1	90	3,874	1	0	1	97	3,898	1	0	1	97	2,187	1	0	2	56
			T4M	3,534	1	0	1	88	3,795	1	0	1	95	3,819	1	0	1	95	2,143	1	0	2	55
			TFTM	3,674	1	0	1	92	3,945	1	0	1	99	3,969	1	0	1	99	2,228	1	0	2	57
			ASYDF	3,284	1	0	1	82	3,527	1	0	1	88	3,549	1	0	1	89	1,991	1	0	2	51
			T2S	2,820	1	0	1	118	3,028	1	0	1	126	3,047	1	0	1	127	1,777	1	0	1	74
			T2M	2,688	1	0	1	112	2,886	1	0	1	120	2,904	1	0	1	121	1,693	1	0	1	71
	530 mA	36W	T3S	2,789	1	0	1	116	2,995	1	0	2	125	3,013	1	0	2	126	1,757	0	0	1	73
			T3M	2,761	1	0	1	115	2,964	1	0	2	124	2,983	1	0	2	124	1,739	1	0	1	72
			T4M	2,705	1	0	1	113	2,904	1	0	2	121	2,922	1	0	2	122	1,704	1	0	1	71
			TFTM	2,811	1	0	1	117	3,019	1	0	2	126	3,038	1	0	2	127	1,771	0	0	1	74
			ASYDF	2,513	1	0	1	105	2,699	1	0	2	112	2,716	1	0	2	113	1,584	1	0	1	66
			T2S	4,079	1	0	1	113	4,380	1	0	1	122	4,408	1	0	1	122	2,504	1	0	1	70
	700 mA	47W	T2M	3,887	1	0	1	108	4,174	1	0	1	116	4,200	1	0	1	117	2,387	1	0	1	66
			T3S	4,034	1	0	1	112	4,332	1	0	1	120	4,359	1	0	1	121	2,477	1	0	1	69
			T3M	3,993	1	0	1	111	4,288	1	0	1	119	4,315	1	0	1	120	2,451	1	0	2	68
			T4M	3,912	1	0	2	109	4,201	1	0	2	117	4,227	1	0	1	117	2,402	1	0	1	67
			TFTM	4,066	1	0	1	113	4,367	1	0	1	121	4,394	1	0	1	122	2,496	1	0	1	69
			ASYDF	3,635	1	0	2	101	3,904	1	0	2	108	3,928	1	0	2	109	2,232	1	0	1	62
	1000 mA	74W	T2S	5,188	1	0	1	110	5,571	1	0	1	119	5,606	1	0	1	119	3,065	1	0	1	65
			T2M	4,945	1	0	1	105	5,310	1	0	1	113	5,343	1	0	1	114	2,921	1	0	1	62
			T3S	5,131	1	0	1	109	5,510	1	0	2	117	5,544	1	0	2	118	3,031	1	0	1	64
			T3M	5,079	1	0	2	108	5,454	1	0	2	116	5,488	1	0	2	117	3,000	1	0	1	64
			T4M	4,976	1	0	2	106	5,343	1	0	2	114	5,377	1	0	2	114	2,939	1	0	1	63
			TFTM	5,172	1	0	2	110	5,554	1	0	2	118	5,589	1	0	2	119	3,055	1	0	1	65
1000 mA	74W	ASYDF	4,624	1	0	2	98	4,966	1	0	2	106	4,997	1	0	2	106	2,732	1	0	1	58	
		T2S	7,205	1	0	1	97	7,736	1	0	1	105	7,785	1	0	1	105	4,429	1	0	1	61	
		T2M	6,866	1	0	2	93	7,373	1	0	2	100	7,419	1	0	2	100	4,221	1	0	2	58	
		T3S	7,124	1	0	2	96	7,650	1	0	2	103	7,698	1	0	2	104	4,380	1	0	2	60	
		T3M	7,052	1	0	2	95	7,736	1	0	2	105	7,620	1	0	2	103	4,335	1	0	2	59	
		T4M	6,910	1	0	2	93	7,420	1	0	2	100	7,466	1	0	2	101	4,248	1	0	2	58	
ASYDF	7,182	1	0	2	97	7,712	1	0	2	104	7,760	1	0	2	105	4,415	1	0	2	60			
ASYDF	6,421	1	0	2	87	6,895	2	0	2	93	6,938	2	0	2	94	3,947	1	0	2	54			

Performance Data

Lumen Ambient Temperature (LAT) Multipliers

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

Ambient		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	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the **DSXW1 LED 20C 1000** platform in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.95	0.93	0.88

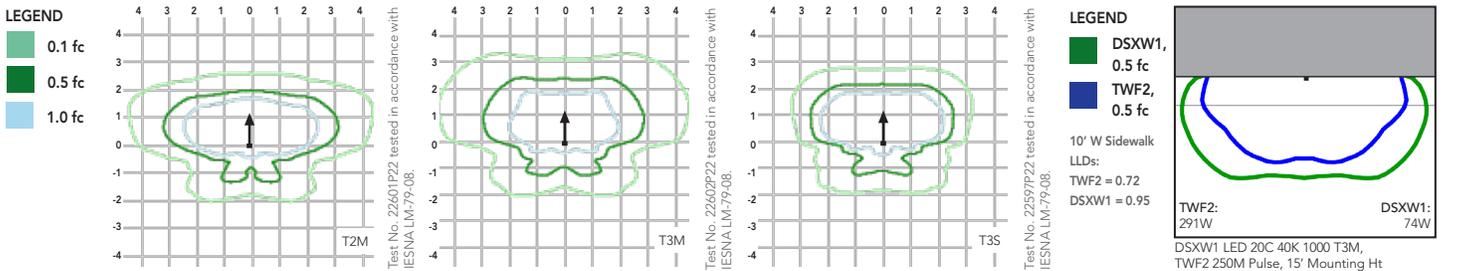
Electrical Load

LEDs	Drive Current (mA)	System Watts	Current (A)					
			120V	208V	240V	277V	347V	480V
10C	350	14 W	0.13	0.07	0.06	0.06	-	-
	530	20 W	0.19	0.11	0.09	0.08	-	-
	700	27 W	0.25	0.14	0.13	0.11	-	-
	1000	40 W	0.37	0.21	0.19	0.16	-	-
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Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's [D-Series Wall Size 1 homepage](#).

Isfootcandle plots for the DSXW1 LED 20C 1000 40K. Distances are in units of mounting height (15').



Options and Accessories



T3M (left), ASYDF (right) lenses



HS - House-side shields



BSW - Bird-deterrent spikes



WG - Wire guard



VG - Vandal guard



DDL - Diffused drop lens

FEATURES & SPECIFICATIONS

INTENDED USE

The energy savings, long life and easy-to-install design of the D-Series Wall Size 1 make it the smart choice for building-mounted doorway and pathway illumination for nearly any facility.

CONSTRUCTION

Two-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance. The LED driver is mounted to the door to thermally isolate it from the light engines for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65).

FINISH

Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in textured and non-textured finishes.

OPTICS

Precision-molded proprietary acrylic lenses provide multiple photometric distributions tailored specifically to building mounted applications. Light engines are available in 3000 K (70 min. CRI), 4000 K (70 min. CRI) or 5000 K (70 min. CRI) configurations.

ELECTRICAL

Light engine(s) consist of 10 high-efficacy LEDs mounted to a metal-core circuit board to maximize heat dissipation and promote long life (L88/100,000 hrs at 25°C). Class 1 electronic drivers have a

power factor >90%, THD <20%, and a minimum 2.5KV surge rating. When ordering the SPD option, a separate surge protection device is installed within the luminaire which meets a minimum Category C Low (per ANSI/IEEE C62.41.2).

INSTALLATION

Included universal mounting bracket attaches securely to any 4" round or square outlet box for quick and easy installation. Luminaire has a slotted gasket wireway and attaches to the mounting bracket via corrosion-resistant screws.

LISTINGS

CSA certified to U.S. and Canadian standards. Rated for -40°C minimum ambient.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org to confirm which versions are qualified.

WARRANTY

Five-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.





D-Series Size 1 LED Wall Luminaire



Catalog
Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

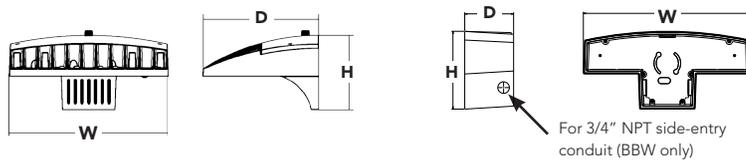
d#series

Specifications Luminaire

Width:	13-3/4" (34.9 cm)	Weight:	12 lbs (5.4 kg)
Depth:	10" (25.4 cm)		
Height:	6-3/8" (16.2 cm)		

Back Box (BBW, ELCW)

Width:	13-3/4" (34.9 cm)	BBW Weight:	5 lbs (2.3 kg)
Depth:	4" (10.2 cm)	ELCW Weight:	10 lbs (4.5 kg)
Height:	6-3/8" (16.2 cm)		



Introduction

The D-Series Wall luminaire is a stylish, fully integrated LED solution for building-mount applications. It features a sleek, modern design and is carefully engineered to provide long-lasting, energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years of nighttime use and up to 74% in energy savings over comparable 250W metal halide luminaires, the D-Series Wall is a reliable, low-maintenance lighting solution that produces sites that are exceptionally illuminated.

Ordering Information

EXAMPLE: DSXW1 LED 20C 1000 40K T3M MVOLT DBTxD

Series	LEDs	Drive Current	Color temperature	Distribution	Voltage	Mounting	Control Options
DSXW1 LED	10C 10 LEDs (one engine) 20C 20 LEDs (two engines)	350 350 mA 530 530 mA 700 700 mA 1000 1000 mA (1 A)	30K 3000 K 40K 4000 K 50K 5000 K AMBPC Amber phosphor converted	T2S Type II Short T2M Type II Medium T3S Type III Short T3M Type III Medium T4M Type IV Medium TFTM Forward Throw Medium ASYDF Asymmetric diffuse	MVOLT ¹ 120 ¹ 208 ¹ 240 ¹ 277 ¹ 347 ² 480 ²	Shipped included (blank) Surface mounting bracket BBW Surface-mounted back box (for conduit entry) ³	Shipped installed PE Photoelectric cell, button type ⁴ DMG 0-10V dimming driver (no controls) PIR 180° motion/ambient light sensor, <15' mtg ht ⁵ PIRH 180° motion/ambient light sensor, 15-30' mtg ht ⁵ PIR1FC3V Motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc ⁵ PIRH1FC3V Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc ⁵ ELCW Emergency battery backup (includes external component enclosure) ⁶

Other Options

Finish (required)

Shipped installed

SF	Single fuse (120, 277 or 347V) ⁷
DF	Double fuse (208, 240 or 480V) ⁷
HS	House-side shield ⁸
SPD	Separate surge protection ⁹

Shipped separately⁸

BSW	Bird-deterrent spikes
WG	Wire guard
VG	Vandal guard
DDL	Diffused drop lens

DDBXD	Dark bronze	DSSXD	Sandstone
DBLXD	Black	DBTxD	Textured dark bronze
DNAXD	Natural aluminum	DBLBXD	Textured black
DWHXD	White	DNATXD	Textured natural aluminum

DWHGXD	Textured white
DSSTXD	Textured sandstone

Accessories

Ordered and shipped separately.

DSXWHS U	House-side shield (one per light engine)
DSXWBSW U	Bird-deterrent spikes
DSXW1WG U	Wire guard accessory
DSXW1VG U	Vandal guard accessory

NOTES

- MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120, 208, 240 or 277 options only when ordering with fusing (SF, DF options), or photocontrol (PE option).
- Only available with 20C, 700mA or 1000mA. Not available with PIR or PIRH.
- Back box ships installed on fixture. Cannot be field installed. Cannot be ordered as an accessory.
- Photocontrol (PE) requires 120, 208, 240, 277 or 347 voltage option. Not available with motion/ambient light sensors (PIR or PIRH).
- PIR and PIR1FC3V specifies the [Sensor Switch SBGR-10-ODP](#) control; PIRH specifies the [Sensor Switch SBGR-6-ODP](#) control; see [Motion Sensor Guide](#) for details. Includes ambient light sensor. Not available with "PE" option (button type photocell). Dimming driver standard. Not available with 20 LED/1000 mA configuration (DSXW1 LED 20C 1000).
- Cold weather (-20C) rated. Not compatible with conduit entry applications. Not available with BBW mounting option. Not available with fusing. Not available with 347 or 480 voltage options. Emergency components located in back box housing. Emergency mode IES files located on product page at www.lithonia.com
- Single fuse (SF) requires 120, 277 or 347 voltage option. Double fuse (DF) requires 208, 240 or 480 voltage option. Not available with ELCW.
- Also available as a separate accessory; see Accessories information.
- See the electrical section on page 3 for more details.



Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K					40K					50K					AMBER				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
(10 LEDs)	350mA	14W	T2S	1,415	0	0	1	101	1,520	0	0	1	109	1,529	0	0	1	109	894	0	0	1	64
			T2M	1,349	0	0	1	96	1,449	0	0	1	104	1,458	0	0	1	104	852	0	0	1	61
			T3S	1,400	0	0	1	100	1,503	0	0	1	107	1,512	0	0	1	108	884	0	0	1	63
			T3M	1,386	0	0	1	99	1,488	0	0	1	106	1,497	0	0	1	107	876	0	0	1	63
			T4M	1,358	0	0	1	97	1,458	0	0	1	104	1,467	0	0	1	105	858	0	0	1	61
			TFTM	1,411	0	0	1	101	1,515	0	0	1	108	1,525	0	0	1	109	892	0	0	1	64
	ASDF	1,262	0	0	1	90	1,355	1	0	1	97	1,363	1	0	1	97	797	0	0	1	57		
	530 mA	20W	T2S	2,054	1	0	1	103	2,205	1	0	1	110	2,219	1	0	1	111	1,264	0	0	1	63
			T2M	1,957	1	0	1	98	2,102	1	0	1	105	2,115	1	0	1	106	1,205	0	0	1	60
			T3S	2,031	0	0	1	102	2,181	0	0	1	109	2,195	0	0	1	110	1,250	0	0	1	63
			T3M	2,010	1	0	1	101	2,159	1	0	1	108	2,172	1	0	1	109	1,237	0	0	1	62
			T4M	1,970	1	0	1	99	2,115	1	0	1	106	2,128	0	0	1	106	1,212	0	0	1	61
			TFTM	2,047	0	0	1	102	2,198	0	0	1	110	2,212	0	0	1	111	1,260	0	0	1	63
	ASDF	1,830	1	0	1	92	1,966	1	0	1	98	1,978	1	0	1	99	1,127	0	0	1	56		
	700 mA	27W	T2S	2,623	1	0	1	97	2,816	1	0	1	104	2,834	1	0	1	105	1,544	0	0	1	57
			T2M	2,499	1	0	1	93	2,684	1	0	1	99	2,701	1	0	1	100	1,472	0	0	1	55
			T3S	2,593	1	0	1	96	2,785	1	0	1	103	2,802	1	0	1	104	1,527	0	0	1	57
			T3M	2,567	1	0	1	95	2,757	1	0	1	102	2,774	1	0	1	103	1,512	0	0	1	56
			T4M	2,515	1	0	1	93	2,701	1	0	1	100	2,718	1	0	1	101	1,481	0	0	1	55
			TFTM	2,614	1	0	1	97	2,807	1	0	1	104	2,825	1	0	1	105	1,539	0	0	1	57
	ASDF	2,337	1	0	1	87	2,510	1	0	1	93	2,526	1	0	1	94	1,376	0	0	1	51		
	1000 mA	40W	T2S	3,685	1	0	1	92	3,957	1	0	1	99	3,982	1	0	1	100	2,235	1	0	1	58
			T2M	3,512	1	0	1	88	3,771	1	0	1	94	3,795	1	0	1	95	2,130	1	0	2	55
			T3S	3,644	1	0	1	91	3,913	1	0	1	98	3,938	1	0	1	98	2,210	1	0	2	57
T3M			3,607	1	0	1	90	3,874	1	0	1	97	3,898	1	0	1	97	2,187	1	0	2	56	
T4M			3,534	1	0	1	88	3,795	1	0	1	95	3,819	1	0	1	95	2,143	1	0	2	55	
TFTM			3,674	1	0	1	92	3,945	1	0	1	99	3,969	1	0	1	99	2,228	1	0	2	57	
ASDF	3,284	1	0	1	82	3,527	1	0	1	88	3,549	1	0	1	89	1,991	1	0	2	51			
(20 LEDs)	350mA	24W	T2S	2,820	1	0	1	118	3,028	1	0	1	126	3,047	1	0	1	127	1,777	1	0	1	74
			T2M	2,688	1	0	1	112	2,886	1	0	1	120	2,904	1	0	1	121	1,693	1	0	1	71
			T3S	2,789	1	0	1	116	2,995	1	0	2	125	3,013	1	0	2	126	1,757	0	0	1	73
			T3M	2,761	1	0	1	115	2,964	1	0	2	124	2,983	1	0	2	124	1,739	1	0	1	72
			T4M	2,705	1	0	1	113	2,904	1	0	2	121	2,922	1	0	2	122	1,704	1	0	1	71
			TFTM	2,811	1	0	1	117	3,019	1	0	2	126	3,038	1	0	2	127	1,771	0	0	1	74
	ASDF	2,513	1	0	1	105	2,699	1	0	2	112	2,716	1	0	2	113	1,584	1	0	1	66		
	530 mA	36W	T2S	4,079	1	0	1	113	4,380	1	0	1	122	4,408	1	0	1	122	2,504	1	0	1	70
			T2M	3,887	1	0	1	108	4,174	1	0	1	116	4,200	1	0	1	117	2,387	1	0	1	66
			T3S	4,034	1	0	1	112	4,332	1	0	1	120	4,359	1	0	1	121	2,477	1	0	1	69
			T3M	3,993	1	0	1	111	4,288	1	0	1	119	4,315	1	0	1	120	2,451	1	0	2	68
			T4M	3,912	1	0	2	109	4,201	1	0	2	117	4,227	1	0	1	117	2,402	1	0	1	67
			TFTM	4,066	1	0	1	113	4,367	1	0	1	121	4,394	1	0	1	122	2,496	1	0	1	69
	ASDF	3,635	1	0	2	101	3,904	1	0	2	108	3,928	1	0	2	109	2,232	1	0	1	62		
	700 mA	47W	T2S	5,188	1	0	1	110	5,571	1	0	1	119	5,606	1	0	1	119	3,065	1	0	1	65
			T2M	4,945	1	0	1	105	5,310	1	0	1	113	5,343	1	0	1	114	2,921	1	0	1	62
			T3S	5,131	1	0	1	109	5,510	1	0	2	117	5,544	1	0	2	118	3,031	1	0	1	64
			T3M	5,079	1	0	2	108	5,454	1	0	2	116	5,488	1	0	2	117	3,000	1	0	1	64
			T4M	4,976	1	0	2	106	5,343	1	0	2	114	5,377	1	0	2	114	2,939	1	0	1	63
			TFTM	5,172	1	0	2	110	5,554	1	0	2	118	5,589	1	0	2	119	3,055	1	0	1	65
	ASDF	4,624	1	0	2	98	4,966	1	0	2	106	4,997	1	0	2	106	2,732	1	0	1	58		
	1000 mA	74W	T2S	7,205	1	0	1	97	7,736	1	0	1	105	7,785	1	0	1	105	4,429	1	0	1	61
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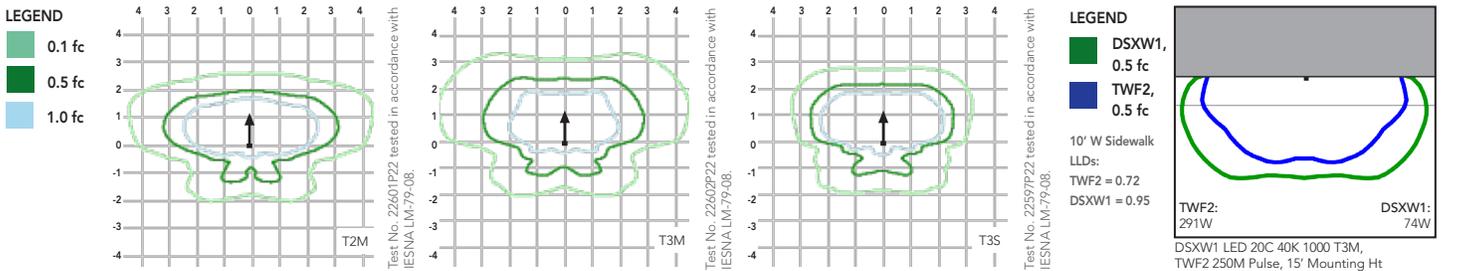
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Included universal mounting bracket attaches securely to any 4" round or square outlet box for quick and easy installation. Luminaire has a slotted gasket wireway and attaches to the mounting bracket via corrosion-resistant screws.

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