



Division 26. Electrical

26 00 00. Electrical

For campus projects that require an electrical system shut down, a [Power Outage Planning Form](#) must be completed and filed seven days prior to activity, so that it can be reviewed, approved, and coordinated with FP&M.

26 05 00. Common Work Results for Electrical

26 05 05. General Requirements for Electrical

1. When owner training is scheduled for equipment and systems, it shall actually take place.
2. Record drawings shall be kept up to date on the job site, and turned over to the A/E prior to final pay requests. They shall be prepared by the A/E in a clear AutoCAD format. The campus shall receive two paper copies as well as a CD for record drawings.
3. Coordination of the GFI devices used on any electrical system shall be required. The use of a single trip mechanism on a main breaker or switch shall not be considered as the sole device for system protection. Consideration for multiplying GFI devices shall be given to avoid a total power loss when a ground fault occurs at a low level.
4. In place of conventional smoke detectors, beam detectors shall be used in all large areas, such as in atriums or large gathering spaces.
5. All thermostats shall be located directly above light switches in private offices and conference rooms. These shall be placed next to the latch side of the door or side light. Coordinate with both mechanical and furniture plans.

26 05 36. Cable Trays for Electrical Systems

Rigid cable trays and fitting, flexible cable trays shall be considered and appropriate. Examples of flexible cable trays are: “Flex tray,” “Cablofil,” or “Snake Tray.” Any cable trays considered for use shall have UL-listing or another appropriate certificate.

26 05 53. Identification for Electrical Systems

All motors shall be labeled with PM number, MCC or panel served from and room number where MCC or panel is located.

26 10 00. Medium-Voltage Electrical Distribution

26 13 00. Medium-Voltage Electrical Switchgear

1. Electrical Switching Protocol: UW Physical Plant personnel shall be involved in all electrical switching activities. Only UW Physical Plant personnel shall operate medium voltage switches (4,160 volt and 13,800 volt). To arrange electrical switching activities, the contractor shall send a date-stamped request to the UW Physical Plant CARS team.



2. Indoor Metal Enclosed Air Interrupter Switch: All efforts shall be made to serve each building on campus with a looped primary feed to allow building to remain in service when an outage must take place.

26 30 00. Facility Electrical Power Generating and Storing Equipment

26 32 00. Packaged Generator Assemblies

26 32 13. Engine Generators

1. All emergency generator installations shall comply with local noise ordinances.
2. Provisions shall be made for year-round access to the fuel port by a standard truck and gravity-fill hose at a distance no greater than 100 feet.
3. When determining generator locations, the possibility of soot staining of nearby building surfaces and cross contamination to nearby air intakes shall be considered.
4. All emergency generators shall be located inside buildings.
5. On the rare occasion when the project supplies the UPS systems, they shall be designed for the specific application of use on emergency generators. Frequency shift of emergency generators, when loads are placed “on” or “off” the system, shall be considered. UPS systems installed by the project shall be able to tolerate this frequency shift without short-cycling the UPS.
6. Large generators shall require synchronizing switches and their related shunt trip protection. Refer to *Division 26 36 00 – Transfer Switches*.
7. Contractors shall test emergency generators under full load (load bank.) Generator shall be refueled upon turn over to the University.
8. Generator fill pipes shall to be located above grade and external to the building. No pressurized filling to the generator shall be permitted. Use gravity feed with remote fuel level monitoring when necessary.
9. Generator installations shall be designed and located to incorporate air transfer for makeup air without the need to be fan motor driven, i.e. use area wells or dampers without fans. Generator rooms shall also be designed to not freeze the sprinkler protection system when the generator is running. Modulate return air dampers for generator radiator exhaust shall be used to maintain room temperature when outside ambient temperature is too low.
10. Makeup air dampers shall be sized to be 1.5 times the size of the radiator. This is considered to be the industry standard.
11. Generator controls shall be installed at no more than 6 feet above finished floor. Proprietary controls shall not be permitted.
12. An extra set of filters and belts shall be supplied. Oil and oil filters and fuel filters shall be changed at the end of the first year warranty period by the contractor.
13. Emissions and fuel consumption data over varying loads shall be provided.



14. Provide 2 hard copies of the complete O&M parts and service manuals. All wiring diagrams and as-builts shall be included.
15. Engine block heaters shall have isolation shut off valves installed at the block. Heaters shall be controlled not to exceed 105 degrees Fahrenheit.
16. Radiators on generators that exceed 350 kW shall have sight glasses or sight bubble installed.
17. Air dampers for intake and exhaust air shall follow UW DDC protocol for sequence and function.
18. An engine vapor collection system shall be provided on all diesel engines.
19. All diesel fuel tanks shall have fuel gauges and a threaded port for manual tests of fuel levels.
20. Provide 2 year parts and labor warranty.

26 36 00. Transfer Switches

1. It shall be preferred to have multiple transfer switches in place of single higher amperage transfer switches. Switches shall be maximum 400 amps whenever possible. This will reduce the liability when and if an equipment failure occurs.
2. Installed generators that are greater than 500 kW shall have a synchronizing type of transfer switch. If the project budget cannot support a synchronizing transfer switch, space shall be provided within the facility to accommodate an installation at a later date. All transfer switches shall be closed transition for connected loads that are not easily tested, to meet the code required test of the emergency power systems.
3. All generators sized 350 kW and greater shall include paralleling switches. Shunt trip breakers shall be provided for ATS emergency feeds when using closed transition switches.
4. One-line emergency power distribution diagrams shall be provided for each ATS's connected loads. Attach to each ATS. Each load shall be labeled from source to destination and from each destination back to the source.

26 40 00. Electrical and Cathodic Protection

26 41 00. Lightning Protection Systems

26 41 13. Lightning Protection for Structures

All building projects shall be studied to determine if there is a need for lightning protection systems. The project design team shall consult with the campus electrical engineer for input.

26 50 00. Lighting

26 50 50. General Lighting Fixture Requirements

1. Consult the UW Electric Shop to determine the standard light fixture for parking ramps. Refer to *Division 34 – Transportation and 26 56 00- Electrical*.



2. Fluorescent lamps shall be based on 4 feet Philips F32T8/TL850 whenever possible. No 8 feet lamps shall be used. Philips shall be used as reference standard, but all lamp brands meeting the DFD specifications are acceptable.
3. Color temperatures of lamps on campus shall be 4100K.
4. U-shaped lamps shall not be used.
5. Whenever possible, local motion controls with manual “off” switches shall be used. Where practical, ambient light detection shall also be implemented to further reduce energy consumption. Central lighting system controls shall only be used in places of assembly or wherever programmatic needs dictate their use.
6. All lighting fixtures shall be accessible to maintenance personnel with a simple 8 foot ladder. Final designed locations shall be at the lowest level possible, to allow the most convenient method for maintenance.

26 06 00. Exterior Lighting

26 56 05. Exterior Lighting Fixtures

1. Outdoor lighting fixtures shall be the campus standard Kim Archetype as identified below. These are a sole source item. No substitutions. DFD requires a Class 1 notice to be included in the specifications.
 - 1.1. The Archetype Model SAR for 12 foot poles and the Archetype Model AR for 25 foot poles are the campus standards.
 - 1.2. Lamps shall be LED.
 - 1.3. The Kim standard arm to connect light fixture to pole shall be used.
 - 1.4. The vertical slipfitter mount shall be round.
 - 1.5. Light fixtures shall include a photo cell control.
 - 1.6. Color of the light fixtures, light poles, arms, vertical slipfitter mounts, and base covers shall be black.
 - 1.7. Poles shall be aluminum, round, smooth (no flutes) and straight (non-tapered).
 - 1.8. The 12 feet tall, 4 inch diameter pole is the campus standard for pedestrian areas. The 25 feet tall, 6 inch diameter pole is the campus standard for vehicular areas.
 - 1.9. Base cover shall be the Kim Standard Base Cover (Round) and sit on a concrete base of 5 inch larger diameter.
2. The campus standard outdoor light fixture for “Historic” areas of campus is the Sternberg Main Street, Model MS6805. Use of this fixture shall be identified and approved by UW Campus Planning and Landscape Architecture. These are a sole source item No substitutions. DFD requires a Class 1 notice to be included in the specifications.
 - 2.1. Lamps shall be LED



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- 2.2. Fixture shall have decorative spikes (A).
 - 2.3. Lens shall be clear seeded acrylic (CSA) unless there are concerns with glare. Any deviations shall be approved by UW Campus Planning and Landscape Architecture.
 - 2.4. Post top (PT) mounted fixture shall be used.
 - 2.5. Color of light fixture, pole and all components shall be black.
 - 2.6. Poles shall be a 12 feet tall, 4 inch diameter, smooth, straight (12P4). The Williamsburg base shall be used.
 - 2.7. Single fuse and holder (FHS) shall be included.
 3. Concrete pedestals/footings for light poles shall be 36 inches above grade in parking lots and 6 inches above grade in all other areas.
 - 3.1. The base shall have a 1 inch beveled edge at a 45 degree angle and rubbed finish. The top of the base shall have a circular broom finish.
 - 3.1.1. Provide construction detail in 35% plan set.
 - 3.2. Diameter of concrete pedestals/footings shall be kept to a minimum but also provide required structural support and be larger than base cover (shroud) for the lamp base. The base cover shall not overhang the concrete pedestal/footing.
 - 3.3. The base cover shall sit flush on the concrete base without any gap.
 - 3.4. The concrete pedestals/footings of multiple light poles in proximity to one another shall have consistent heights.
 4. For Parking Structure Lighting see *Division 34 09 05, #6*.
 5. Provisions for control of exterior lighting circuits shall be made through the campus building control system (Johnson Controls METASYS).
 6. Exterior lighting shall be limited to what is required for security and safety.
 7. Seat wall lighting, step lights, hand rail lights, and bollard lights (LED and non-LED) are strongly discouraged for maintenance reasons and shall not be used
 8. Control of light pollution continues to be an important issue on the campus. Up-lighting and/or building accent lighting shall not be specified. All lights shall have sharp cut offs and be Night Sky Compliant.
 9. Wall pack light fixtures shall be avoided. Use building mounted light fixtures instead if needed. Pole mounted lights are the campus preferred method of illumination and shall be used whenever possible.
 10. Any exterior light fixtures within the project boundary shall be updated to meet current campus standards. Non-standard lights shall not be reinstalled.
 11. An exterior lighting plan with schedule that identifies location and type of all exterior lights including pole mounted and building mounted fixtures shall be provided.



11.1. The light schedule for exterior lights shall be on the same sheet as the lighting layout plan.

Division 26 Detail 1



Power Outage Planning

Completed form required for power outage on UW Madison Campus
 UW Electric Shop - Approved (Yes , No)

Electrician Name
Company

Date
Contact Phone #

Building
Address

Number

1. Requested Outage Date
2. Time of Day
3. Reason for outage
4. Work order Number
5. Project #

Contact the following people-

Bldg Manager

Others

Rick Werre----- 263-3089

Kurtis Johnson----- 262-7776

Classroom Timetable-Registrar's Office

Cheryl Wise----- 265-6956

Please contact (BEFORE and AFTER) shutdown!!!

Doit Platform----- 263-2648 email (ns-field-repair@doit.wisc.edu)
 email (noc@doit.wisc.edu)

UW Police----- 262-2957
 262-4524 Fax (262-9768)