

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 26 • ELECTRICAL

26 00 00 • ELECTRICAL

SECTION INCLUDES

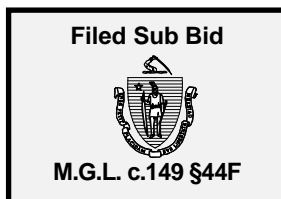
Electrical Service
Standby Generators
Wiring and Panel Boxes
Interior Lighting
Exterior Lighting
Emergency Egress Lighting

RELATED SECTIONS

07 07 00 Solar Photovoltaic Systems
08 70 00 Hardware
14 20 00 Elevators
22 00 00 Plumbing
23 00 00 Heating, Ventilation & Air Conditioning
33 00 00 Site Utilities

The following Section should be included as part of Section 26 00 00 when you have a project that has both electrical work and Electronic Safety equipment. Should the work just be, for example, Fire Alarm work then it can be bid as section 28 00 00.

28 00 00 Electronic Safety Equipment – including
Fire Alarm (Smoke & Carbon Monoxide Detectors)
Telephone
Cable TV
Intercom
Emergency Call System



Electrical is a stipulated filed sub-bid category under M.G.L. Chapter 149, §44F. If the project total cost is \$100,000.00 or greater and the cumulative estimated value of the work in this section exceeds \$20,000, it triggers the filed sub-bid requirement.

For Contracts estimated over \$100,000 that are predominately Electrical Work the DCAM category for the General Contractor should be Electrical.

TECHNICAL STANDARDS, LAWS, ORDINANCES AND CODES

All materials furnished and all work installed shall comply with the rules and recommendations of:

- MA Electrical Code (MEC)
- National Board of Fire Underwriters
- Local Utility Company

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- All Federal, State, Local, Town, City or County Departments having jurisdiction

ELECTRICAL SERVICE

DESIGN

Coordinate the design with the local utility company prior to finalizing bidding documents. Check with the local utility to determine whether pole or pad-mounted transformers are preferred and determine the concrete encasement requirements.

Underground wiring and pad-mounted transformers are recommended for electrical service, if economically feasible. Underground service is preferred mainly for appearance considerations. It may be possible to have overhead service to the site with underground distribution to the buildings.

Evaluate the service connection for capacity and reuse.

Where three-phase equipment is installed, e.g., septic system pumps, etc, confirm that three-phase power is available on-site.

If residents will *not* be paying for their own electric consumption, the site should be centrally metered in order to take full advantage of the utility company's time of use rates.

Consult with the LHA to determine whether there is a likelihood in the near future that the residents will be individually billed for electricity. If that is the case, consider adding empty meter sockets.

During design, the consultant shall contact the electric utility to inform them of the impending electrical work and determine whether any utility primary side work is anticipated. If an agreement for utility work needs to be completed between the utility and the LHA before the electrical contractor starts construction, assist the LHA to obtain this agreement from the utility. This will avoid time delays once the electrical contractor's construction contract is signed.

EXECUTION

The Contractor is responsible for the coordination of utilities, including installation and scheduling. Coordinate the Contract Documents accordingly.

All local utility connection fees should be billed to the housing authority which will pay the utilities directly. Backcharges should not be included in the bid.

Provide spare conduit where utilities cross roads and paving to make future installation easier.

STANDBY GENERATORS

Provide a standby generator only where required by the building code.

The standby generator may be powered by diesel fuel oil or by natural gas. Use of natural gas shall be with the approval of the local authority only. In addition to the mandatory loads to be carried by the generator per code, the consultant may include a few receptacles on each floor to support the

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residents' medical equipment and the AC in the community room. Consult with the LHA to determine if there are any other special needs required to be added to the generator load.

Avoid oversizing the standby generator.

Where diesel fuel is used to run the generator, provide a sub-base fuel oil storage tank with a run capacity of a minimum of 24 hours unless otherwise directed by the LHA or the authority having jurisdiction.

Consider the installation of a fence around the generator.

WIRING & PANEL BOXES

DESIGN

Unit load calculations should consider at least two window air conditioners per apartment. A separately circuited (120v, 20amp) air conditioner receptacle should be considered in the living room and master bedroom. The receptacles should be in addition to the receptacles required by code.

Mounting heights:

- Wall Receptacles 18" AFF (except @ kitchen counters)
- Light Switches 48" AFF
- Thermostats, etc. 54" AFF to top of dials for side reach
and 48" AFF for forward reach

For Kitchen and Bath upgrade projects, confirm that the unit loadcenter does not require replacement due to the need for additional circuits or lack of accessibility.

In most bathroom applications, bathroom exhaust fans shall be run intermittently. The bathroom lights and exhaust fan shall be controlled by a single switch. The switch shall be a time delay switch, that when turned off, allows the fan to continue to operate for a field adjusted period of time.

In some bathroom applications, where high humidity may be a problem, design alternates such as continuous bathroom fan operation or humidistat controls should be evaluated.



If there are no bathroom fans, provide one (less than 2 sones). Avoid fans that can be unplugged inside the fan unit by the residents. New bathroom exhaust fans shall be Energy Star rated.

For new homes certified to meet Energy Star or Stretch code requirements, bathroom exhaust fans may need to run continuously.

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Where new electric baseboard is installed, baseboard should not be located below wall receptacles per the MEC. Do not locate electric baseboard under toilet tanks.

Evaluate the existing construction features of the building to determine whether wires can be fished in walls and ceilings. Determine whether there is strapping in the ceilings, block walls, fire blocking in walls, blown-in insulation in the attics, etc. These are all factors that impact the contractor's ability to run wires in the building. Selective demolition by an electrical contractor may be required to determine feasibility of fishing wire in a building.

Determine whether the existing underground wires are direct buried or installed in conduit. Also determine whether any interior wiring may be old knob and tube type and evaluate its suitability for continued use.

MATERIALS

Aluminum wire should only be considered for use for site power distribution if recommended by the local electrical utility.

Use copper wiring within buildings; aluminum is not acceptable even if it is permitted by code.

Main panel boxes must be lockable.

Panelboard bus bars shall be copper.

All unit loadcenters shall meet the accessibility requirements of the Massachusetts Electrical Code. When new unit loadcenters are being installed, the minimum size should be 100 amps. New loadcenters should have spare poles in accordance with the MEC.

Existing load centers located in closets may need to be relocated outside of the closets due to the accessibility requirements of the MEC. Consult with the authority having jurisdiction.

As an alternative to replacing the entire loadcenter, replacing just the internals of the existing loadcenters shall be investigated.

Unit loadcenters shall have Arc Fault Circuit Interruption (AFCI) breakers for bedroom circuits. Where AFCI breakers are to be installed in older existing panels, confirm AFCI breaker will fit in existing panels during Construction Document preparation. Also, AFCI breakers have been shown to be problematic when installed, even though they are required by the MEC. Confirm with the authority having jurisdiction that they are required to be installed.

Federal Pacific Electric Co. (FPE) panels are no longer manufactured and replacement breakers are difficult to obtain. FPE (Stab Lok model) panels also have a history of problems. If FPE panels are in use at an LHA, assess whether these panels should be replaced based on the LHA's experience with these panels and whether additional breakers are to be added to the existing FPE panels.

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Run site electrical lines underground in PVC conduit. Encase underground conduit in concrete as required by MEC.

Electrical manholes should be kept to a minimum.

When working with or replacing light fixtures as part of a modernization project, for example, re-siding, bath modernization or fire alarm system upgrades, check wiring to existing fixtures. Insulation around wires may be old and brittle and could create problems when an electrician tries to rework the wires.

For re-siding projects, review the exterior electrical equipment, i.e., meters, disconnects, etc., to determine whether they are suitable and can be reused or should be replaced.

Surface metal raceways, e.g., Wiremold, installations in family housing must consider vandalism abuse. Concealed wiring in finished spaces of family units is preferred.

INTERIOR LIGHTING

DESIGN

Install a bathroom light fixture on the wall or medicine cabinet above the bathroom sink.

Avoid wall-mounted fixtures except for fixtures above the bathroom sink.

Verify that gypsum/plaster walls and ceilings and popcorn type ceilings do not have asbestos containing joint compound.



Energy Star fixtures which accept screw-based lamps or standard T8 type lamps are preferred. Avoid fixtures that require lamps with specialized bases.

New lighting levels, especially in kitchens and baths, should not be less than existing levels and should be improved above existing if needed. Measure existing lighting levels as required by the project.

INTERIOR LIGHTING, CONT

MATERIALS

Recessed lights and track lights are not recommended. Recessed lights may be considered in certain applications such as above kitchen counters or sinks, etc.

Consult with the Housing Authority on lamp and ballast preferences.

Consider light fixtures with plastic globes to minimize breakage.

Provide economical, residential fixtures suitable for public housing.

Install switched receptacles or switched ceiling lights in bedrooms.

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In kitchens, provide full spectrum, fluorescent lamped fixtures with high quality, energy efficient, electronic ballasts. Provide fluorescent task lighting above the sink.

In bathrooms, provide full spectrum, fluorescent lamped fixtures with high quality, energy efficient, electronic ballasts.



Investor-owned utilities have funded a Low Income Multifamily Energy Retrofit program targeted to public and affordable housing. The program conducts an energy audit and typically provides many interior and exterior lighting fixtures and bulbs **at no cost** to the housing authority. Designers should inquire whether the housing authority has applied to this program as a complement to the resources available to any capital project involving electrical services. Program guidance is found at www.leanmultifamily.org. This program does not apply to housing authorities in communities with municipal electric companies.

EXTERIOR LIGHTING

DESIGN

Provide a site lighting map showing proposed point-by-point lighting levels.

Design exterior lighting to avoid excessive contrast. The Illuminating Engineering Society (IES) www.iesna.org maximum/minimum ratio should be 1:3.

For site lighting, e.g., walkways and parking lots, evaluate the advantages of high pressure sodium, LED and metal halide fixtures and make a recommendation for the specific application to DHCD and the LHA. Consider light output, longevity, cost, light quality and environmental impact.

MATERIALS

Site, exterior lighting should have underground wiring, suitable poles, and light fixtures.

Specify fixtures with shielded lamps to prevent glare to adjoining property and night sky.

Photo cells, dusk to dawn, are recommended.

EMERGENCY EGRESS LIGHTING

MATERIALS

For emergency egress lighting, the following options are acceptable:

- Headlamps on a battery
- Recessed "butter dishes" with remote battery
- Converted PL fixture with emergency ballast
- Floor fixture

Emergency egress lighting is required immediately outside the exterior egress door.

All exit signs must be illuminated.