

CLARK COUNTY DEPARTMENT OF BUILDING



COMMERCIAL ELECTRICAL INSPECTION CHECKLISTS 2005 NEC CODE

August 30, 2010

GENERAL NOTES

- This checklist is intended for use as a GUIDE to assist and promote consistency in the application of the electrical code and standard practices within Clark County. This list is for use of county inspectors and for the general public.
- Approved plans, inspection record card, permit and any inspection history shall be on site for all inspections.
- Review the job history prior to starting any inspection.
- All work complies with all applicable codes and the approved plan.
- Deviation from the approved plan will require a revision to the plan
- Any item, that requires a plan review action, requires a correction notice be issued.
- All electrical equipment shall be listed by a Nationally Recognized Testing Laboratory and be installed to the terms of its listing
- The owner, permit holder or responsible person on the job site is responsible for establishing safe access to perform all inspection.
- In the event that ladders are necessary to perform inspections, all ladders and equipment shall meet minimum OSHA standards. Inspectors are not responsible for setting up or moving ladders from one location to another, within or to other buildings or structures.
- Inspectors are not responsible for unscrewing/unbolting of items to verify information that is part of an inspection.

Code references coding

- A= amendment
- E= energy code
- EL= NEC, electrical code
- R= residential code

Note: This is not a complete list and is not inclusive of all construction methods, materials or practices. Checklists are intended to serve as a reference point for a basic inspection only. Compliance with all the provisions of applicable codes shall be required.

COMMERCIAL GROUNDING ELECTRODE (3319)

- 22.02.090 If the approved plans exceed the code minimum for an electrode, as prescribed by the National Electrical Code, then the plans shall govern.
- A250.50 All new construction shall have a concrete encased electrode (UFER) installed as the main grounding electrode, as required by the Southern Nevada Electrical Code Amendments.
- 250.52A3 Verify concrete encased electrode is of the proper size, material, length and located in the bottom of the footing.
- A250.52 Existing structures, stand alone service equipment, generators, temp power poles or other separately derived systems may have a grounding electrode of any type prescribed in the National Electrical Code, or per the Southern Nevada Electrical Code Amendments.

NOTE: "PIPE" AND "PLATE" ELECTRODES ARE NOT PERMITTED BY AMENDMENTS.

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COMMERCIAL GROUNDING ELECTRODE INSPECTION (3319)

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UNDERGROUND ELECTRICAL (3311)

- 300.6 The wiring method and all associated fittings used are listed for an underground application. Burial depth is the depth required by Table 300.5 of the NEC.
- 300.5J Direct burial cables, such as USE or UF, are provided with an S loop at each end and protected by conduit to the required burial depth or **18 inches** below grade.
- 300.10 Metallic elbows and fittings that do not have earth coverage of **18 inches** are to extend in metallic raceways back to a panelboard, box or other enclosure due to grounding requirements.
- 408.5 Metallic conduit entering open bottom switch boards are to be racked to allow the installation of any bonding bushings or other fitting that may be required at the termination.
- A352.10 Rigid non-metallic conduit that is subject to physical damage must be a minimum schedule 80 RNMC.
- 300.5D3 Warning tape at **12 inches** above the service lateral conductor is provided and shall be verified prior to approval of underground electrical.
- 310.4 Raceways for parallel feeders are to be of the same material and the same length.
- 34x.30 Conduits within the building are supported and installed as prescribed by the Building Code and the NEC.
- 310.8C Any conductor used underground shall be required to be wet location conductors (i.e. THW, THWN, THHW, etc.).

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SLAB ELECTRICAL (3321)

- 300.6 The wiring method and all associated fittings used are listed for an underground application. Burial depth is the depth required by the NEC.
- 300.5C Cables such as USE or UF, can not be direct buried under a slab of a building, and must be installed in conduit as per 300.5 (C).
- 300.10 Metallic elbows and fittings that do not have earth coverage of **18 inches** are to extend in metallic raceways back to a panelboard, box or other enclosure due to grounding requirements.
- A352.10 Rigid non-metallic conduit that is subject to physical damage must be minimum schedule 80 RNMC.
- 408.5 Metallic conduit entering open bottom switch boards are to be racked to allow the installation of any bonding bushings or other fitting that may be required at the termination.
- 310.4 Raceways for parallel feeders are to be of the same material and of the same length.
- 34_.30 Conduits within the building are supported and installed as prescribed in the Building Code and the NEC.
- 310.8C Any conductor used under the slab shall be required to be wet location conductors (i.e. THW, THWN, THHW, UF, etc.).

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COMMERCIAL ROUGH ELECTRICAL (3331)

GENERAL

- 22.02.475 The rough electrical inspection is not to be approved until all of the previous inspections have been performed and approved including all feeders, branch circuit and service or distribution equipment installed.

PANELBOARDS (ALL PANELS)

- 408.30 Review the listing information in the panel and read all information on the label.
408.30 The panelboard is rated with the correct size, voltage and interrupting rating.
408.16 The panelboard is the correct type for the location, such as "Wet Location," etc. and installed per its listing.
110.3B The panelboard is listed and installed per the terms of its listing and any installation instructions provided by the manufacturer.
UL Any field modification of the equipment will result in voiding the listing.
A110.12 Used electrical equipment shall not be used without the prior approval of the Building Official.
110.26 Working clearances, dedicated spaces and illumination are provided where required.
110.26 Access is provided and meets the minimum dimensions.
110.26 If two exits are required, those exits are to swing in the direction of travel and be provided with approved panic hardware.
110.26 Panelboard is located in a dedicated space, unless it serves special use equipment or appliances.
408.17 No open bottom equipment is to be installed on a combustible floor.
110.3B Oxide inhibitor is required on all aluminum conductors at their terminations.
250.66 Grounding electrode conductor, when required, is sized per Table 250.66, terminates on the correct buss and by an approved method.
110.14A Only one grounded conductor (neutral) is permitted under a single screw on any buss, unless it is listed for multiple conductors.
110.3B All conductor terminations are listed for the correct wire size, type of conductor and are tightened to the listed torque requirement using the proper tool.
240.24 D&E No panels are to be installed in bathrooms of a dwelling, hotel/motel room or in a clothes closet.
300.10 Raceways or cables are terminated at the panel as prescribed for the wiring method used.

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- 404.8 No circuit breakers are higher than **6 feet, 7 inches** above the floor or grade level.
- 110.12C The inside of the panel or electrical equipment is not damaged or contaminated by foreign materials such as paint, plaster, cleaners, abrasives, or corrosive residues.
- 110.12A All unused openings are closed using knock out seals of the appropriate thickness and type.
- 408.36F Any back fed breaker, that the conductors are not factory installed on, must be held to the buss with a positive means, such as clips, screws or bolts.
- 408.35 Lighting and appliance panel boards shall not exceed the number of circuits the panel board was designed and listed for.
- 110.27B Protection is provided where equipment is subject to physical damage.

SERVICE EQUIPMENT

- 230.70 Service is rated with the correct size, voltage and interrupting rating with a main disconnect, located on the exterior of the building or in a room that has direct access to the exterior of the building.
- 110.3B The installation instructions shall be on site and all instructions followed.
- 250.24A1 Line side conductors or grounding and bonding connections are not located in the utility section of the service.
- 110.3B All entries made into the enclosure are made at the correct locations for the equipment used.
- 250.92 If a metallic service riser is used, it must be bonded to the service enclosure.
- 250.92 All interconnecting raceways, gutters, wire ways, and equipment enclosures on the line side of the service are to be bonded together using appropriate fittings, correct size bonding jumpers and correct methods.
- 408.5 Raceways do not extend into open bottom enclosures by more than three inches.
- 300.5G Underground raceways entering equipment are to be sealed.
- 250.24 Service is connected to the grounding electrode with the conductor sized per Table 250.66 and is terminated in an approved manner.
- 250.104 Water piping or building steel must be bonded to the service equipment. This conductor is sized from Table 250.66.
- 250.24A1 Connection of the grounding electrode conductor and any bonding conductor is not made in the utility side (line side of the enclosure).
- 230.95 Ground Fault Protection (GFP) of the service equipment is provided if required.
- 250.94 No phone or CATV grounds inside of the service equipment enclosure.

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FEEDERS

- Plans Feeders are sized per the approved plans.
- 215.6 Feeders shall contain an equipment grounding conductor.
- 310.8C Conductors run under slab or underground are approved for wet location.
- 215.12 Conductors are identified with the correct color for their use.
- 338.10 SE, SER, or UF Cables installed inside of buildings are to be installed per Article 334 for non-metallic sheathed cable.
- 34x Feeders installed in raceways shall have that raceway installed as required by the appropriate section of the code for that raceway.
- 310.4 Parallel feeders are to be installed as required by the code.

TRANSFORMERS

- 110.3 Transformers shall be listed and be installed per the terms of the listing.
- 110.3 Transformers shall be listed for the environment they are installed in.
- 450.9 All clearances must be maintained and no ventilation openings may be obstructed.
- 450.13 All transformers shall be accessible and protected from physical damage.
- 450.21 Dry-type transformers over 112-1/2 KVA shall be installed in a room having a fire rating of not less than one hour.
- 450.13B Dry-type transformers over 600 volts or over 50 KVA shall not be installed in hollow spaces of the building or structure where they will be enclosed by building construction, such as, above suspended ceilings.
- 450.3 Over current protection, where required, is provided.
- 450.10 Transformer is grounded and bonded as required in Article 250 of the NEC.

WIRING METHODS

- 90.7 All wiring methods shall be listed and per approved plan.
- 110.8 All wiring methods are to be installed in compliance with the applicable code article for that wiring method.
- 90.3 Wiring methods in specific locations, such as hazardous locations, health care facilities, and environmental air spaces shall be of the type required by that specific article of the code.
- 300.1 All wiring methods shall utilize the correct fittings, boxes and support methods for the method used and the environment they are installed in.
- A250.120D All wiring methods installed on roofs with a slope of 4/12 inches or less shall contain an equipment grounding conductor run with the circuit conductors.
- 300.7B All wiring methods crossing building expansion joints shall do so using the appropriate flexible raceway for the wiring method and field condition.

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LUMINAIRES (LIGHTING FIXTURES)

- 22.02.475C All luminaires that are supported directly from any suspended ceiling without the use of a box are to be installed at the time of the ceiling rough electrical inspection.
- 22.02.475C All box support wires and any slack wires to luminaires are to be in place for inspection.
- FIG-B-007 Minimum #12 slack wire with 3 turns within **3 inches** of each end.
- FIG-B-007 All lay in luminaires installed in a suspended ceiling are to be clipped or screwed to the ceiling frame on opposing corners.
- FIG-B-007 Luminaires are to be adequately supported as required for their weight and size.
- 410.17 Luminaires are to be grounded as required in Article 250.
- 410.68 All clearances to any luminaries shall be maintained.

BOXES

- Plans Boxes for all required devices and fixtures are installed and located as required on the approved plans.
- 314.23 Boxes must be rigidly secured to the structure.
- 314.27 Boxes are of the correct type for the device or fixture being installed.
- 300.14 Minimum **3 inches** of wire out of boxes before any joints including equipment ground wires.
- 314.20 Boxes in walls and ceiling shall be within ¼ inch of finished surface in non-combustible wall covering and flush in combustible wall covering.
- 110.3B Use of box extensions (goof rings) are acceptable and must be verified at final.
- 250.148 Tie all equipment grounding conductors in each box together. No tek or sheet metal screws are permitted to be used on grounding conductor connections.
- 250.148C Metallic boxes must be properly grounded.
- 404.9 Snap switches, including dimmers, shall be grounded unless installed in a metal box with self-grounding devices used and properly installed. Grounding pigtails must be present at time of rough.
- 314.3 Plastic boxes that use connectors have only non-metallic connectors installed.
- 314.25 Non-metallic type plaster rings (mud rings or box extensions) are to be used with non-metallic boxes or need grounding requirements.
- 314.23B1 No metallic fasteners inside of plastic boxes unless the box is listed for such use.
- 110.3B No box is to be field modified.
- R317.13.2 Boxes in fire rated walls are steel or are of the appropriate fire rating of the firewall and meet any opening size limitation or offset requirement set by the other codes.

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ELECTRICAL METER TAG (3395)

- 22.02.475 All work under the scope of work of the permit is to be complete.
- 230.95 If service equipment contains Ground Fault Protection (GFP), the ground fault performance test must be completed and approved with the equipment provided with the approval sticker of the agency performing the test. The testing agency is to provide a copy of the Ground Fault Performance Test Report to EQAA for inclusion in the permanent job record.
- A230.70 All required signage is to be correct and posted at the appropriate locations.
- FIG-E-008 If electrical meter tag is being issued prior to approval of the building final, a completed copy of the "AUTHORIZATION FOR TEMPORARY POWER THROUGH THE METER" is required and is to be forwarded to the area supervisor.
NOTE: Fire Alarm Pre-Final inspection is not required prior to issuance of an electrical meter tag when tag is done under the above agreement.
- FIG-E-008 Where the tag is being issued under the agreement prior to building final, all work contained under the scope of work on the permit(s) must be substantially complete, unless approved by the supervisor for special conditions.

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COMMERCIAL ELECTRICAL METER TAG INSPECTION (3395)

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FINAL ELECTRICAL (3399)

GENERAL

- 22.02.475 The final electrical inspection is not to be approved until all of the work under the scope of work is complete.
- 22.02.475 All boxes and outlets are provided with approved devices and cover plates.
- 210.8 All circuits that require GFCI protection, such as roofs, outdoors, kitchens and bathrooms are protected with ground fault circuit interrupter protection.
- 210.63 Receptacle outlet located within **25 feet** of all Heating, Air-Conditioning, and Refrigeration equipment, GFCI protected if outside or in crawlspace.
- 110.12C Verify the inside of electrical equipment not contaminated by foreign materials, such as paint, texture or similar agents.
- 404.9B All switches are to be grounded.
- 210.12 Verify AFCI protection is provided at AFCI required circuits.

SERVICE EQUIPMENT AND PANELBOARDS

- A230.70 All required signage is in place.
- 408.4 Service is complete with all covers in place, unused openings in the covers closed, and breakers or disconnects clearly labeled to indicate the loads served by a permitted method suitable for the environment.
- 110.3B If series rated systems are used, warning labels are required at the service and all panel boards.
- 230.95 Ground Fault Performance Test complete and report approved by EQAA.
- 110.27B Protection is provided where equipment is installed in a location that is subject to physical damage.
- 110.26 Working clearances and dedicated spaces around service are maintained.
- 110.26 Any illumination required for electrical rooms is installed.
- 110.26 Door swing from any electrical room requiring two exits is correct and panic hardware is installed.

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APPLIANCES AND MOTORS

- 90.7 Appliances and motors shall be listed by a “Nationally Recognized Testing Laboratory.”
- 422.30 Disconnecting means is provided in sight of equipment that require a disconnecting means and disconnect is correctly sized and rated for the load served.
- 430.101 Disconnects are readily accessible or accessible as required by code.
- 110.3B Appliances and Motors are listed for the use and environment and installed to the terms of their listings.
- 110.26 Working clearances and dedicated spaces around disconnects have been maintained.
- 430.51 Over current, short circuit and overload protection are correct size.
- 430.12E Appliances and Motors are grounded and bonded as required by Article 250.
- 110.3B Heat producing appliances may require the use of high-heat insulation on the conductors that supply the appliance.
- 110.14 Check for proper splicing methods of aluminum to copper.

LUMINAIRES (LIGHTING FIXTURES)

- Plans All luminaires required per approved plan are installed.
- 110.3B Luminaires are listed and installed to the terms of their listings.
- 410.4 Luminaires are listed for the environment or location they are installed in.
- 110.3B Luminaires connecting to manufactured wiring systems must comply with the requirements for that wiring method.
- 410.16 Luminaires are to be adequately supported as required for their weight and size.
- 410.17 Luminaires are to be grounded as required in Article 250.
- 410.5 All clearances to any luminaires shall be maintained.

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SOLAR PHOTOVOLTAIC CHECKLIST

The solar array shall be secured and supported in compliance with building code requirements.

- 690.4B Photovoltaic source and output circuits shall be kept separate from all other system circuits unless separated by a partition or connected together.
- 690.4D Equipment for use in photovoltaic systems shall be identified and listed for the application.
- 690.5 Grounded dc photovoltaic arrays shall be provided with dc ground-fault protection.
- 690.5 Exception No. 2 PV arrays at other than dwelling units.
- 690.7C One and two-family dwelling PV systems limited to maximum 600 volts.
- 690.7(D) Live parts over 150 V shall not be accessible to other than qualified persons.
- 690.8A The maximum PV source current shall be the short-circuit currents ratings multiplied by 125%.
- 690.8B PV systems currents shall be considered continuous.
(Conductors and overcurrent devices sized at 125%.)
- 690.13 A means shall be provided to disconnect all current-carrying conductors of a PV source from all other conductors in a building.
- 690.14C2 The disconnecting means shall be permanently marked to identify it as a PV system disconnect.
- 690.31E Where dc PV source or output circuits penetrate the building envelope they shall be in metal raceways.
- 690.64B2 The maximum of the overcurrent devices feeding the load side of a panel shall be 120% of the rating of the bus.
- 690.64B7 The 120% allowance is only if the overcurrent devices feed opposite ends of the bus.

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