Harford County Board of Electrical Examiners

Rules and Regulations of the Board

These Rules of Procedure are adopted pursuant to the Harford County Code, §16- 3

1. Board

A. Membership

The Board of Electrical Examiners shall consist of the following 5 members:

i) Three master electricians, actually working as electricians, who are residents of the County and whose principal place of business is located in Harford County;
ii) An architect or engineer who is a resident of the County and who is registered and licensed in accordance with the requirements of the state; and
iii) One citizen who is a resident of the County.

B. Officers

The members of the Board shall elect a Chairperson and Vice Chairperson, and the officers shall serve a term coterminous with the term of the County Executive.

C. Duties

1) To examine applicants for limited electrician, restricted electrician and limited journeyperson electrician registrations and other registrations as described in Chapter 105 of the Harford County Code.

2) The Board shall notify the Director of all qualified applicants who have applied for the issuance of registrations for limited electrician, restricted electrician, and limited journeyperson electrician.

3) To hold hearings on charges of misconduct of any of the registration holders. Suspend the registration of a registered registrant for up to one year and recommend revocation or suspension of greater than one year should the charges be substantiated and of sufficient gravity to warrant such suspension or revocation.

4) To file annually with the Director of the Department of Inspections, Licenses, and Permits a report of its activities for the preceding year.

D. Meetings

1) The Board shall meet at least once each month, unless determined by the chair that there is no business to be brought forth and shall hold special meetings, as necessary.

2) A quorum of the Board consists of three members.

3) An affirmative vote of a majority of a proper quorum shall be necessary for any action by the Board.

4) Meetings shall be conducted in compliance with the State's Open Meetings Act.

5) Unless otherwise provided in these rules and regulations, Roberts Rules of Order Newly Revised, current edition, shall govern parliamentary procedure during a meeting.

2. Registrations

A. Examination

i) Applications

Any individual desiring to secure a registration for a limited or restricted electrician registration as specified under Chapter 105 of the Harford County Code shall file an application on a form provided by the Department and submit the examination fee when applicable. Such application shall be reviewed by the Board along with any additional results from examinations.

ii) Testing

1) A written examination will be required of all applicants except those applicants who are currently licensed by the State and who meet the requirements of Subtitle 5, of Title 6, of the Business Occupations and Professions Article of the Annotated Code of Maryland.

2) Any applicant failing to pass an examination shall be afforded an opportunity to take the examination again. An applicant who fails an examination for a third time shall be required to submit evidence showing successful completion of an examination preparation course related to the classification of the registration the applicant is trying to achieve.

3) An applicant that fails to appear, for any reason, for a scheduled examination shall forfeit the application fee. An applicant unable to appear for a scheduled examination shall call or email the Department 24 hours prior to the examination, to inform the Board of the cancellation.

B. Registration Renewal

1) An application for renewal of a registration received within 90 days after the expiration of the registration shall be renewed provided the renewal and restoration fees are paid.

2) When an application for renewal of a registration is made after 90 days after a registration has expired, the Harford County Code(§105-22 A (2)) provides flexibility to the Board to determine if an applicant for registration renewal must show competency by examination. In cases where the applicant for renewal submits the application after the grace period but prior to the expiration of the current registration cycle, the Board will not require examination as long as the applicant for registration renewal submits a renewal application and can demonstrate that they have obtained the required continuing education hours and pays the required registration and restoration fees.

3) Except under extenuating circumstances, an applicant who fails to submit for renewal within two years of the expiration of the last valid registration will be required to take and pass a written examination before the Board will recommend issuance of a renewal registration.

(a) To be considered extenuating circumstances an applicant must provide written evidence to the Board demonstrating that the applicant was unable to complete the renewal process within the 2-year time frame due to some severe life event. The Board may waive the examination requirement if the Board determines that extenuating circumstances have prevented the applicant from applying for renewal or obtaining the required continuing education hours to qualify for registration renewal. Such life events may include, but are not limited to, military deployment, medical conditions including conditions of a family member, and prolonged out of state employment.

(b) Applicants for registration renewal seeking the Board's considerations of extenuating circumstances shall submit a written request to the Department of Inspection's, Licenses, and Permits. Applications will be considered at the next regularly scheduled Board meeting.

C. Suspension or Revocation of Registrations

1) Hearings

i) When the Board receives information or evidence that a master electrician, limited electrician, restricted electrician, or limited journeyperson electrician has engaged in conduct as described under § 105-28 A of the Harford County Code the Board shall schedule a public hearing.

ii) At least five (5) calendar days prior to the hearing, the Board Secretariat shall send by certified mail a notice of the alleged violation and hearing date, place, and time to the individual who is believed to have engaged in conduct as described under § 105-28 A of the Harford County Code.

iii) Three members shall constitute a quorum for the purpose of conducting a hearing, to participate in a hearing a member must attend in person or participate via a virtual meeting format.

iv) The individual shall have the right to be represented by counsel.

v) The Board shall record a transcription of the hearing, and the transcription shall be maintained for three (3) years after the action is concluded.

vi) The Chair or another member designated by the Chair shall convene the hearing and shall briefly state the allegations against the individual.

vii) The Chair or designated member acting as Chair shall have the authority to:

1. Grant a postponement of a hearing for good cause;
2. Rule on admissibility of evidence;
3. Consider and rule on all motions appropriate to the proceedings; and
4. Recess the hearing for any reasonable purpose.

viii) A party to the hearing has the right to:

1. Present opening and closing statements;
2. Call witnesses and present evidence;
3. Cross-examine witnesses; and
4. Present evidence.

2) Decisions

Each Board decision shall be in writing and shall include specific findings of fact with respect to each alleged violation. The Board shall issue a decision or submit a recommendation to the Director within 30 days of the hearing. Under §105-28 of the Harford County Code if the Board finds that a registration holder has violated that section of the Code, the Board may institute a suspension for up to one (1) year or recommend to the Director revocation of the registration.

D. Limited Electrician Registration Types

The Board finds that the following Limited Electrician Registration types shall be created in accordance with Harford County Code 105-15 B. A person registered by the County shall be deemed qualified to install, repair and maintain a particular appliance, apparatus, device, or fixture in accordance with the Electrical Code for the following categories:

1. Low Voltage and Home Automation
2. Commercial and Residential HVAC
3. Residential HVAC Service and Replacement
4. Signs
5. Elevators

MASTER ELECTRICAN - A person licensed by the State, who has completed a reciprocity application with Harford County, who is qualified to install, repair, maintain, erect electrical wiring, equipment, apparatus, and systems in accordance with the Electrical Code, including but not limited to electrical raceways, conductors, fixtures, signs, motors, switchgears and distribution systems, fixed electric heating systems or any other fixed electrical equipment or apparatus which conducts or consumes electric.

LIMITED ELECTRICIAN - A person registered by Harford County who is eligible to obtain permits for each of the sub-set of licenses listed below.

A. LOW VOLTAGE AND HOME AUTOMATION

This examination contains 50 questions – Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website. Applicants seeking this registration can work on electrical systems of 50 volts or less. The examination will require the applicant to demonstrate basic knowledge in these eight (8) basic areas. A few examples in each of the eight (8) areas are provided:

1. **Voltage and Current Limitations**
   - Cite the article that allows coaxial cable to carry power to equipment.
   - Write 2 microvolts in decimal form.
2. **Grounding and Bonding**
   - Calculate the grounding and bonding conductors for communication cables entering a building.
   - Describe the color of the grounded conductor.
   - Cite the article that states alternating current systems of fifty (50) volts or less must be grounded.
3. **Fire Safety**
   - List the power limitation for a Class 2 circuit with a voltage between 20-30 volts that needs overcurrent protection.
4. **Hazardous Locations**
   - Define intrinsically safe circuits and wiring in hazardous areas.
   - Lighting systems installed rated 30 volts or less cannot be operated within how many feet of swimming pools, spas, hot tubs?
5. **Antennas**
   - Cite the article that does not allow lead-in antenna wires to be attached to the service mast.
6. **Electrical Definitions and Calculations**
   - Define amperes, ohms, voltage, watts.
   - Calculate for resistance when given current and power.
7. **Class Circuits**
   - Define each Class of wiring systems regarding power and voltage limitations.
8. **Battery and Power Supply**
   - Calculate the battery life when given the ampere draw and the batter-life in hours.

B. SIGN

This examination contains 25 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these four (4) basic areas. A few examples in each of the four (4) areas are provided:

1. **Grounding and Bonding**
   - Cite the code article that states Flexible Metal Conduit may be used as a grounding means.
   - Cite the code article and materials that may be used as a bonding jumper.
2. **Electrical conduit and conductors**
   - List the size conduit required for four pieces of #12AWG THHN wire.
   - List the maximum amperage for one piece of #14 AWG with at 90 Celsius rating.
3. **Transformers**
   - List the maximum voltage allowed on a transformer secondary for signs.
4. **Overcurrent protection**
   - State the maximum size overcurrent protection for neon lights.
   - Cite the code article that describes where the disconnection means is located regarding the sign location.

C. **ELEVATOR**

This examination contains 50 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these eight (8) basic areas. A few examples in each of the eight (8) areas are provided:

1. Motor Disconnecting Means

Calculate a motor's disconnecting means using Article 430 in the NEC.
Calculate motor controller disconnecting means for circuits rated 600 volts or less.

2. Ampere Ratings for Fuses

Cite the code article for the standard rating of overcurrent protection.
Cite the code article for the smallest ampere rating of overcurrent protection.

3. Working Space Clearance

Cite the code article for working clearances in elevator shafts.

4. Voltage Drop and Conductors

Cite the maximum voltage drop for branch circuits and feeders.
Cite the code article for the minimum securing of flexible metal conduit and electrical metallic tubing.
Cite the maximum length of flexible metallic tubing when used with voltages over 600 volts.

5. Overcurrent Protection

Cite the code article that requires 125% increase for a single motor in continuous duty.
Cite the overcurrent protection required for a piece of 12AWG copper wire using 60C in Table 310-16.

6. Grounding and Identification

Describe the color of the grounding conductor.
Describe the color of the grounded conductor.

7. Branch Circuits and Identification

Cite the code article that allows the higher voltage on slash voltage circuit breakers 120/240 to be used.
Cite the code article that requires each ungrounded conductor must be identified by a system voltage.
Calculate the maximum ampere rating of a piece of #8 THHN in an ambient temperature of 40 degrees Celsius.

8. Electrical Penetrations

Cite the code article for electrical penetrations through fire-resistant-rated walls.
Cite the code article for thermal expansion of conduit on buildings.

D. HVAC RESIDENTIAL SERVICE & REPLACEMENT

This examination contains 50 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these three (3) basic areas. A few examples in each of the three (3) areas are provided:

1. Electrical Code and Standards

List the minimum depth of a direct buried cable supplying a thirty (30) amp condensing coil.
Determine the derating factor of electrical conductors when eight (8) conductors are in one piece of conduit.
List the required minimum distance of securing electrical metallic tubing.
Cite the code article that describes the distance required for bored-holes in wood frame members.

2. Electrical Components and Measurements

Define the term amperes, voltage, resistance.
Explain how a wattmeter is connected into an electrical circuit to measure wattage.
List the term used for measuring electrical capacitance.

3. Safety and Installation Practices

Cite the code article that states disconnecting means for HVAC equipment must be within sight and readily accessible.
Cite the code article that allows no more than four-quarter bends in one length of flexible metal conduit.
Describe the color of a grounding conductor.
Define the minimum setback of drilled holes in wood members when installing nonmetallic-sheathed cable.
List the maximum amperage overcurrent protection when using Liquid Tight Flexible Metal Conduit on sizes .75 – 1.125.

E. HVAC COMMERCIAL & RESIDENTIAL

This examination contains 50 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these five (5) basic areas. A few examples in each of the five (5) areas are provided:

1. **Circuit Loading**
   List the minimum cross fill area allowed in conduit.
   List the maximum rating or setting of a branch circuit overcurrent protection for a hermitic motor compressor.
2. **Air Conditioning Systems**
   Cite the code article that states the location of the disconnecting means regarding the AC unit.
   Calculate the minimum size AWG conductors that feed a group of motor compressors for refrigeration equipment.
3. **Electrical Conductors**
   Cite the article that allows 75-degree ampacity rating for wires rather than the normal 60-degree rating.
4. **Motor and Motor Protection**
   Describe how to reverse the direction of a split-phase motor.
   Describe how to reverse the direction of a three-phase motor.
   Calculate the wire size using the motor nameplate that draws 28 amps and is rated continuous duty using 60-degree conductors.
5. **Cable Support and Protection**
   Cite the code article that allows Flexible metal conduit to be used as a grounding conductor.
   Cite the code article that determines the fastening of Electrical Metallic Conduit to a surface.

LIMITED JOURNEYPERSON ELECTRICIAN - A person registered by Harford County who is **NOT** eligible to obtain permits for each of the sub-set of registrations listed below. Upon successful completion of any of the examinations listed below the *Limited Journeyperson Electrician* is qualified to install, repair and maintain electrical equipment and systems in accordance with the NEC, under the direction and supervision of a ***LIMITED ELECTRICIAN.***

A. **JOURNEYPERSON HVAC COMMERCIAL & RESIDENTIAL**

This examination contains 25 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these six (6) basic areas. A few examples in each of the six (6) areas are provided:

1. Circuit Loading

Calculate HVAC loads on electrical circuits.
Calculate HVAC continuous duty loads.
Calculate wattage of HVAC loads.

2. Air Conditioning Systems

Calculate the maximum size overcurrent protection in amperes for HVAC systems.
Determine NEC code requirements for HVAC exterior disconnects.
Determine locked rotor current for HVAC compressors.

3. Electrical Conductors

Calculate the volume in cubic inches for junction boxes.
Site the code article that states maximum and minimum free conductor at junction boxes.
Calculate minimum size 60-degree conductors for HVAC equipment.

4. Motor Protection

Use the motor nameplate to calculate running motor (heater) overload protection.
Calculate the maximum motor branch circuit, ground-fault protection.

6. Cable Support and Protection

Cite the code article where metal plate physical protection is required.
Cite code article that determines the securing of non-metallic sheathed cable.
Cite code article that determines the securing of electrical metallic tubing.

B. JOURNEYPERSON LOW VOLTAGE AND HOME AUTOMATION

This examination contains 25 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these five (5) basic areas. A few examples in each of the five (5) areas are provided:

1. **Electrical Installation Standards**
   Cite the code article that states electrical boxes must be within .25 inches of the finished surface.
   Cite the article that allows only certain types of optical fiber cable allowed in ducts and plenums.
2. **Circuit and Wiring Regulations**
   Define the minimum distance required between direct buried low voltage cables and power conductors.
   Describe which conductor in a low voltage electrical circuit requires overcurrent protection.
3. **Grounding and Bonding Requirements**
   Cite the code article that describes how non-current carrying metallic members of optical fiber cables must be grounded.
   List the minimum size bonding conductor for the antenna of an amateur radio and TV station system.
4. **Article 800 of the NFPA**
   List the minimum and maximum voltages allowed on Broadband communication cables.
   Provide the code article that states that Broadband Communication Cables must be at least 2 inches from 120-volt cables.
5. **Electrical Measurements and Definitions**
   Write, in decimal form, how 1 millivolt would be represented.
   Define ohms.

C. **JOURNEYPERSON SIGN**

This examination contains 25 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these five (5) basic areas. A few examples in each of the five (5) areas are provided:

1. Grounding and Bonding

Cite the code article that determines the equipment grounding conductor size for signs and non-current carrying equipment.
Machine screws may be used for grounding if the machine screw engages at least ____ of threads or is secured with a nut.
Describe and define when Flexible Metal Conduit may be used as a bonding conductor.

2. Wiring Methods

List the minimum size branch circuit for signs.
Cite the maximum size branch circuit protection for neon signs.
Cite the code article that determines where the sign disconnecting means must be located.

3. Portable Signs

All portable signs must have a grounding conductor (True or False).
List the types of cords acceptable in both dry and wet locations.

4. Ballasts

Define the working space required for ballasts and Class 2 power sources.
Ballasts secondary circuits must not exceed how many volts?

5 Neon

Neon secondary conducts shall be supported not less than _____ inches from the electrode connection to the tubing.
Define the difference, in neon secondary circuits that are 1000 volts or less compared to circuits that are over 1000 volts.

RESTRICTED ELECTRICIAN – A person registered by Harford County who is **NOT** eligible to obtain permits for the *MAINTENANCE ELECTRICIAN* registration. Upon successful completion of the *MAINTENANCE ELECTRICIAN* examination the applicant is qualified to install, repair and maintain electrical equipment and systems in accordance with the Electrical Code, under the direction and supervision of a *MASTER ELECTRICIAN.* The license shall apply only to a designated place such as a plant factory or apartment complex that employs maintenance personnel. In no case shall the person be allowed to extend or install any new electrical wiring or equipment.

A. **MAINTENANCE ELECTRICIAN**

This examination contains 50 questions - Code Edition to be determined by the Board and publicly published on the Department of Inspections, Licenses, and Permits website.
The examination will require the applicant to demonstrate basic knowledge in these seven (7) basic areas. A few examples in each of the seven (7) areas are provided:

1. **Electrical Systems**
   - Grounded and ungrounded systems.
   - AC and DC systems, transformers, rectifiers, and motor generators.
2. **Electrical Measurements**
   - Amperes, ohms, wattage, voltage, farad, induction.
   - Connection of measuring devices into circuits.
3. **Conductors and Wiring**
   - Interpreting table 310.16 for wire amperes.
   - Determine minimum size wires for circuits.
   - Calculating square mils for wires.
4. **Circuit Protection**
   - Determine where ground fault protection is required.
   - Determine what type of ground fault protection is required.
   - Calculate overload protection for electrical circuits.
5. **Electrical Devices**
   - Determine how to electrically connect a dual voltage motor.
   - Proper connection of aluminum and copper conductors.
6. **Electrical Codes and Standards**
   - Explain Class I Division 1 locations.
   - Installations of disconnecting means for outdoor equipment.
   - Interpret the NEC to find minimum code requirements.
7. **Electrical Calculations**
   - Calculate electrical costs of operating equipment.
   - Calculate voltage drop of a circuit.
   - Calculate the correct size conduit for wires using a 40% fill capacity.
   - Calculate circular mil for conduits.