



# **GHANA ELECTRICAL WIRING CERTIFICATION GUIDELINES**

**February 2013**

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## 1.0 INTRODUCTION

These guidelines are issued this 5<sup>th</sup> day of February, 2013 in fulfillment of the provisions of Regulation 8 of the Electrical Wiring Regulations, 2011, L.I. 2008.

## 2.0 BACKGROUND

The Ghana Electrical Wiring Regulations was passed by the Parliament of Ghana into law on Friday 24<sup>th</sup> February, 2012. The key objectives of the Regulations are to guide professionals who engaged in electrical wiring, and installation works in the performance of their duties and to ensure safety of lives and property.

The Electrical Wiring Regulations, 2011, L.I 2008 specifically provides for issues related to:

**i. Who qualifies to undertake electrical wiring in Ghana?**

Regulation 7 provides that:

*“ A person shall not undertake electrical wiring on premises unless that person is certified by*

- (a) a licensed electricity distribution utility; or*
- (b) a recognised person appointed by the Energy Commission”.*

**ii. How a certified qualified electrical wiring professional undertakes the wiring?**

Regulation 5 (1) and (2) state that:

*“ 5. (1) The Ghana Standards for electrical wiring set out in the Schedule, consists of the following matters:*

- (a) requirements for control and distribution of electricity on premises;*
- (b) protective measures for safety;*
- (c) selection and erection of equipment;*
- (d) special installations, locations and structures; and*
- (e) inspection and testing*

*and shall be construed in accordance with the provisions of these Regulations.*

*(2) A person shall not undertake electrical wiring on premises unless the wiring is carried out in accordance with the requirements **provided in GS 1009**”; and*

**iii. The type of materials to be used for electrical wiring in Ghana**

Regulation 4 states that:

*“A person shall not use a material for electrical wiring unless that material is*

- (a) *capable of maintaining the integrity of an electrical equipment or installation under environmental conditions stipulated by the manufacturer of the material for electrical wiring; and*
- (b) *approved by the Standards Authority”.*

## 3.0 CERTIFICATION

### 3.1 Classes of Certification

There shall be two classes of certification;

- a) Certified Electrical Wiring Professional (CEWP); and
- b) Certified Electrical Wiring Inspector (CEWI).

#### 3.1.1 Certified Electrical Wiring Professional (CEWP)

The Certified Electrical Wiring Professional shall be a qualified person certified to undertake safe electrical wiring in accordance with the Electrical Wiring Regulations 2011, L.I.2008.

The CEWP shall be certified to undertake one or more of the following:

- a. Domestic electrical wiring and installations;
- b. Commercial electrical wiring and installations; or
- c. Industrial electrical wiring and installations.

##### 3.1.1.1 Electrical Installation Certificate

All CEWPs shall be issued with identification numbers, cards and seals by the certifying authority. Blank Electrical Installation Certificate forms shall be issued by the certifying authority for completion, signature and seal by the CEWP in his certification class. Without prejudice to any legitimate requirements of the Utility, an Electricity Distribution Utility may connect a premise to its distribution system **only** upon presentation of;

- (a) a signed and sealed Electrical Installation Certificate ; and
- (b) the “ As Wired Electrical Drawing”.

The “As Wired Electrical Drawing” is a single line diagram showing the details of the installation as completed by the CEWP and capable of being used to trace and rectify faults in the installation should they occur. The Utility may further demand an Inspection Report prepared by a CEWI before connection.

### 3.1.2 Certified Electrical Wiring Inspector (CEWI)

A person may be certified and authorized to undertake inspection and auditing of ongoing, new and existing wiring of buildings and installations by the certifying authority in accordance with Regulation 11 of the Electrical Wiring Regulations 2011, L.I.2008 which provides that:

*“(1) A person who is authorised by an electricity distribution utility to carry out an inspection and test of an installation shall*

- (a) inspect and test that installation before use, and carry out another inspection and test where an addition or alteration is made to the fixed wiring of the existing installation;*
- (b) take precautions during the inspection and testing to avoid causing danger to persons and damage to property including installed equipment;*
- (c) complete and sign the relevant Electrical Installation Certificate and the schedule of inspection and test results; and*
- (d) submit the documents referred to in paragraph (c) to the person who requested for the inspection and test if the inspection and test are satisfactory.*

*(2) A distribution utility that authorises an inspection and test of an installation shall ensure that a periodic inspection and test is carried out at the intervals indicated in subsection (3) taking into consideration the type of installation, its use, maintenance schedule and environmental influences.*

*(3) Periodic inspection and testing shall be carried out in accordance with the following schedule:*

- (a) ten years after the initial installation and use;*
- (b) every three to five years after ten years of the initial installation and use but before the expiration of thirty years; and*
- (c) every two years after thirty years of service”.*

A CEWI shall:

- (i) be a CEWP with a minimum of five (5) years' experience; and
- (ii) have evidence of at least ten (10) duly certified electrical wiring installation works executed within the period.

### 3.2 How to obtain Certification

A person can become a CEWP through

- i Apprenticeship
- ii Formal education and Practical Training

An apprentice may during the course of apprenticeship or training undertake wiring works **only** under the supervision of a CEWP, who shall be responsible for all works performed by the apprentice.

An apprentice can undergo the proficiency training of the Council for Technical and Vocational Education Training (COTVET) formerly NVTI to prepare and take the examinations and interview to become a CEWP.

### 3.3 Stages in Certification

The certification process shall be in 3 stages and shall consist of :

- i. Written examination
- ii. Practical examination and
- iii. Interview

**The Written Examination** shall be based on the Ghana Standard for Electrical Wiring, GS 1009 which is part of the Schedules to the Electrical Wiring Regulations 2011, L.I. 2008 and as per the curriculum developed for that purpose. The written examination shall be practically oriented and shall involve the testing of the ability of an applicant to read and understand electrical wiring diagrams. The written examination shall be conducted at least twice in a year. Applicants shall have the choice of receiving private tuition from any source they deem good enough to prepare them for the examination.

**The Practical Examination** shall be a hands-on type. Candidates shall perform given practical assignment under the supervision of industry experts at accredited technical/vocational institutions.

The **interview** shall involve the applicant facing a panel of experts for an oral examination and shall be coordinated and chaired by the Technical and Vocational Education Directorate of the Ministry of Education. The interview shall be conducted at least twice in a year at accredited examination centres. Members of the interview panel may be drawn from the following institutions:

- i. Technical and Vocational Education Directorate of the Ghana Education Service (Chair);
- ii. Electricity Distribution Company within the area;
- iii. Polytechnic in the region that offers courses in Electrical Wiring;

- iv. Ghana Institution of Engineers ;
- v. Ghana Electrical Contractors Association;
- vi. Institute of Incorporated Engineers;
- vii. National Vocational Training Institute.
- viii. Energy Commission;
- ix. Technical & Vocational Education Division of Ministry of Education;

### 3.4 Exemptions

Electricians who have been certified by the Electricity Company of Ghana (ECG) or the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1)(a) of L.I.1816 **before** 24<sup>th</sup> February, 2007 shall be exempted from the written and practical examinations but shall take the interview and when successful shall be issued with

- a) A Certificate
- b) An Identity Card; and
- c) A Seal

Electricians who have been certified by the Electricity Company of Ghana (ECG) or the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1)(a) of L.I.1816 **after** 24<sup>th</sup> February, 2007 shall before 24<sup>th</sup> February 2015 pass the written examinations, the practical examination and the interview and shall be issued with

- a) A Certificate
- b) An Identity Card; and
- c) A Seal

A person who fails to take or who fails to pass the examinations and interview and in the case of the persons exempted who fails the interview to obtain the necessary certification shall from 24<sup>th</sup> February, 2015 cease to undertake any wiring installation works in Ghana.

### 3.5 Certified Electrical Wiring Inspectors

A person who has been a member of the Ghana Electrical Contractors Association, for more than 15 years as at 24<sup>th</sup> February 2012, who holds an internal installation license issued before 24<sup>th</sup> February 2007 and wishes to practice as a Certified Electrical Wiring Inspector (CEWI) shall undergo a proficiency interview and shall be required to show proof of jobs at least five (5) electrical wiring works.

Applications for certification as a CEWI shall be made to the Technical Examinations Unit and shall be accompanied with the payment of the appropriate application fee to be determined by the Examination Body and the Commission.

### **3.6 Renewal of Certificate**

A certificate shall be subject to renewal every five (5) years. The renewal process shall involve the applicant passing an interview.

## **4.0 ACCREDITED INSTITUTIONS**

### **4.1 Curriculum Development**

The Technical and Vocational Education Directorate of the Ghana Education Service shall be responsible for the development and subsequent revision of the curriculum in consultation with Distribution Utilities and the Energy Commission. The curriculum shall be reviewed periodically to conform to changing technological trends in the electrical wiring industry.

### **4.2 Conduct of Examination**

The Technical Examination Unit (TEU) which is under the Technical and Vocational Education Directorate of the Ghana Education Service (GES) shall coordinate and conduct the certification examination. The examination shall be conducted at least twice in a year at selected centres in the various regions of the country.

### **4.3 Practical Examination**

The Practical Examination shall be conducted at designated technical institutions. The Energy Commission shall grant accreditation to such institutions to host the practical examinations.

### **4.4 Oral Examination (Interview)**

The Energy Commission shall coordinate the conduct of the oral examination or may appoint an institution/professional body to coordinate it on its behalf.

### **4.5 Certification**

Results of the examination and interviews shall be forwarded to the Energy Commission. The Commission or any person authorized by the Commission shall issue the certificates of

the appropriate class to qualified applicants. The Commission shall keep a register of all qualified electrical wiring professionals and inspectors and shall publish the names on the Commission's website- [www.energycom.gov.gh](http://www.energycom.gov.gh) and the print media.

#### **4.6 Revision of Regulation**

The Energy Commission shall hold at least one (1) stakeholder forum every two (2) years to discuss and share experiences in the implementation of the regulation and possible review in the light of changing trends in the electrical wiring industry in an effort to sustain relevance of the regulations in the industry.

### **5.0 INSPECTION AND TESTING**

#### **5.1 New Facilities**

The distribution utility shall appoint inspectors who are certified under 2.1.2 of these guidelines, in accordance with Regulation 11 of the Electrical Wiring Regulation 2011, L.I. 2008

The distribution utility shall appoint a minimum of two inspectors per district within its distribution zone and make the list and contact details of certified inspectors for the respective districts available to the public on its website, at the offices of the Distribution Utility and in the print media and also make it available to the Commission. The cost of inspection shall be borne by the owner of the facility

The distribution utility shall report annually on inspection performed to the Commission in a format that shall be agreed with the Commission.

#### **5.2 Existing Facilities**

The electrical wiring of facilities existing before the commencement of the regulation shall be sampled and inspected by certified electrical inspectors to assess their capacity to continue receiving supply from a distribution utility in accordance with Regulation 11 of the Ghana Electrical Wiring Regulations.

## **6.0 ENFORCEMENT**

Enforcement of the provisions of the regulation shall be the preserve of the Energy Commission.

Certified professionals shall be issued seals, I.D. cards and Electrical Installation Certificates by the certifying authority. The seal shall appear on the Electrical Installation Certificate and shall be demanded by the distribution utility before connecting a new customer to its distribution network. This shall have a registered number traceable to the CEWP. This will ensure that, all households are wired by a CEWP or the wiring inspected and tested by CEWI before receiving supply from a distribution utility.

A licensed electrical wiring professional shall keep signed copies of;

- i. Electrical Installation Certificate;
- ii. Minor Electrical Installation Works Certificate;
- iii. Periodic Inspection Report; duly endorsed by the distribution utility serving the area; and
- iv. Single line diagram of the wired installation or facility labeled “ As Wired Electrical Drawing”.

Such reports and drawings shall be made available to the Commission on request for monitoring and enforcement purposes.

A copy of the “As Wired Electrical Drawing” shall be made available to the owner of the building or premises where the wiring was undertaken.

Periodically, the Commission shall obtain data of new service connections from distribution utilities and perform random checks on the wiring of new customers for compliance. If found short of the requirement, the CEWP who endorsed the wiring (as per the seal) shall be sanctioned. A distribution utility that connects a premise, which has not been endorsed by a CEWP, shall be sanctioned.

## **7.0 BUILDING CONTRACTS**

In all building contracts, electrical wiring jobs shall be under taken only by a CEWP. Distribution Utilities shall be entreated to demand the duly signed Electrical Installation Certificate for such projects before connecting to the utility system.

## **8.0 SANCTIONS**

Sanctions shall be applied to a person in accordance with Section 12(2) and 13 of L.I. 2008, Electrical Wiring Regulations 2011.

## 9.0 TRANSITIONAL PROVISIONS

### 9.1 Regularization of existing ECG and Ghana Electrical Contractors Association Internal Installation Licenses

Holders of Indoor Installation Licenses issued by the Electricity Company of Ghana (ECG) and the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1)(a) of L.I.1816, shall upon an application to the Energy Commission, be issued a provisional certificate to practice as CEWPs for a transitional period ending on 24<sup>th</sup> February 2015.

Indoor Installation Licenses issued by the Electricity Company of Ghana (ECG) and the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1)(a) of L.I.1816, shall continue to remain valid until 24<sup>th</sup> February 2014.

After 24<sup>th</sup> February 2014, all Indoor Installation Licenses issued by the Electricity Company of Ghana (ECG) and the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1)(a) of L.I.1816, shall cease to be valid but shall be exchangeable for provisional certificates until 24<sup>th</sup> February 2015.

Within the period ending on 24<sup>th</sup> February 2015, holders of Indoor Installation Licenses issued by the Electricity Company of Ghana (ECG) and the Ghana Electrical Contractors Association or other similar body recognized by a licensed electricity distribution utility under Regulation 2 (1) (a) of L.I.1816, are expected to have their certificates regularized under the Electrical Wiring Regulations after taking the certification examination or lose their certification.

Application forms for regularization shall be completed and the payment of the appropriate application fee in the form of a banker's draft shall be submitted at the nearest Regional or District office of the Electricity Company of Ghana (ECG) or the Northern Electricity Distribution Company (NEDCO)

### 9.2 Apprentices and Existing Practitioners

Electricians who have undergone apprenticeship training but do not have the academic qualifications to take the written examination immediately but have exceptional practical experience shall work under the supervision of a CEWP, within the transitional period. An apprentice may during the course of apprenticeship or training undertake wiring works **only** under the supervision of a CEWP, who shall be responsible for all works performed by the apprentice.

Such electricians can undergo the proficiency training of the COTVET to prepare to take the written examinations and interview within the 24-month transitional period to become a CEWP.

## **APPENDIX**



**PARTICULARS OF SIGNATORIES TO THE ELECTRICAL INSTALLATION CERTIFICATE**

**Designer (No 1)**  
 Name: ..... Company: .....  
 Location: .....  
 Postal address: ..... Tel No: .....

**Designer (No 2)**  
 (if applicable)  
 Name: ..... Company: .....  
 Location: .....  
 Postal address: ..... Tel No: .....

**Constructor**  
 Name: ..... Company: .....  
 Location: .....  
 Postal address: ..... Tel No: .....

**Inspector**  
 Name: ..... Company: .....  
 Location: .....  
 Postal address: ..... Tel No: .....

**SUPPLY CHARACTERISTICS AND EARTHING ARRANGEMENTS** Tick boxes and enter details as appropriate

Earthing Arrangements	Number and type of Live Conductors	Nature of Supply Parameter	Supply Protective Device Characteristics
TN-C <input type="checkbox"/>		Nominal voltage, $U/U_o^{(1)}$ ..... V	Type: .....
TN-S <input type="checkbox"/>	a.c. <input type="checkbox"/> d.c. <input type="checkbox"/>	Nominal frequency, $f^{(1)}$ ..... Hz	
TN-C-S <input type="checkbox"/>	1 -phase, 2 wire <input type="checkbox"/> 2 -pole <input type="checkbox"/>	Prospective fault current, $I_{pf}^{(2)}$ .....kA	Nominal current rating ..... A
TT <input type="checkbox"/>	2 -phase, 3 wire <input type="checkbox"/> 3 -pole <input type="checkbox"/>	External loop impedance, $Z_o^{(2)}$ ..... $\Omega$	
Alternative source of supply (to be detailed on attached schedules) <input type="checkbox"/>	3 -phase, 3 wire <input type="checkbox"/> Other <input type="checkbox"/>	(Note: (1) by enquiry, (2) by enquiry or by measurement)	
3 -phase, 4 wire <input type="checkbox"/>			

**PARTICULARS OF INSTALLATION REFERRED TO IN THE CERTIFICATE** Tick boxes and enter details as appropriate

Means of Earthing	Maximum Demand
Supplier's facility <input type="checkbox"/>	Maximum demand (load) ..... Amps
Installation earth Electrode <input type="checkbox"/>	<b>Details of Installation Earth Electrode</b> (where applicable)
	Type Location Electrode resistance to earth (e.g. rod(s), tape, etc) ..... ..... $\Omega$

**Main Protective Conductors**

Earthing conductor: material ..... csa ..... connection verified   
 Main equipotential bonding conductors material ..... csa ..... connection verified   
 To incoming water and/or gas service To other elements: .....

**Main Switch or Circuit-breaker**

GS, Type and No. of poles ..... Current rating ..... A Voltage rating ..... V  
 Location ..... Fuse rating or setting ..... A  
 Rated residual operating current  $I_{\Delta n}$  = ..... mA, and operating time of .....ms (at  $I_{\Delta n}$ ) (applicable only where an RCD is suitable and is used as a main circuit breaker)

**COMMENTS ON EXISTING INSTALLATION** (in the case of an alteration or addition see Regulation 743-01-04):  
 .....  
 .....

**SCHEDULES**  
 The attached Inspection and Test Result Schedules are part of this document and this Certificate is only valid when Test Result Schedules are attached to it.  
 ..... Inspection Schedules and ..... Test Result Schedules are attached. (Enter quantities of schedules attached)

ENERGY COMMISSION  
ELECTRICAL INSTALLATION CERTIFICATE (FORM A)

SEAL

SERIAL NO ·

**To be used only for minor electrical work which does not include the provision of a new circuit**

**PART 1 : Description of minor works**

1. Description of the minor works  
Location/Address

3. Date of minor works completed

**PART 2 : Installation details**

1. System earthing arrangement (where known)      TN-C-S  TN-S  TT

2. Method of protection against indirect contact

3. Protective device for the modified circuit      Type ..... Rating ..... A

**PART 3 : Essential Tests**

Earth continuity satisfactory     

Insulation resistance:

Phase/neutral..... M Ω

Phase/earth ..... M Ω

Neutral/earth ..... M Ω

Earth fault loop impedance..... Ω

Polarity satisfactory     

RCD operation (if applicable). Rated residual operating current  $I_{\Delta n}$  ..... mA  
and operating time of .....ms (at  $I_{\Delta n}$ )

**PART 4 : Declaration**

I/We CERTIFY that the said works do not impair the safety of the existing installation, that the said works have been designed, constructed, inspected and tested in accordance with the Electrical Wiring Regulations and that the said works, to be the best of my/our knowledge and belief, at the time of my/our inspection complied with the Electrical Wiring Regulations except as detailed in Part 2.

Name: .....	Signature: .....
For and on behalf of: .....	Position: .....
Address: .....	Date: .....
.....	
.....	

ENERGY COMMISSION  
ELECTRICAL INSTALLATION CERTIFICATE (FORM A)

SEAL

SERIAL NO ·

**DETAILS OF THE CLIENT**

Client: .....  
Address: .....

Purpose for which this Report is required:  
.....

**DETAILS OF THE INSTALLATION (Tick boxes as appropriate)**

Occupier: .....  
Installation: .....  
Address: .....

Description of Premises: Domestic  Commercial  Industrial  Other

Estimated age of the Electrical Installation: .....years

Evidence of Alterations or additions: Yes  No  Not apparent

If "Yes", estimate age: ..... years

Date of last inspection: ..... Records available Yes  No

**EXTENT AND LIMITATION OF THE INSPECTION**

Extent of electrical installation covered by this report:  
.....

Limitations:  
.....  
.....

This inspection has been carried out in accordance with the Electrical Wiring Regulations. Cables concealed within trunking and conduits, or cables and conduits concealed under floors, in roof spaces and generally within the fabric of the building or underground have not been inspected.

**NEXT INSPECTION**

I/We recommend that this installation is further inspected and tested after an interval of not more than ..... months/years, provided that any observations 'requiring urgent attention' are attended to without delay.

**DECLARATION**

INSPECTED AND TESTED BY

Name: ..... Signature: .....

For and on behalf of: ..... Position: .....

Address: .....

..... Date: .....

.....

**SUPPLY CHARACTERISTICS AND EARTHING ARRANGEMENTS** Tick boxes and enter details, as appropriate

Earthing Arrangements	Number and type of Live Conductors	Nature of Supply Parameter	Supply Protective Device Characteristics
TN-C <input type="checkbox"/> TN-S <input type="checkbox"/> TN-C-S <input type="checkbox"/> TT <input type="checkbox"/> Alternative source of supply (to be detailed on attached schedules) <input type="checkbox"/>	a.c. <input type="checkbox"/> d.c. <input type="checkbox"/> 1 -phase, 2 wire <input type="checkbox"/> 2 -pole <input type="checkbox"/> 2 -phase, 3 wire <input type="checkbox"/> 3 -pole <input type="checkbox"/> 3 -phase, 3 wire <input type="checkbox"/> Other <input type="checkbox"/> 3 -phase, 4 wire <input type="checkbox"/>	Nominal voltage, $U/U_o^{(1)}$ ..... V Nominal frequency, $f^{(1)}$ ..... Hz Prospective fault current, $I_{pf}^{(2)}$ .....kA External loop impedance, $Z_o^{(2)}$ ..... $\Omega$  (Note: (1) by enquiry, (2) by enquiry or by measurement)	Type: .....   Nominal current rating ..... A

**PARTICULARS OF INSTALLATION REFERRED TO IN THE REPORT** Tick boxes and enter details, as appropriate

Means of Earthing	Details of Installation Earth Electrode (where applicable)		
Suppliers facility <input type="checkbox"/> Installation earth electrode <input type="checkbox"/>	Type (e.g. rod(s), tape, etc) .....	Location .....	Electrode resistance to earth ..... $\Omega$

Main Protective Conductors			
Earthing conductor:	material .....	csa .....	
Main equipotential bonding conductors	material .....	csa .....	
To incoming water service <input type="checkbox"/>	To incoming gas service <input type="checkbox"/>	To incoming oil service <input type="checkbox"/>	To structural steel <input type="checkbox"/>
To lightning protection <input type="checkbox"/>	To other incoming service(s) <input type="checkbox"/> (state details .....		

Main Switch or Circuit-breaker			
GS, Type and No. of poles .....	Current rating ..... A	Voltage rating ..... V	
Location .....	Fuse rating or setting ..... A		
Rated residual operating current $I_{\Delta n}$ = ..... mA, and operating time of .....ms (at $I_{\Delta n}$ ) (applicable only where an RCD is suitable and is used as a main circuit breaker)			

**OBSERVATIONS AND RECOMMENDATIONS** Tick boxes as appropriate

Recommendations as detailed below  
 Referring to the attached Schedule(s) of Inspection and Test Results, and subject to the limitations specified at the Extent and Limitations of the Inspection section

No remedial work is required  The following observations are made

.....

.....

.....

One of the following numbers, as appropriate, is to be allocated to each of the observations made above to indicate to the person(s) responsible for the installation the action recommended.

1 requires urgent attention  2 requires improvement  3 requires further investigation

4 does not comply with the Regulations. This does not imply that the electrical installation inspected is unsafe.

**SUMMARY OF THE INSPECTION**

Date(s) of the inspection:  
 .....

General condition of the installation:  
 .....

Overall assessment: Satisfactory/Unsatisfactory

**SCHEDULE(S)**

The attached Inspection and Test Result Schedules are part of this document and this Report is only valid when Test Result Schedules are attached to it.

..... Inspection Schedules and..... Test Result Schedules are attached  
 (Enter quantities of schedules attached)