

# 2395-302 Level 3 Principles, Practices and Legislation for the Periodic Inspection, Testing and Condition Reporting of Electrical Installations.

Chief Examiner's report – **August 2016**



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## **City & Guilds**

**1 Giltspur Street**

**London EC1A 9DD**

**T +44 (0)844 543 0000**

**F +44 (0)20 7294 2413**

**[www.cityandguilds.com](http://www.cityandguilds.com)**

**[centresupport@cityandguilds.com](mailto:centresupport@cityandguilds.com)**

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# 1 Introduction

The purpose of this document is to provide centres with feedback on the performance of candidates in the **August 2016** examination for 2395-302 Level 3 Principles, Practices and Legislation for the Periodic Inspection, Testing and Condition Reporting of Electrical Installations.

The Chief Examiners' Report has been reintroduced as a result of feedback from centres, to give them guidance in preparing candidates for the written examination.

## 2 Feedback on candidate performance

### General feedback

The following comments are intended to help students prepare for the examination by having a better understanding of what is expected of them. The feedback within this report would also be valuable to tutors in understanding candidates' difficulties in answering questions and the areas where more guidance is required.

The August 2016 series question paper was found to be in accordance with the scheme requirements.

Candidates appeared to have no issues with the paper format. They need to be aware that the space left for their answer is intended to be generous and, in almost all cases, is more than enough to record their answer.

Candidates should keep their responses within the allotted area and any additional sheets should be stapled to the back of the answer book. Any additional sheets should be completed on plain lined paper and not in a second answer book. The blank pages at the back of the answer book should not be used for candidate responses.

Where it becomes necessary for centres to copy/print additional answer books these should be produced double sided to facilitate correct scanning into the marking software.

Candidates and centres should be mindful that this qualification relates to the periodic inspection of electrical installations. It was evident from the answers provided by some candidates that they had little experience or understanding of the requirements for periodic inspection. It was further apparent from some of the information given in the candidates' responses that many were referencing the requirements for initial verification.

It was apparent that some candidates were not reading the question carefully and so not producing appropriate answers. Some candidates gave responses which did not relate to the question asked or provided generic answers which were not appropriate to the given scenario. These types of responses indicate that the candidates were either not in possession of suitable knowledge or have failed to consider and understand the requirements of the questions.

The requirements of periodic inspection, the actions to be taken by the inspector in given situations and the information which is recorded on the report presented problems for a number of candidates. These areas of the periodic inspection process require a better understanding than is currently being demonstrated. Centres may wish to review the extent to which this is covered in their course presentation.

From the information provided by candidates it appears that, whilst they may be aware of the need for inspection, they had poor understanding of what needs to be inspected and why the inspection is required. A large number of candidates when answering questions related to inspection gave responses related to items inspected at initial verification which are not appropriate at a periodic inspection. A large number of candidates failed to address the specific items identified in the question when describing inspection items. Many responses indicated that the candidate was not aware of the requirements of periodic inspection in relation to the fixed installation and containment systems.

Candidates should be aware that the inclusion of inspection items which require dismantling or which cannot be accessed is not acceptable when answering questions related to periodic inspection. It is a standard limitation of the model forms in BS 7671 that cables contained

within the building structure and within containment systems are excluded from the inspection. Furthermore BS 7671 requires that periodic inspection and testing is carried out with as little taking apart or dismantling as possible. Therefore items which require the dismantling of the containment system and equipment in order to inspect should not be included.

The requirements specifically related to the inspection of an electrical installation continue to be an area of considerable misunderstanding. It appears that the requirements of inspection (that is the inspection items and what they are inspected for) is an area which requires more attention during the related course delivery. This area is important to ensure that candidates have the knowledge required to both carry out an inspection and maximise their chances of success in the examination. Centres may wish to review the extent to which the inspection is covered during their course presentation.

Candidates should be aware that the Schedule of Inspections for the periodic inspection of electrical installations given in Guidance Note 3 provides detailed information on the items of inspection for these installations. Further guidance is given in Appendix 6 of BS 7671 for installations with a supply exceeding 100 A. Candidates becoming familiar with the items they are to consider, inspect and record the outcome, will greatly improve both their understanding of the inspection process and their success in any related questions.

Candidates should also be aware that where questions carry high marks these require a more detailed response, for example a three word statement is not going to achieve 10 marks.

The candidates should be aware of the requirement to show calculations and descriptions to demonstrate their conclusions when answering questions. It is also important that candidates include the correct units for the answers produced from their calculations e.g.  $\Omega$ , m $\Omega$ , M $\Omega$ , A, kA, ms etc.

### **Knowledge of BS 7671 and Guidance Note 3**

A number of candidates were unable to explain the purpose of a periodic inspection and test. Many candidates were unable to correctly name the documents to be completed and handed to the client on completion of a periodic inspection and test.

Many candidates were unable to identify reasons why fault finding and remedial work do not form part of periodic inspection and testing. Candidates were asked to identify two reasons and despite there being at least five options for their answer many had difficulty in identifying one correct item. It would appear that this is an area where centres may wish to consider how this is covered in their course presentation

### **Test Equipment**

Candidates were asked questions relating to carrying out various tests. A number of candidates were unable to correctly identify the instruments used for these activities. A number of candidates identified inappropriate test instruments for specific tests. Candidates should be aware that the instruments to be identified are those specific to the test in question as identified in GN3.

### **Inspection**

The requirements for inspection continue to be a problem for candidates taking this examination.

When asked to identify items to be inspected and recorded during a periodic inspection, this appeared to present problems for candidates and many had difficulty in providing correct answers. This often appears to be due to candidates failing to read the question carefully and consider the information required.

Candidates were asked specifically to identify the inspection requirements for a steel-wire-armoured cable termination into a metal-clad isolator. The question specifically referred to the requirements for the SWA termination and the conductors. Many candidates included unrelated items in their responses including such items as the IP rating of the enclosure, the clipping/fixing of the cable, fixing of the isolator and references to test requirements.

Many of these incorrect items would indicate that the candidates either failed to read the question carefully or could not identify the appropriate inspection items for the given scenario.

It also appears that a number of candidates were unable to distinguish between inspection at initial verification and that required at periodic inspection.

## **Testing**

When asked to state the instrument tests that are carried out on a BS EN 61009, 30 mA RCD together with applied test current and maximum disconnection time in each case a large number of candidates were unable to correctly identify these values. As RCD/RCBO installation is increasingly common it is of concern that candidates are not aware of the values they should obtain.

It was also apparent that a large number of candidates did not understand the operation of an RCD as they indicated that a fault between live conductors would cause the RCD to operate. Centres may want to consider the need to explain the operation principles of an RCD in their course delivery.

Candidates were asked to describe the procedure for carrying out an insulation resistance test on a shower circuit which had been safely isolated and locked off. A large number of candidates proceeded to disconnect the shower, rather than isolate at the local switch, when minimal disconnection of equipment is a requirement of periodic inspection and testing. A large number of candidates disconnected circuit conductors including the cpc, where the test procedure clearly requires the cpc to be connected to the earthing arrangement (including all bonding and protective conductors) during the test.

A cause for concern was the few candidates who disconnected the circuit conductors and carried out a continuity test on the conductors using an insulation resistance tester.

A further question asked candidates to state the observation, classification code and their reason for the code they used where the insulation resistance N-E was found to be half the minimum value. Many candidates failed to provide an observation that would be understood by the recipient of the report. The application of appropriate code and reasoning proved to be a problem for many candidates.

It would appear that the process of recording appropriate observations, allocating a suitable and appropriate code and being able to determine why a particular code would be used is an area which candidates find difficult to understand. As these are essential components of the

periodic inspection and testing activity and are required to be entered on the EICR, centres may wish to consider how this area is covered in their course delivery.

Candidates were asked to consider the test results for given circuit  $Z_s$  values and determine whether these met the requirements of BS 7671 for disconnection time to be achieved. There appeared to be some confusion for candidates as to how the comparison was carried out and a number incorrectly opted to calculate  $Z_e + (R1 + R2)$ . Of those candidates who correctly approached this question a number lost marks for failing to identify whether their conclusion indicated compliance and if so why this was the case. A number of candidates incorrectly identified that the result for one circuit was acceptable as it was protected by a 30 mA RCBO. The question clearly asked whether the measured value of earth fault loop impedance was acceptable, which it was not, and the RCBO was installed for additional protection.

A large number of candidates were unable to explain why all the earthing and bonding conductors must be connected when carrying out a test of earth fault loop impedance on a given circuit. Many were of the opinion that these conductors formed part of the earth fault path for the circuit or had a direct effect on the disconnection time. A common answer simply identified 'parallel paths' with no further explanation.

It would appear that there is generally some confusion regarding the functions of earthing and bonding, the difference between these two functions and how they relate to protection and their implications for the testing process.

### 3 National pass rate

The national pass rate for the 2395-302 **August 2016** examination is as follows:

<b>Exam series</b>	<b>Pass rate (%)</b>	<b>Fail rate (%)</b>
<b>August 2016</b>	<b>74</b>	<b>26</b>

#### **Past examination series**

<b>Exam series</b>	<b>Pass rate (%)</b>	<b>Fail rate (%)</b>
<b>June 2016</b>	<b>63</b>	<b>37</b>
<b>April 2016</b>	<b>78</b>	<b>22</b>
<b>February 2016</b>	<b>56</b>	<b>44</b>

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**London**  
**EC1A 9DD**  
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