

RG 105

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Accreditation for the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment

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Changes since last edition

- References to EN 45004 have been updated to ISO/IEC 17020:2012
- EA-5/01 reference updated to ILAC P15:07/2016 Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies

1. Introduction

1.1 This publication should be read in conjunction with

- ISO/IEC 17020:2012 Requirements General Criteria for the Operation of Various Types of Bodies Performing Inspection
- ILAC P15:07/2016 Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies
- UKAS publication RG 0 Guidelines on the competence of personnel undertaking engineering inspections

The field of inspection covered by this publication is low voltage electrical installations and associated electrical equipment as defined in BS 7671.

1.2 This publication has been produced by UKAS and the UKAS Technical Advisory Committee for Engineering Inspection.

1.3 The selection of an inspection body accredited against the requirements of ISO/IEC 17020:2012 and this publication is intended to give the owner or user of an electrical installation the assurance of the level of competence concerning the provision of an inspection service.

1.4 For the purposes of this publication the term inspection body shall be taken to mean an accredited inspection body.

2. Inspection services covered by RG 105

2.1 This publication details the requirements for inspection bodies undertaking the inspection of electrical installations and associated electrical equipment as defined in BS 7671. The inspection is to ascertain whether the electrical system meets relevant statutory requirements, is fit for purpose (i.e. is safe for continued use in service) and if it complies with applicable international, European or national standards together with any other relevant codes of practice, guidance or similar documents.

2.2 The inspection is of the installation identified in the contract for the inspection from its origin as defined in BS 7671. Inspection of any on-site interconnecting high voltage electrical system and protection of the high voltage electrical system is covered by document RG 102.

2.3 Additional requirements relating to the inspection of electrical equipment and installations in potentially explosive atmospheres are covered by document RG 101.

2.4 The inspection may be for the initial verification of a new or modified installation or the inspection of an installation already in-service including periodic inspections.

3. Impartiality and independence

(ISO/IEC 17020:2012 clause 4.1 including Annex A)

3.1 Inspection bodies operating as Type A, B or C bodies as defined in ISO/IEC 17020:2012 may be accredited for inspecting electrical systems provided they meet the requirements of ISO/IEC 17020:2012 and this publication.

3.2 Independence

3.2.1 To ensure the independence of inspection work, the reporting chain for inspection shall be separate from that of any other work undertaken.

3.2.2 A Type C inspection body which undertakes installation, maintenance or remedial work in conjunction with inspections shall have clearly documented procedures for each activity and shall establish adequate safeguards to ensure the integrity and impartiality of the inspections. Such safeguards may include the use of separate bodies of staff to carry out the inspection and maintenance work coupled to independent auditing of the inspection work.

3.2.3 The inspection bodies shall, on an on-going basis, identify any risks to impartiality that may arise from its activities and be able to demonstrate mitigation controls and measures taken to eliminate such risks.

4. Organisation, management and supervision

(ISO/IEC 17020:2012 clause 5)

4.1 In addition to the requirements of RG 0 the following shall apply.

(a) For the inspection of electrical installations covered by this publication the requirements for supervision shown in Table 1 shall apply.

(b) The technical manager in charge of, and having overall responsibility for, an inspection body seeking accreditation is to be of Category 1 or 2 status as specified in Table 1 and shall be employed or contracted to the inspection body.

(c) For effective supervision, inspection staff shall be monitored by personnel familiar with inspection methods and procedures. The technical manager may delegate supervisory responsibilities to locally appointed managers.

(d) Where sub-contracted service providers are required they shall be able to demonstrate their technical competence and ability to undertake the required tasks to the satisfaction of the technical manager.

5. Internal audits

(ISO/IEC 17020:2012 clause 8.6)

ILAC P15:07/2016 applies without change.

6. Personnel (ISO/IEC 17020:2012 clause 6)

- 6.1 The requirements for qualifications, experience and training relevant to the inspections covered by this document are shown in Table 1.

Table 1 Experience category and supervision

Type of installation	Technical Manager and deputy	Locally appointed Technical Supervisor (according to operational needs)	Inspection personnel	Trainee
	Category 1	Category 2	Category 3	Category 3
Group I Multi-phase incoming supply(ies) above 500 A rating and/or Public buildings & stadiums, etc. with a capacity above 250 persons	5 years' appropriate experience	5 years' appropriate experience Supervision Level B	4 years' appropriate experience Supervision Level B	Supervision Level D
	Category 2	Category 2	Category 3	Category 3
Group II Single or multi-phase incoming supply(ies) up to 500 A rating	5 years' appropriate experience	4 years' appropriate experience Supervision Level B	3 years' appropriate experience Supervision Level B	Supervision Level D

Categories, levels of supervision and constraints placed on activities are explained in Appendices 1, 2 and 3
 Category 1 personnel undertaking inspection activities shall be subject to Supervision Level A
 An inspection body may be accredited to undertake inspections in both Groups

7. Training (ISO/IEC 17020:2012 sub-clauses 6.1.3, 6.1.5, 6.1.7)

- 7.1 In addition to the requirements of RG 0, the inspection body shall ensure that each member of the inspection staff receives such induction training and continuation training as is both appropriate and sufficient for the purposes of the inspection work carried out. Each member of the inspection staff shall be able to demonstrate a competent working knowledge, for the types of installation to be inspected, of:
- the relevant type(s) of electrical installation(s) including the technology used for the manufacture of the products inspected, inspection, testing, operation, maintenance, significance of defects and typical problem areas;
 - where relevant, any associated areas of technology.

8. Equipment (ISO/IEC 17020:2012 clause 6.2)

- 8.1 Inspection and test equipment used during an inspection shall be fit for purpose, have a current calibration certificate and be suitable for the locations in which it is intended to be used.

9. Inspection methods and procedures **(ISO/IEC 17020:2012 clause 10)**

- 9.1 The inspection body shall make it clear to those seeking the inspection body's services where it may be necessary to close down or otherwise de-energise and isolate equipment in order to complete the inspection. The implications of such isolation shall be jointly considered by the inspection body and owner/operator/user of the electrical installation.
- 9.2 The inspection body shall co-operate with the equipment/installation owner/operator/user to ensure that inspections cause the minimum of disruption.
- 9.3 Inspection staff shall comply with any regulatory or local requirements relating to such matters as site induction procedures, relevant safety procedures e.g. Permit to Work, Sanctions to/for Test and other safety access control measures appropriate to the field of activity.
- 9.4 Inspection methods and procedures shall as a minimum be in accordance with BS 7671. However, for installations designed and installed to other equivalent European, National or International Standards and additional requirements of industry standards the inspections shall be undertaken in accordance with the requirements of those standards. When reporting, it should be made clear that departures noted, may have satisfied an earlier edition of an appropriate standard, current at the time the installation was completed.

10. Inspection records **(ISO/IEC 17020:2012 clause 7.3)**

- 10.1 Where integral recording facilities in inspection or test equipment are used the data shall be transferred to a secure storage facility taking due account of the effect of loss of data.

11. Reporting **(ISO/IEC 17020:2012 clause 7.4)**

- 11.1 In addition to the requirements of ILAC P15:07/2016 the following shall apply:
- (a) Where inspections cannot be completed due to unavailability or nonaccess to any part of the installation, plant or equipment being inspected this limitation shall be stated in the report;
 - (b) Where maintenance, remedial or installation work is undertaken concurrently with inspection work, the associated inspection report shall clearly define the work associated with inspection and testing in a manner of sufficient accuracy for meaningful audit trails;
 - (c) Where the inspection report or certificate includes the results of subcontractors, these results shall be clearly identified.

12. Sub-contracting **(ISO/IEC 17020:2012 clause 6.3)**

- 12.1 The requirements of ILAC P15:07/2016 apply without change.

Appendix 1 - Qualification and competency categories

- Category 1** They will be a person having a wide general and technical knowledge gained through experience of the type of LV system and the risks involved, normally a chartered or incorporated electrical engineer. They shall have:
- a) technical knowledge and experience in this subject and be able to make proper judgements on the range of technical problems likely to arise in all topics under consideration;
 - b) an understanding and working experience of relevant Standards, International and National certification procedures, European Directives and National Regulations based thereon, and of other relevant National laws, regulations and guidance;
 - c) the ability to define inspection duties required;
 - d) the ability either to draw up written plans for inspection, or to report on the technical accuracy of plans prepared by others. This knowledge shall include that pertaining to the follow up effects of any failure within their jurisdiction;
 - e) the knowledge to correctly interpret the results of the submitted reports and properly relate them to the tasks and duties as defined.

- Category 2** In addition to the requirements of Category 3 they shall have a demonstrable:
- a) understanding of electrical standards including equipment classification, design standards and codes of practice for the selection and use of equipment together with the applicable inspection criteria;
 - b) understanding of the safety rules and associated codes of practice that are applicable to LV, FELV, PELV and SELV systems;
 - c) understanding of the inspection and maintenance requirements of LV systems as specified in codes of practice and other relevant documents;
 - d) knowledge of electrical inspection and associated test procedures which may be employed including the significance of sampling techniques;
 - e) knowledge of methods used to maintain electrical integrity;
 - f) knowledge of any special electrical inspection and testing techniques which may be required;
 - g) an understanding of drawings, and manufacturers literature, relevant to the equipment to be inspected.

- Category 3** Persons with a proven minimum level of competence in Electrical Engineering will be suitable for selection at entry level. This may be gained by completing a time served apprenticeship / attending appropriate training course(s) and subsequently receiving a Certificate of Competence following assessment.

They will work under constant supervision until they have sufficient experience, as determined by their superiors, to allow them to work under frequent or infrequent supervision as allowed in Table 1 prior to achieving the competence levels required for Category 2.

It is anticipated that a minimum of 1 year working under frequent supervision will be required before upgrading can be considered.

Appendix 2 - Levels of supervision

Regular documented meetings of inspection personnel with their management shall be conducted to resolve specific issues and to review work undertaken.

In the Levels described below, Supervisor means a technical superior, however named. Direct contact means on the job contact at the site of operation.

Level A: Occasional

Formal, direct contact to review work with Supervisor at least annually. More frequent direct contact with Supervisor may be necessary. Authoritative technical support from personnel of Category 1 or 2 to be readily available.

Level B: Infrequent

Direct contact with Supervisor at least every 3 months. Access to supervision and technically authoritative support to be available as needed.

Level C: Frequent

Direct contact with Supervisor at least weekly. Authoritative technical support from category 1 or 2 personnel.

Level D: Constant

Direct daily contact with Supervisor at site of operation. Authoritative technical support from category 1 or 2 personnel to be readily available.

Appendix 3 - Constraints placed on activities

Inspection personnel shall restrict their tasks to those within the bounds of their authorisation and responsibilities.

Inspection activities or tests, shall be in accordance with relevant Standards, Codes of Practice, Performance Specifications, and related National Statutory legislation.

- ❖ Inspection staff must not become involved with technology outside their field of declared competence other than when in consultation with, and acting with the approval of, competent persons.
- ❖ Carry out any repairs to equipment or to initiate changes to operating parameters unless it is in accordance with their assigned duties.
- ❖ Authorise or undertake any remedial action beyond their authorisation. Where such action, which they believe to be required, is outside their authorisation, to consult with persons at a higher level who shall authorise any agreed requirements in writing.

Appendix 4 - Selected list of reference documents

This list is not intended to be exhaustive. Reference should be made to all regulations and standards which are relevant to the location of the installation and also to all revisions which have been published.

SI 1974 No. 1439	Health and Safety at Work etc Act 1974 Chapter 37
SI 1978 No.1039 (NI.9)	Health and Safety at Work (NI) Order 1978
SI 1992 No. 2051	The Management of Health and Safety at Work Regulations 1992
SI 1992 No. 3004	The Workplace (Health, Safety and Welfare) Regulations 1992
SI 1998 No. 2306	Provision and Use of Work Equipment Regulations 1998
SI 1989 No. 635	The Electricity at Work Regulations 1989.
SR 1991 No. 13	The Electricity at Work Regulations (NI) 1991
SI 1994 No. 3260	The Electrical Equipment (Safety) Regulations 1994 (Implementing the Low Voltage Directive)
SI 1994 No. 1768	The Plugs and Sockets etc. (Safety) Regulations 1994
SI 1988 No. 1057	The Electricity Supply Regulations 1988 (Replacement: Electricity Safety, Quality and Continuity Regulations 2002)
BS 7671:2018	Requirements for Electrical Installations (IET Wiring Regulations)

The Building Standards (Scotland) Regulations 1990, as amended British, European and International Standards relating to equipment which is the subject of inspection.

The IET also publish various guides and Codes of Practice relating to installations, equipment and inspection and testing such as:

Guidance Note 3 Inspection and Testing 18th Edition 2018

The Health and Safety Executive publish a number of guidance documents available from HSE Books