Code of Practice for In-service Inspection and Testing of Electrical Equipment

4th Edition

Published by The Institution of Engineering and Technology, London, United Kingdom

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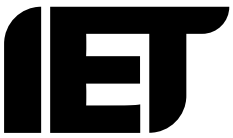

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First published 1994 (0 85296 844 2)
Second edition 2001 (0 85296 776 4)
Reprinted with new cover 2003
Third edition 2007 (978-0-86341-833-4)
Reprinted 2008, 2009, 2010, 2012
Fourth edition 2012 (978-1-84919-626-0)

Copies of this publication may be obtained from:
The Institution of Engineering and Technology
PO Box 96, Stevenage, SG1 2SD, UK
Tel: +44 (0)1438 767328
Email: sales@theiet.org
www.theiet.org/wiringbooks

ISBN 978-1-84919-626-0

Typeset in the UK by Carnegie Book Production, Lancaster
Printed in the UK by Cambrian Printers Ltd, Aberystwyth

Contents

Cooperating organizations

The Institution of Engineering and Technology wishes to acknowledge the contribution made by the following representatives of organizations in the preparation of this Code of Practice.

Association for Professional Appliance Testing
T.J. Dyster

Association of Manufacturers of Domestic Appliances (AMDEA)
S. MacConnacher

BEAMA Installation Ltd
M. Mullins
P. Sayer IEng MIET GCGI

British Cables Association (BCA)
C.K. Reed IEng MIET

City & Guilds
Mr P. Tanner MIET LCGI

Electrical Contractors' Association (ECA)
G. Digilio IEng FIET

Electrical Safety Council
S. Curtler IEng MIET GCGI

GAMBICA Association Ltd
J. Wallace MPhil BSc
M.D. Moore

Health and Safety Executive (HSE)
K. Morton BSc CEng FIET

Institution of Engineering and Technology (IET)
M. Coles BEng(Hons) MIET

NAPIT
B. Allan BEng (Hons) CEng MIET

SELECT (Electrical Contractors' Association of Scotland)
D. Millar IEng MIET
B. Cairney IEng MIET

Revising author, compilation and editing
R. Townsend CMS MIET

Acknowledgements

References to British Standards are made with the kind permission of BSI. Complete copies can be obtained from:

BSI Customer Services
389 Chiswick High Road
London W4 4AL
Tel: +44 (0)20 8996 9001
Fax: +44 (0)20 8996 7001
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Suffolk CO10 2WA
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Preface

The objective of this Code of Practice is to give advice on in-service inspection and testing to determine whether electrical equipment is fit for continued service or if maintenance or replacement is necessary.

The main changes in this edition of the Code of Practice include clarification of which equipment is covered, the inclusion of hired and second-hand equipment and a change in the scope. In addition, there is an explanation of the risk assessment required to determine frequencies between inspection and testing, if it is required.

Information on microwave leakage testing is not within the remit of this Code of Practice, because it does not directly relate to 'electrical safety'. For this reason microwave in-service leakage testing has been removed.

Production testing, previously included in this Code of Practice, has been removed as it is not relevant to in-service inspection and testing.

Changes have been made to the initial frequencies in Table 7.1, to reflect information made available from equipment manufacturers, which is based on historic test results.

This Code of Practice does not cover in-house inspection and testing of equipment or appliances that are used for commercial gain hire purposes. Equipment hire companies should refer to the Hire Association of Europe (HAE) (www.hae.org.uk) and Event Hire Association (EHA) (www.eha.org.uk), whose document *HAEEST2012: 'Guidance on Electrical Safety Testing in the Hire Industry'* gives information on in-service inspection, maintenance, return to service after repair and regimes for hire equipment prior to its release to customers/clients.

Introduction

Why is it necessary to maintain electrical equipment?

Electric shock can kill or seriously injure. This is one of the hazards that electrical safety legislation is intended to protect against. Many serious shocks occur when the current flow is from hand to hand, because the route the current takes is through or near the heart.

The Electricity at Work Regulations requires, in Regulation 4(2), that:

> As may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practicable, such danger.

Regulation 4(2) is concerned with the need for maintenance to be done in order to ensure safety of the system if danger would otherwise result. The quality and frequency of maintenance should be sufficient to prevent danger, so far as is reasonably practicable.

Regular inspection of equipment is an essential part of any preventive maintenance programme. Practical experience of the use of equipment and its environment may indicate an adjustment to the frequency with which preventive maintenance needs to be carried out. This is a matter for the judgement of the responsible person or duty-holder, who should seek all the information needed to make an informed decision including reference to the manufacturer's guidance.

Although the Electricity at Work Regulations does not require records of maintenance to be kept, it is recommended that records of maintenance, including test results, should be kept throughout the working life of the electrical equipment to enable

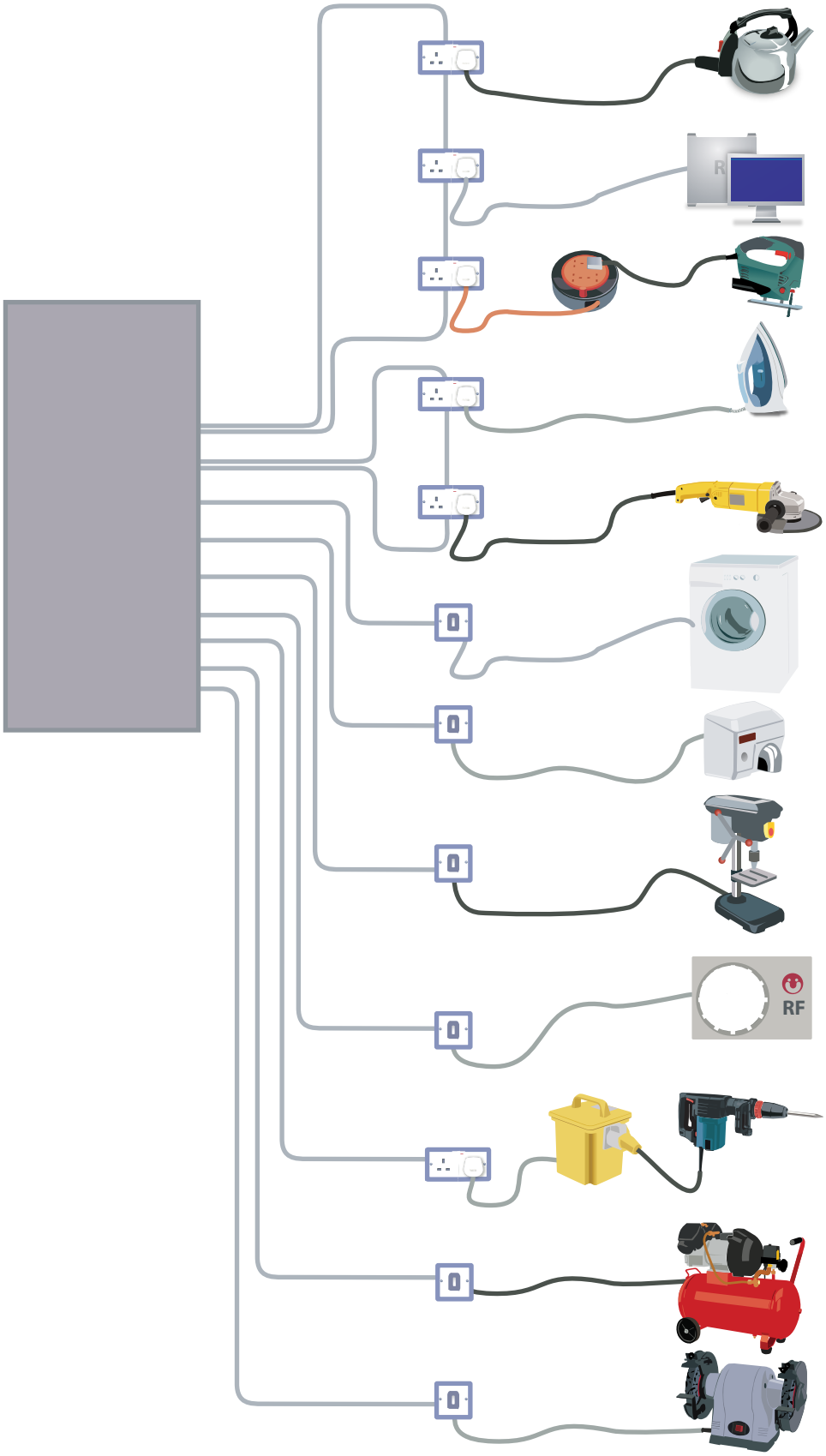
- the condition of the equipment to be monitored,
- the effectiveness of the maintenance policies to be assessed,
- the demonstration that an effective maintenance system is in place, and
- the duty-holder responsible for the inspection and testing regime to assess the future frequency required between formal visual inspections and any combined inspections and tests.

What should be maintained?

All electrical systems and equipment should be maintained if danger would otherwise arise (see Figure 1).

Other than the fixed installation, which is considered to be the installation from the meter point to the socket-outlet, or fuse connection unit, all electrical equipment in an installation, whether permanently connected or connected by a plug and socket-outlet,

▼ **Figure 1** Examples of equipment covered by this Code of Practice



should be inspected and tested in accordance with the recommendations contained in this Code of Practice.

Items of heavy plant, including air handling units (AHUs), heating ventilation and air conditioning (HVAC) systems, and other items of integrated plant and their associated systems, are not covered by this Code of Practice. These types of systems should form part of a specialized maintenance and inspection routine. The connecting cables and junction boxes for integrated plant should be inspected and tested during the electrical installation's periodic inspection regime and a report of its condition given in the Electrical Installation Condition Report.

Note: Self-contained or two-part air conditioners and climate control units, which are not AHU or HVAC systems, are within the scope of this Code of Practice.

BS 7671

GN3

The fixed installation should be periodically inspected and tested to ensure its satisfactory condition for continued use as required by BS 7671:2008 (2011) *Requirements for Electrical Installations*, *17th Edition of the IET Wiring Regulations*. Guidance on the requirements of BS 7671, concerning inspection and testing of the fixed electrical installation, is given in the IET's Guidance Note 3: *Inspection & Testing* (GN3).

Who has responsibilities?

The following people have responsibility for electrical systems and equipment:

- users of electrical equipment (whose responsibilities include user checks)
- duty-holders with responsibility for electrical maintenance who may not necessarily have detailed technical knowledge
- the competent person carrying out the formal visual inspection and the inspections and tests
- other duty-holders such as company directors, managers or building services managers
- hirers and suppliers of hired equipment (additional advice can be found on the Trading Standards Institute website, www.tradingstandards.gov.uk)
- landlords and property management companies in control of Houses in Multiple Occupation (HMOs).

What needs to be done to comply with the relevant requirements of the Electricity at Work Regulations?

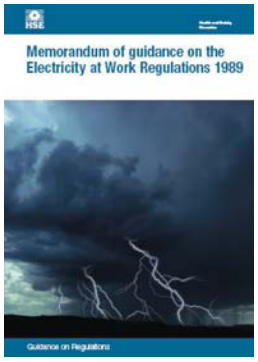
The requirements of the Electricity at Work Regulations 1989 can be met by

1 performing in-service inspection and testing, which consist of three activities:
   i user checks
   ii formal visual inspections (without tests)
   iii combined inspections and tests (although the Electricity at Work Regulations do not require the keeping of records, up-to-date information can be a means of showing that a maintenance scheme exists)

2 performing maintenance or, if necessary, replacing the defective item of equipment (depending upon the results of the in-service inspection and testing), and

3 keeping up-to-date records that can be a means of showing compliance.

▼ **Figure 2**
HSR25: Memorandum of Guidance on the Electricity at Work Regulations 1989 [Courtesy of the HSE]



Information on the Electricity at Work Regulations can be found in the Health and Safety Executive (HSE) publication *Memorandum of Guidance on the Electricity at Work Regulations 1989* (see Figure 2). This publication is now available as a free download from www.hse.gov.uk.

Background to the Code of Practice

To encourage free trade within the European Union, existing national standards are being harmonized and converted to European standards. Compliance with harmonized European standards gives assurance to purchasers that appliances and equipment have been designed and constructed to a standard that ensures in normal use, as intended by the manufacturer, they function safely.

In order to check compliance, manufacturers have to perform a series of tests on the appliance and its components as required by the standard. The appliance is required to pass these tests if it is to be said that it complies with the standard. A list of some of the safety standards for electrical equipment is given in Appendix I. The tests detailed in these standards are generally not suitable for in-service testing.

This Code of Practice recommends in-service inspections and tests that can be applied generally to equipment and appliances in normal use. Routine manufacturers' tests are not required for general in-service testing, but may be applied to appliances after repair.

Layout of the Code of Practice

Part 1 provides guidance on what work should be done in order to comply with the applicable legislation, including the Electricity at Work Regulations, and whether this work can be carried out in-house. Advice is included on the law, procedures, documentation and training.

Part 2 is written for those carrying out the practical work and explains the details of the inspections and tests.

Part 3 comprises a series of appendices containing information and guidance and includes model forms that allow records to be kept in order to demonstrate that an effective system of maintenance is in place.

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Note: Entries refer to chapter and section numbers; Appx=Appendix; 'n' refers to the notes following a table.