Australian/New Zealand Standard™

In-service safety inspection and testing of electrical equipment

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The following interests are represented on Committee EL/36:

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Canterbury Manufacturers Association, New Zealand
Communications, Electrical Plumbing Union
Electrical Contractors Association of New Zealand
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL/36, *In-service Testing of Electrical Equipment*, to supersede AS/NZS 3760:1996.

The in-service safety inspection and testing requirements in this Standard do not cover testing for design and approval of equipment (which is covered separately in the AS/NZS 3100, AS 3300/NZS 6200 and AS/NZS 3350 series of Standards).

Changes to AS/NZS 3760:1996 include the following:

(a) Additions and changes to Table 2, Testing Intervals for Electrical Equipment.

(b) Numerous minor text changes.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard and subject to the same level of compliance as if it were in the body of the Standard, whereas an ‘informative’ appendix is provided for information and guidance, and may indicate good practice. Non-compliance with an informative appendix will not be seen as non-compliance with the Standard.

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FOREWORD

In-service testing is necessary for the safety of persons using the equipment and for the proper discharge of the obligations of employers and employees, as listed in legislation covering occupational health and safety matters. This Standard specifies in-service safety inspection and testing protocols and criteria that satisfy these obligations and provides a cost effective approach to safety without jeopardizing personnel safety or involving excessive equipment downtime.

The following requirements are necessary for the safety of persons using electrical equipment:

(a) The equipment needs to be designed and manufactured to appropriate safety standards.

(b) Each item of equipment needs to be subjected to routine inspection and testing to detect damage, wear or other conditions which might render it unsafe.

(c) Equipment identified as faulty needs to be withdrawn from service and referred for repair or disposal by expert personnel.

(d) Appropriate equipment needs to be used for each particular application.

(e) In specific cases, e.g. for use in confined spaces, equipment also needs to be used in accordance with an appropriate set of rules linking the type of work with the class of equipment and environmental safety facilities.

This Standard refers only to the matters in Items (b) and (c).

The following information provides some insight and background to the inspection and electrical testing requirements specified in this Standard.

PRINCIPLES OF CONSTRUCTION OF ELECTRICAL EQUIPMENT

Exposed metal parts of equipment operating from supply voltage must be prevented from becoming live in the event of insulation failure or the bypassing of insulation during the normal use of the equipment (e.g. through the ingress of conducting liquids or other conducting materials).

This protection may be provided by either one or both of the following:

(a) Provision of basic insulation between the exposed metal parts and the live parts, and earthing the exposed metal parts. Equipment in which some or all of the exposed metal parts require protective earthing, as described in Item (a), are basic insulated items which are also referred to as Class I equipment. The protective earthing terminal of this equipment is marked with one of the symbols ‘E’,  ,  or the word ‘earth’.

(b) Provision of double or reinforced insulation between the external metal parts and the live parts. Equipment in which none of the external metal parts require protective earthing, due to the provision of double or reinforced insulation as described in Item (b), are double insulated items which are also referred to as Class II equipment. This equipment is marked with the symbol or with the words ‘DOUBLE INSULATED’.

PROTECTIVE EARTHING

The resistance to earth from protectively earthed parts in Class I equipment must be low enough to permit adequate fault current to flow to earth, thereby ensuring that the overcurrent protection device in the final sub-circuit (i.e. fixed wiring) opens quickly in the event of insulation failure.

The protective earthing conductor also ensures that any leakage current from the live parts within Class I equipment flows to earth via a low resistance path.

INSULATION RESISTANCE

Insulation resistance testing is intended to ensure the integrity of the insulation between live mains parts and exposed or external metal parts.

Accordingly, equipment must have its insulation resistance measured prior to commissioning, and at regular intervals during its service life to ensure that no degradation has occurred since manufacture, during transport or over its service life.

TEST EQUIPMENT

The equipment required to carry out the tests detailed in this Standard should be subjected to routine calibration to ensure its accuracy is maintained.

DOCUMENTATION

Records of maintenance, including tests, should be kept throughout the working life of the equipment. Such records are a useful management tool for reviewing the frequency of inspection and test, and ensuring that inspection and testing has been carried out.

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In-service safety inspection and testing of electrical equipment

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies procedures for the safety inspection and testing of single and polyphase electrical equipment, (other than fixed equipment) which is in-service, or available for hire or resale, and which is designed for connection by a flexible power supply cord and plug to a low voltage supply. It applies also to cord extension sets, electrical portable outlet devices, portable residual current devices and portable isolation transformers.

Equipment connected by fixed wiring and large, stationary equipment connected by a flexible cord which is not flexed during normal use or exposed to abuse or damage in a hostile environment e.g. window mounted air conditioners, is not normally considered to represent a hazard sufficient to warrant routine in-service electrical safety testing. Accordingly, the testing of such equipment is not required by this Standard, although other standards or statutory requirements may specify such testing.

Specialized electronic equipment, e.g. portable computers, may sustain damage if not tested in accordance with manufacturers' instructions. Accordingly, advice should be sought from the equipment manufacturer or agent before proceeding with in-service tests.

1.2 APPLICATION

This Standard is intended for use by those persons involved in the testing, maintenance, repair and use of electrical equipment.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1939 Degrees of protection provided by enclosures for electrical equipment (IP Code)

3002 Electrical installations—Shows and carnivals

3190 Approval and test specification —Residual current devices (current-operated earth-leakage devices)

AS/NZS

3003 Electrical installations—Patient treatment areas of hospitals and medical and dental practices

3012 Electrical installations—Construction and demolition sites

3100 Approval and test specification—General requirements for electrical equipment

3199 Approval and test specification for cord extension sets

3551 Technical management programs for medical devices

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