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Electrical installations of buildings

Part 4: Protection for safety

Chapter 48: Choice of protective measures as a function of external influences

Section 482 — Protection against fire

Bureau Central de la Commission Electrotechnique Internationale

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ELECTRICAL INSTALLATIONS OF BUILDINGS
Part 4: Protection for safety
Chapter 48: Choice of protective measures as a function of external influences
Section 482 — Protection against fire

FOREWORD

1) The formal decisions or agreements of the I E C on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
3) In order to promote international unification, the I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by I E C Technical Committee No. 64: Electrical Installations of Buildings.

A draft of this standard was discussed at the meeting held in Pretoria in 1980. As a result of this meeting, a draft, Document 64(Central Office)112, was submitted to the National Committees for approval under the Six Months' Rule in March 1981.

The National Committees of the following countries voted explicitly in favour of publication:

Australia
Austria
Canada
Denmark
Egypt
France
Japan
Netherlands
Poland
Switzerland
United States of America

Other I E C publications quoted in this standard:

Publications Nos. 332-1: Tests on Electric Cables under Fire Conditions, Part 1: Test on a Single Vertical Insulated Wire or Cable.

364-3: Electrical Installations of Buildings, Part 3: Assessment of General Characteristics.

364-4-41: Part 4: Protection for Safety, Chapter 41: Protection against Electric Shock.

ELECTRICAL INSTALLATIONS OF BUILDINGS

Part 4: Protection for safety

Chapter 48: Choice of protective measures as a function of external influences

Section 482 — Protection against fire

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482. PROTECTION AGAINST FIRE

482.0 General

The requirements of this section shall be observed in addition to those of Chapter 42 for installations in locations where the following conditions of external influences exist.

482.1 Conditions of evacuation in an emergency

(Influences BD2: Low density occupation, difficult conditions of evacuation
BD3: High density occupation, easy conditions of evacuation
BD4: High density occupation, difficult conditions of evacuation
according to Clause 322.4.)

Note. — Conditions BD may be regulated by authorities responsible for building construction, public gatherings, fire prevention.

482.1.1 In conditions BD2, BD3 and BD4, wiring systems shall preferably not encroach on escape routes, but if such encroachment is unavoidable, the wiring shall be provided with sheaths or enclosures which will not contribute to or propagate a fire or attain a temperature high enough to ignite adjacent material, during the time authorized by regulations for building elements of the escape route or for 2 h in the absence of such regulation.

Note. — Corresponding test conditions are under consideration.

Wiring systems encroaching on escape routes shall not be within arm's reach or shall be provided with protection against mechanical damage likely to occur during an evacuation. Any wiring systems in escape routes shall be as short as practicable.

482.1.2 In conditions BD3 and BD4, switchgear and controlgear devices, except certain devices to facilitate evacuation, shall be accessible only to authorized persons. If they are placed in passages, they shall be enclosed in cabinets or boxes constructed of non-combustible or not readily combustible material.

Note. — Definitions for "non-combustible" and "not readily combustible" are under consideration.

482.1.3 In conditions BD3 and BD4 and in escape routes, the use of electrical equipment containing flammable liquids is prohibited.

Note. — Individual auxiliary capacitors incorporated in apparatus are not subject to this requirement. This exception principally concerns discharge lamps and capacitors of motor starters.

482.2 **Nature of processed or stored materials**

Condition BE2: Fire risk (according to Clause 322.5).

Notes 1. — Quantities of flammable materials, surface or volume of the locations may be regulated by national authorities.

2. — For explosion risks, see IEC Report XXX: Electrical Installations in Explosive Gas Atmospheres (other than Mines) (in preparation).

482.2.1 Electrical equipment shall be restricted to that necessary to the use of these locations, except wiring systems according to Sub-clause 482.2.6.

482.2.2 Where it is expected that dust sufficient to cause a fire hazard could accumulate on enclosures of electrical equipment, measures shall be taken to prevent the enclosures from attaining excessive temperatures.

482.2.3 Electrical equipment shall be so selected and erected that its normal temperature rise and foreseeable temperature rise during a fault cannot cause a fire.

These arrangements may be effected by the construction of equipment or its conditions of installation.

Special measures are not necessary where the temperature of surfaces is unlikely to cause combustion of nearby substances.

482.2.4 Switchgear for protection, control and isolation shall be placed outside locations presenting BE2 conditions, unless it is in an enclosure providing a degree of protection appropriate for such a location but at least IP4X.

482.2.5 Where wiring is not embedded in non-combustible material, precautions shall be taken to ensure that the wiring cannot propagate flame.

In particular, conductors and cables shall satisfy the test for flame retardance defined by IEC Publication 332-1: Tests on Electric Cables under Fire Conditions, Part 1: Test on a Single Vertical Insulated Wire or Cable.

482.2.6 Wiring systems which traverse these locations but are not necessary to the use of these locations shall satisfy the following conditions:

— the wiring systems are made in accordance with the rules of Sub-clause 482.2.5;

— they have no connection along the route inside these locations, unless these connections are placed in a fire-resistant enclosure;

— they are protected against overcurrent in accordance with the rules of Sub-clause 482.2.11.

482.2.7 In forced-air heating installations, the air intake shall be outside locations, where presence of combustible dust exists.

The temperature of the outgoing air shall not be such as to cause fire in the location.

482.2.8 Motors, other than light-duty servomotors, which are automatically or remotely controlled or which are not continuously supervised, shall be protected against excessive temperature rise by temperature responsive devices.

482.2.9 Luminaires shall be appropriate for such a location and be provided with enclosures providing a degree of protection of at least IP4X.

Lamps and elements of lighting apparatus shall be adequately protected in places where mechanical damage is anticipated, for example, by sufficiently robust plastic covers, grilles or robust glass covers. These protective devices shall not be fixed on lampholders unless this is foreseen by construction.

482.2.10 Where it is necessary to limit the consequences of fault currents in wiring systems from the point of view of fire risks, the circuit shall either be:

— protected by a residual-current protective device, the rated operating residual current of which does not exceed 0.5 A, or

— monitored by a continuous insulation monitoring device which initiates an alarm on the occurrence of an insulation fault.

A bare monitoring conductor which may be a protective conductor, may be incorporated in the wiring system of the corresponding circuit, unless the wiring system comprises a metallic enclosure connected to the protective conductor.

482.2.11 Circuits supplying or traversing BE2 locations shall be protected against overload and against short circuits by protective devices located in advance of these locations.

482.2.12 Notwithstanding Sub-clause 411.1.3.7, in circuits at safety extra-low voltage, live parts shall be:

— either contained in enclosures affording the degree of protection IP2X,

— or provided with insulation capable of withstanding a test voltage of 500 V for 1 min.

regardless of the nominal voltage of the circuit.

482.2.13 PEN conductors are not allowed in BE2 locations, except for circuits traversing such locations.

482.3 **Combustible constructional materials**

Condition CA2 (according to Clause 323.1).

482.3.1 Precautions shall be taken to ensure that electrical equipment cannot provoke the ignition of walls, floors and ceilings.

482.4 **Fire propagating structures**

Condition CB2 (according to Clause 323.2).

482.4.1 In structures of which the shape and dimensions facilitate the spread of fire, precautions shall be taken to ensure that the electrical installation cannot propagate a fire (e.g. chimney effect).

Note. — Fire detectors may be provided which ensure the implementation of measures for preventing propagation of fire, for example, the closing of fire-proof shutters in ducts, troughs or trunkings.