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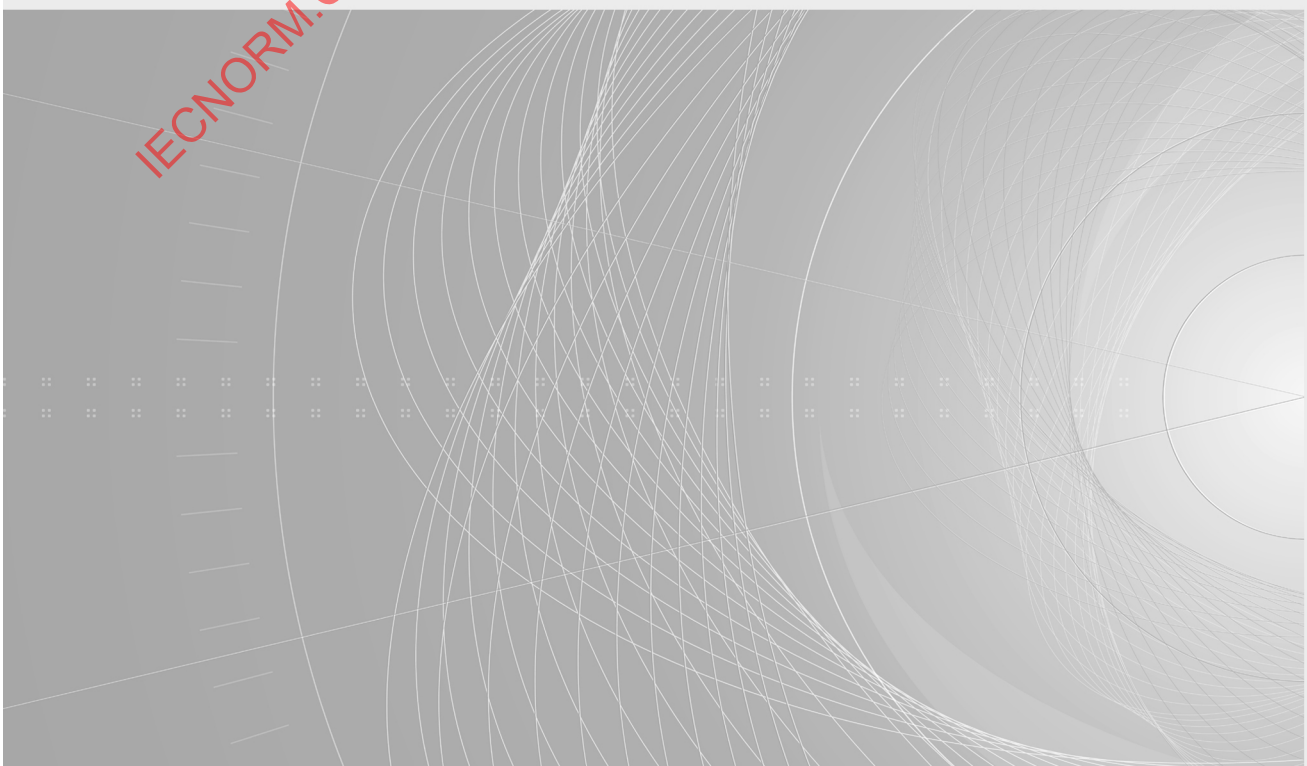
INTERNATIONAL STANDARD

Low voltage electrical installations –
Part 7-704: Requirements for special installations or locations – Construction and demolition site installations



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CONTENTS

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LOW VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-704: Requirements for special installations or locations – Construction and demolition site installations

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60364-7-704 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This third edition cancels and replaces the second edition published in 2005. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) clarification of the Scope;
b) clarification of compliance with standards;
c) clarification of devices for isolation.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
64/2155/FDIS	64/2167/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the “in-some-countries” clauses on differing practices of a less permanent nature relating to the subject of this standard.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

For the purpose of this part of IEC 60364 (IEC 60364-7-704) the requirements of the general parts 1 to 6 of IEC 60364 apply.

The IEC 60364-7-7XX parts of IEC 60364 contain particular requirements for special installations or locations which are based on the requirements of the general parts of IEC 60364 (IEC 60364-1 to IEC 60364-6). These IEC 60364-7-7XX parts are considered in conjunction with the requirements of the general parts.

The particular requirements of this part of IEC 60364 supplement, modify or replace certain of the requirements of the general parts of IEC 60364 being valid at the time of publication of this part. The absence of reference to the exclusion of a part or a clause of a general part means that the corresponding clauses of the general part are applicable (undated reference).

Requirements of other 7XX parts being relevant for installations covered by this part also apply. This part may therefore also supplement, modify or replace certain of these requirements valid at the time of publication of this part.

The clause numbering of this part follows the pattern and corresponding references of IEC 60364. The numbers following the particular number of this part are those of the corresponding parts, or clauses of the other parts of the IEC 60364 series, valid at the time of publication of this part, as indicated in the normative references of this document (dated reference).

If requirements or explanations additional to those of the other parts of the IEC 60364 series are needed, the numbering of such items appears as 704.101, 704.102, 704.103 etc.

In the case where new or amended general parts with modified numbering were published after this part was issued, the clause numbers referring to a general part in this 704 part may no longer align with the latest edition of the general part. Dated references should be observed.

LOW VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-704: Requirements for special installations or locations – Construction and demolition site installations

704 Construction and demolition site installations

704.1 Scope

The requirements of this part of IEC 60364 apply to installations for construction and demolition sites for use during the period of the construction or demolition work which are intended to be taken out of service upon completion of the works. Examples include the following:

- construction work of new buildings;
- repair, alteration, extension or demolition of existing buildings or parts of existing buildings;
- engineering works;
- earthworks;
- work of similar nature.

The requirements apply to fixed or moveable installations.

The requirements do not apply to installations in administrative locations of construction sites (e.g. offices, cloakrooms, meeting rooms, canteens, restaurants, dormitories, toilets).

704.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60245-4, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*

IEC 60309-1, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 60364 (all parts), *Low voltage electrical installations*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-5-53:2001[1], *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*
IEC 60364-5-53:2001/AMD1:2002
IEC 60364-5-53:2001/AMD2:2015

IEC 61439-4, *Low-voltage switchgear and controlgear assemblies – Part 4: Particular requirements for assemblies for construction sites (ACS)*

704.3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

704.30 Assessment of general characteristics

704.30.101 The clearances for overhead lines above construction sites shall be agreed with the owner of the overhead power line, on the basis of the dimensions of the construction site machines, such as cranes, and equipment, such as ladders and scaffolding, to be used.

704.31 Purposes, supplies and structure

704.313 Supplies

The following note is added:

NOTE A single construction site can be served by several sources of supply, including generating sets; see IEC 60364-5-55:2011, Clause 551.

704.4 Protection for safety

704.41 Protection against electric shock

704.410 Introduction

704.410.3 General requirements

704.410.3.5 *Replace with the following:*

The protective measures:

- obstacles, and
- placing out of reach

as specified in IEC 60364-4-41:2005, Annex B shall not be used.

704.410.3.6 *Replace with the following:*

The protective measures

[1] A consolidated version of this publication exists, comprising IEC 60364-5-53:2001, IEC 60364-5-53:2001/AMD 1:2002 and IEC 660364-5-53:2001/AMD 2:2015.

- non-conducting location,
- earth-free equipotential bonding, and
- electrical separation for the supply of more than one current-using equipment

as specified in IEC 60364-4-41:2005, Annex C shall not be used.

704.410.3.101 Circuits supplying socket-outlets with rated current up to and including 32 A and other circuits supplying hand-held electrical equipment with rated current up to and including 32 A shall:

- be protected by automatic disconnection of supply together with additional protection by the use of residual current devices having a rated residual operating current not exceeding 30 mA (see IEC 60364-4-41:2005, 415.1.1), or
- be supplied by SELV or PELV (see IEC 60364-4-41:2005, 414), or
- have electrical separation of circuits (see IEC 60364-4-41:2005, 413), each socket-outlet and hand-held electrical equipment being supplied by an individual isolating transformer or by separate windings of an isolating transformer.

704.411 Protective measure: automatic disconnection of supply

704.411.3 Requirements for fault protection

704.411.3.2 Automatic disconnection in case of a fault

704.411.3.2.101 For circuits supplying socket-outlets with a rated current exceeding 32 A, residual current devices shall be used as disconnection devices.

704.414 Protective measure: Extra-low voltage provided by SELV and PELV

704.414.4 Requirements for SELV and PELV circuits

704.414.4.5 *Replace the subclause with the following:*

Irrespective of the nominal voltage, in AC and DC circuits, the requirement for basic protection shall be provided by the following:

- insulation in accordance with IEC 60364-4-41:2005, Clause A.1, or
- barriers or enclosures in accordance with IEC 60364-4-41:2005, Clause A.2.

704.44 Protection against voltage disturbances and electromagnetic disturbances

704.443 Protection against transient overvoltages of atmospheric origin or due to switching

704.443.1 General

704.443.1.101 Cranes, lifts, cement mixers and similar items of equipment are liable to produce switching overvoltages. Where such equipment is present, consideration should be given to the need for protection against switching overvoltages.

704.5 Selection and erection of equipment

704.51 Common rules

704.511 Compliance with standards

704.511.1 *Add the following:*

All assemblies on construction and demolition sites (ACS) for the distribution of electricity shall be in compliance with the requirements of IEC 61439-4.

Where interchangeability is required:

- socket-outlets with a rated current not exceeding 16 A shall comply with IEC 60309-2 or relevant national standards, and
- socket-outlets with a rated current exceeding 16 A but not exceeding 125 A shall comply with IEC 60309-2.

Socket-outlets shall comply with IEC 60309-1 where:

- the rated current exceeds 125 A, or
- interchangeability is not required.

704.512 Operational conditions and external influences

704.512.2 External influences

Add the following:

Consideration shall be given to the risk of damage to electrical equipment by corrosive substances, movement of structures and vehicles, wear and tear, tension, flexing, impact, abrasion, severing and ingress of liquids or solids.

704.52 Wiring systems

704.522.8 Other mechanical stresses (AJ)

704.522.8.101

To avoid damage, cables should not be run across site roads or walkways. Where this is necessary, special protection against mechanical damage and contact with construction plant machinery shall be provided.

Particular attention shall be given to the protection of surface run and overhead cables against mechanical damage, given the environment and activities at the construction site.

Flexible cables that are subject to movement shall be IEC 60245-4 type 66 or equivalent, resistant to abrasion and to water.

704.53 Isolation, switching and control

704.536 Isolation and switching

704.536.2 Isolation

704.536.2.2 Devices for isolation

The following requirements are added:

Each assembly for construction sites (ACS) shall incorporate devices for isolating the incoming supply.

Devices for isolating the incoming supply shall be suitable for securing in the off position (see IEC 60364-5-53:2001, 536.2.1.2) (for example, by providing a padlocking facility on the device or by locating the device inside a lockable enclosure). Safety and standby supplies shall be connected by means of devices arranged to prevent interconnection of the different supplies.

704.56 Safety services

Add the following:

Site conditions may require the provision of safety services, for example escape lighting.

704.6 Verification

704.6.101 Site work is in a constant state of change and, therefore, the associated electrical installation is subject to risk of damage or misuse. Therefore, in addition to initial and periodic verification, the installation shall be inspected frequently, for example daily, weekly, or monthly, as appropriate. Examples of some items to be inspected include:

- the adequacy of connections and the condition of the protective conductors;
- the condition of flexible conductors and their connections to portable equipment and hand-held equipment;
- the rating and condition of fuses and the setting of the circuit-breakers to ensure that they are not unduly altered;
- the functioning of residual current devices.

Annex A
(informative)

List of notes concerning certain countries

Country	Clause/ Subclause No.	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
IT	704.30.101			In Italy clearances are established in ANNEX IX of Dlgs 81/08.
FR	704.410.3.101			In France, all final circuits supplying socket-outlets shall be protected by: – residual current devices having a rated residual operating current not exceeding 30 mA, or – be supplied by SELV or PELV, or – have electrical separation of circuits, each socket-outlet and handheld electrical equipment being supplied by an individual isolating transformer or by separate windings of an isolating transformer.
FI	704.410.3.101			In Finland, circuits supplying socket-outlets with rated current up to and including 32 A that supply other ACSs are exempted provided that constructional provisions or warning signs for these socket-outlets have been provided to avoid misuse.
GB	704.410.3.101			In Great Britain, the use of a reduced low voltage system is also permitted.
HU	704.410.3.101			In Hungary, if the environmental conditions require it, then residual current devices with rated residual operating current of 100 mA can be used.
IE	704.410.3.101			In Ireland, the protective measure ”electrical separation” is not permitted.
IE	704.410.3.101			In Ireland, only portable equipment with the protective measure Reduced Low Voltage is permitted for equipment having a rating of 2kVA or less.
NL	704.410.3.101			In the Netherlands, circuits supplying socket-outlets with rated current up to and including 32 A that supply other assemblies for construction sites (ACS) are exempted provided that constructional provisions for these socket-outlets have been provided to avoid misuse.
SE	704.410.3.101			In Sweden, the requirement of this clause applies for socket-outlets with rated current up to and including 16 A.

Country	Clause/ Subclause No.	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
GB	704.411.3			In Great Britain, a PME earthing facility shall not be used for the means of earthing for an installation falling within the scope of this document unless all extraneous-conductive-parts are reliably connected to the main earthing terminal in accordance with IEC 60364-4-41:2005, 411.3.1.2. NOTE If the PME earthing facility is considered for use, see also BS 7375."
DE	704.411.3.2.101			In Germany, for circuits supplying socket-outlets with a rated current exceeding 32 A, residual current operating devices having a rated residual operating current not exceeding 500 mA shall be used as disconnection devices.
IE	704.414.3.2.101			In Ireland, the rated residual operating current shall not exceed 500 mA.
IT	704.411.3.2.101			In Italy, socket-outlets with a rated current exceeding 32 A shall be protected according to the general rules.
NL	704.411.3.2.101			In the Netherlands, for circuits supplying socket-outlets with a rated current exceeding 32A, residual current operating devices having a rated residual operating current not exceeding 300 mA shall be used as disconnection devices.
NO	704.411.3.2.101			In Norway, first fault disconnection is required in new consumer installations connected to a public IT- distribution network. In this case it may be necessary to choose a lower rated residual operating current in order for the RCD to operate. In IT-distribution systems the necessary rated residual operating current will normally be determined by the capacitance of the network.
NO	704.411.3.2.101			In Norway, the following requirement is added: For circuits supplying socket-outlets with rated current exceeding 32 A, residual current devices or insulation monitoring devices provided with means for tripping a circuit breaker shall be used as disconnection devices. The rated residual operating current of the devices shall: – in TN and TT systems, not exceed 50 % of the minimum prospective earth fault current in the circuit, and – in IT system, not exceeding 3 x the expected leakage current in the circuit during normal operation.

Country	Clause/ Subclause No.	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
DK	704.511.1			In Denmark, single-phase socket-outlets up to and equal to 13 A according to the Danish Heavy Current Regulation, and DS 60884-2-D1, may be used.
DE	704.511.1			In Germany, there are no exceptions to the requirement that plugs and socket-outlets with a rated current exceeding 16 A shall comply with the requirements of IEC 60309-2.
GB	704.511.1			In Great Britain, plugs and socket-outlets with a rated current of 16 A up to 125 A shall comply with the requirements of IEC 60309-2. Plugs and socket-outlets with a rated current exceeding 125 A up to 800 A and where interchangeability is not required shall comply with IEC 60309-1.
ES	704.511.1			In Spain, assemblies on construction sites to be installed in Spain shall comply with IEC 61439-4 and also with the constructive requirements included in UNE 201008-IN.
IT	704.511.1			In Italy, for all rated currents above 16 A, for inter-changeability reasons, socket-outlets shall comply with IEC 60309-2.
GB	704.522.8.101			In Great Britain, for reduced low voltage systems, low temperature 300 V/500 V thermoplastic (PVC) or equivalent flexible cables shall be used.
DE	704.531.2 Residual current protective devices (new)			In Germany, socket outlets up to and included 63 A shall be protected by a residual current protective device of Type B.
IE	704.536.2.2			In Ireland, enclosures for supply authority's equipment shall be of non-conductive material and have a degree of protection IP55.
ES	704.56			In Spain, circuits such as those supplying lift pumps, fans and lifts or hoists for people, whose service continuity is essential, shall be arranged such that the protection against indirect contacts is ensured without automatic disconnection of the power supply. These circuits shall be supplied by an automatic system with a brief disconnection which may be one of the following types: – generating sets with heat engines, or – accumulators linked to a rectifier or undulator.

Country	Clause/ Subclause No.	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
ES	704.56			In Spain, depending on the type of construction site, the safety lighting shall allow, if the normal lighting fails, the evacuation of personnel and the implementation of the specified safety measures.
NL	704.559 (new)			In the Netherlands, only class II luminaires shall be used with the exception of: – fixed installed luminaires not within arm's reach; – luminaires being part of SELV-circuits.