IEC 61084-2-4

Edition 2.0 2017-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Cable trunking systems and cable ducting systems for electrical installations – Part 2-4: Particular requirements – Service poles and service posts

Systèmes de goulottes et systèmes de conduits-profilés pour installations électriques – Partie 2-4: Exigences particulières – Colonnes et colonnettes

IEC 61084-2-4:2017-03(en-fr)

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CABLE TRUNKING SYSTEMS AND CABLE DUCTING SYSTEMS FOR ELECTRICAL INSTALLATIONS –

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FOREWORD

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International Standard IEC 61084-2-4 has been prepared by subcommittee 23A: Cable management systems, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 1996. This edition constitutes a technical revision.

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

- classification;
- construction;
- mechanical and electrical properties.

The text of this standard is based on the following documents:

FDIS	Report on voting
23A/830/FDIS	23A/837/RVD

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

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

This International Standard is to be used in conjunction with IEC 61084-1:2017.

This part of the IEC 61084 series supplements or modifies the corresponding clauses of IEC 61084-1:2017 as follows:

- where no particular clause or subclause of IEC 61084-1 is mentioned, the corresponding clause or subclause of IEC 61084-1 applies as far as is reasonable;
- where “addition” or “replacement” is stated, the relevant text of IEC 61084-1 is to be adapted accordingly;
- subclauses, figures and tables which are additional to those in IEC 61084-1 are numbered starting from 101.

In this standard, the following print types are used:

- requirements and definitions: roman type;
- *compliance statements: italic type.*

A list of all parts in the IEC 61084 series, published under the general title *Cable trunking and cable ducting systems for electrical installations*, can be found on the IEC website.

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

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

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CABLE TRUNKING SYSTEMS AND CABLE DUCTING SYSTEMS FOR ELECTRICAL INSTALLATIONS –

Part 2-4: Particular requirements – Service poles and service posts

1 Scope

This part of the IEC 61084 series specifies requirements and tests for cable trunking systems (CTS) and cable ducting systems (CDS) intended for the accommodation, and where necessary for the electrically protective separation, of insulated conductors, cables and possibly other electrical equipment in electrical and/or communication systems installations. The maximum voltage of these installations is 1 000 V AC and 1 500 V DC

Service poles and service posts are intended to be mounted in free space and in contact with mounting surface(s) only at one or two ends, where the word “mounted” means fixed or placed on the floor with a weighted base or linked to a mounting surface through a flexible component.

NOTE Service poles and service posts can also be part of a CTS/CDS intended for wall or ceiling mounting covered by IEC 61084-2-1 or floor mounting covered by IEC 61084-2-2 and are then also tested according to said parts, as appropriate.

This international standard does not apply to conduit systems, cable tray systems, cable ladder systems, powertrack systems or equipment covered by other standards.

2 Normative references

This clause of Part 1 is applicable, except as follows:

Addition:

IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60228:2004, *Conductors of insulated cables*

IEC 61084-1:2017, *Cable trunking systems and cable ducting systems for electrical installations – Part 1: General requirements*

IEC 61084-2-1:2017, *Cable trunking and cable ducting systems for electrical installations – Part 2-1: Particular requirements – Cable trunking systems and cable ducting systems intended for mounting on walls and ceilings*

IEC 61084-2-2:2017, Cable trunking systems and cable ducting systems for electrical installations – Part 2-2: Particular requirements – Cable trunking systems and cable ducting systems intended for mounting underfloor, flushfloor, or onfloor

ISO 535:2014, *Paper and board – Determination of water absorptiveness – Cobb method*

ISO 536:2012, *Paper and board – Determination of grammage*

ISO 9328-7:2011, *Steel flat products for pressure purposes – Technical delivery conditions – Part 7: Stainless steels*

3 Terms and definitions

This clause of Part 1 is applicable, except as follows:

Addition:

3.101
service pole
CTS/CDS intended to be mounted in free space and in contact with mounting surfaces only at two ends

Note 1 to entry: Service pole can be part of a CTS/CDS intended for wall, ceiling or floor mounting. See Figure 101.

Note 2 to entry: The word “mounted” means fixed or placed on the floor with a weighted base or linked to a mounting surface through a flexible component.

3.102
service post
CTS/CDS intended to be mounted in free space and in contact with mounting surface only at one end

Note 1 to entry: Service post can be part of a CTS/CDS intended for wall, ceiling or floor mounting. See Figure 101.

Note 2 to entry: The word “mounted” means fixed or placed on the floor with a weighted base or linked to a mounting surface through a flexible component.

3.103
pre-equipped service pole/service post
service pole/service post already assembled by the manufacturer or responsible vendor with one or more electrical accessories and/or communication components

3.104
pre-wired service pole/service post
service pole/service post already assembled by the manufacturer or responsible vendor, wired by means of insulated conductors and/or cables connecting one or more electrical accessories and/or communication components

3.105
modular service pole/service post
service pole/service post which includes the assembly of two or more modules allowing to increase the height or width or depth of the product

3.106
rated current
value of the current assigned to a pre-wired and/or pre-equipped service pole/service post by the manufacturer and to which operation and performances characteristics are referred

3.107
rated voltage
value of the voltage assigned to a pre-wired and/or pre-equipped service pole/service post by the manufacturer and to which operation and performances characteristics are referred

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for tests

This clause of Part 1 is applicable, except as follows:

5.1 *Replacement:*

5.1 Unless otherwise specified, tests according to this standard are type tests.

Additional subclause:

5.101 Unless otherwise specified in the relevant test, service poles/service posts are tested on the longest version declared by the manufacturer, and service poles/service posts which differ only by being shorter than one which complies with the requirements for a given test are deemed to comply with the requirements for the same test.

6 Classification

This clause of Part 1 is applicable except as follows:

6.4.1 Flame propagating CTS/CDS

This subclause of Part 1 is not applicable.

Additional subclauses:

6.101 According to floor treatment for service poles/service posts placed on the floor

6.101.1 Service poles/service posts for dry-treatment of floor

6.101.2 Service poles/service posts for wet-treatment of floor

6.102 According to resistance to vertical load applied through small surface area

6.102.1 CTS/CDS for 500 N

6.102.2 CTS/CDS for 750 N

6.102.3 CTS/CDS for 1 000 N

6.102.4 CTS/CDS for 1 500 N

6.102.5 CTS/CDS for 2 000 N

6.102.6 CTS/CDS for 2 500 N

6.102.7 CTS/CDS for 3 000 N

6.103 Optional classification according to resistance to vertical load applied through large surface area

6.103.1 CTS/CDS for 2 000 N

6.103.2 CTS/CDS for 3 000 N

6.103.3 CTS/CDS for 5 000 N

6.103.4 CTS/CDS for 10 000 N

6.103.5 CTS/CDS for 15 000 N

7 Marking and documentation

This clause of Part 1 is applicable except as follows:

7.3 *Add the following three last bullet points:*

- for modular service poles/service posts, the constraints concerning the number or configuration of assembled modules;
- whether non-vertical mounting is allowed;
- whether the flexible component, if any, linking to the mounting surface is not part of the enclosure.

8 Dimensions

This clause of Part 1 is applicable except as follows:

Replacement:

There are no dimensional requirements.

9 Construction

This clause of Part 1 is applicable except as follows:

9.1 Sharp edges

Replacement of the second paragraph by:

Compliance is checked by inspection using one sample, if necessary after cutting the samples apart.

Replacement of the fourth paragraph by:

Compliance is checked by inspection using one sample.

9.3 Means for protective separation and/or retention

Replacement of the second paragraph by:

Compliance is checked by the tests of 10.3 and 10.5.

Additional subclauses:

9.101 Service poles/service posts which are likely to be moved during use shall be provided with means to relieve conductors from strain in terminals or terminations.

NOTE A service pole with a weighted base is an example of service pole likely to be moved during use. A clamped service pole is not considered likely to be moved during use.

When a cable anchorage is used, compliance is checked by inspection and by the test of 9.11.

Other means are checked by the following test.

After installation according to the manufacturer's instructions, a pull force of 100 N ± 2 N is applied to the means in the most unfavourable direction for 60 s ± 5 s.

During the application of the force, there shall be no stress on insulated conductors.

9.102 Areas of service poles/service posts shall have adequate resistance to vertical load when both the following conditions are fulfilled.

- These areas are reasonably subjected to vertical load during installation and/or application. Some areas of service poles or service posts are considered not to be subjected to vertical load due to their dimensions or shape or height at least 100 mm above the floor.
- Damage to these areas would impair mechanical or electrical safety.

Compliance is checked by the test of 10.5.103 and, when a resistance to vertical load through large surface area is declared, by the test of 10.5.104.

9.103 Insulated conductors and/or cables used to connect electrical accessories and/or communication components in pre-wired service poles/service posts shall be selected in accordance with the rated voltage of the connected equipment and, in case of electrical accessories, its rated current.

Compliance is checked by inspection.

9.104 Service poles/service posts placed on the floor declared according to 6.101.2 shall avoid water coming into contact with insulated conductors and live parts during wet-treatment of floor by one or a combination of the following methods:

– method 1: ensuring by design that water does not come into contact with insulated conductors and live parts when the water level is 10 mm above the upper level of the floor covering;

– method 2: providing manufacturer's instructions which require that insulated conductors and live parts are positioned not less than 10 mm above the upper level of the floor covering;

– method 3: providing appropriate sealing.

For method 1, compliance is checked by measurement. For method 2, compliance is checked by inspection. For method 3, compliance is checked by the following test.

The test is made using the lower part of the service pole/service post fixed on a plywood board 16 mm thick, with a 50 mm minimum spacing between the sample and the edge of the support.

Ingress of water is detected by the use of dry absorbent paper positioned between the plywood board and the sample. The absorbent paper is placed only in areas intended to accommodate insulated conductors or live parts.

The absorbent paper has a water absorptive height longitudinal of 75 mm per 10 min according to ISO 535 and a basis weight of 250 g per m^2 according to ISO 536.

The sample is placed carefully into a tray containing water to simulate a $^{0}_{-1}$ mm height of water on the floor.

NOTE For easy detection of water absorption, coloured water can be used.

After 15 s ± 1 s the sample is removed carefully from the tray and the exterior of the sample is immediately wiped.

The service pole/service post is removed from the plywood board.

The absorbent paper shall show no trace of water absorption.

10 Mechanical properties

This clause of Part 1 is applicable except as follows:

10.2 Cable support test

This subclause of Part 1 is not applicable.

10.3 Impact test

10.3.2 Impact test for installation and application

This subclause of Part 1 is applicable except as follows:

Replacement of the first paragraph by:

The test is carried out with the impact test values declared according to Table 6.

Additional subclauses:

10.3.2.101 The resistance to impact is checked on service poles/service posts including a flexible component, if any, used to link the service pole/service post to the mounting surface if the flexible component provides a safety function.

NOTE 1 Examples of safety function are retaining the service pole/service post or relieving conductors from strain or providing an enclosure.

The test is carried out on an assembly consisting

– for a service pole/service post not longer than 1 000 mm: of a complete service pole/service post;

NOTE 2 The length to be considered does not take into account the flexible component if any.

– for a service pole/service post longer than 1 000 mm: of one or more sections 1 000 mm ± 5 mm long to simulate the various characteristics (function, design, material, …) within the service pole/service post.

For service poles/service posts which differ only in length the test is carried out on the shortest and the longest ones. Other service poles/service posts within the range are deemed to comply with the requirements for this test.

For a service pole intended for vertical mounting, the test is carried out only on parts of the service pole which will be lower than 1 500 mm above the floor when installed in accordance with manufacturer's instructions.

The assembly includes system components, if any, to simulate normal use.

Before the test, non-metallic system components and composite system components are aged at the temperature declared according to Table 3 with a tolerance of ±2 °C for 168 h ± 4 h continuously.

The test is carried out with the impact test values declared according to Table 6.

The impact test apparatus according to Clause 4 of IEC 60068-2-75:2014, is mounted on a solid wall or structure providing sufficient support.

For service poles, the assembly is placed horizontally in the impact test apparatus. In order to prevent any movement of the ends, the assembly is secured at both ends. This method of securing should not introduce a compressive force in the longitudinal axis of the assembly which would not exist in normal application. Between both ends, the assembly is not supported and is free to move in the impact direction.

Service posts are tested in their normal mounting position. The assembly is secured at the appropriate end to prevent any movement of this end without any additional support. Products intended to be mounted vertically are tested vertically whenever possible, otherwise they are tested horizontally.

No impact is applied to knockouts, membranes and the like.

When the assembly consists of a section, no impact is applied within 50 mm of any open end of the assembly.

NOTE 3 When another system component has been included at an end of the assembly to prevent movement, this end is still considered open.

Compliance is checked according to 10.3.2.104 after carrying out the test of:

– *10.3.2.102 for service poles/service posts with declared minimum installation and application temperature of +5 °C or higher;*
– *10.3.2.103 for service poles/service posts with declared minimum installation and application temperature lower than +5 °C.*

10.3.2.102 The test is carried out at an ambient temperature of 20 °C ± 5 °C. The hammer is allowed to fall so that an impact is applied as far as possible perpendicular to the accessible region of the assembly likely to be the weakest.

10.3.2.103 The assemblies are placed in a cabinet at the temperature declared according to Table 2 with a tolerance of ±2 °C.

After 2 h, each assembly is, in turn, removed from the cabinet and immediately placed in position in the impact test apparatus.

At 12 s ± 2 s after the removal of the assembly from the cabinet, the hammer is allowed to fall so that an impact is applied as far as possible perpendicular to the accessible region of the assembly likely to be the weakest. Compliance with impact applied before 10 s provides also compliance with this test of the standard.

Instead of placing the assemblies in a cabinet and applying the impact at 12 s ± 2 s after the removal of the assembly from the cabinet, it is allowed to apply the impact in a climatic chamber at the temperature declared according to Table 2 with a tolerance of ±2 °C on assemblies placed at this temperature for 2 h. Compliance in the climatic chamber is sufficient. In case of failure in the climatic chamber, compliance using the cabinet provides compliance with the standard.

10.3.2.104 After the test,

– the assembly shall show no cracks or similar damage visible to normal or corrected vision without magnification, and
– the assembly shall remain intact

such that safety is not impaired.

In case of doubt, the test of 14.1.3 is carried out on the impacted assemblies, with the exception of the open ends, to check that the declared degree of protection against access to hazardous parts is maintained. The declared degree of protection against access to hazardous parts is either the additional letter directly declared by the manufacturer according to 6.7.3, if any, or the degree of protection against access to hazardous parts indirectly declared by the manufacturer according to 6.7.1.

NOTE Any cracks in internal dividers which are not likely to impair electrical safety or use are ignored. Electrical safety can be impaired when the impact creates a sharp edge on a partition which can possibly damage insulated conductors or cables (see 9.1).

10.4 Linear deflection test

This test is only applicable to service poles/service posts intended to be mounted in a non-vertical position.

Compliance is checked by the following test.

The test is carried out on a complete service pole/service post mounted horizontally. If no manufacturer's instructions for the orientation of the service pole/service post are provided, the test is carried out in the most unfavourable orientation.

The test sample is subjected to an evenly distributed load of 1,0 g/mm^2 per metre length of the declared usable area for cables.

The load consists of copper cables complying with class 5, Table 3 of IEC 60228:2004 or flexible insulated conductors or cables of similar mass per meter which are placed in the sample.

Cables of 25 mm^2 nominal cross section are placed in the samples so that approximately 50 % of the load is achieved.

Cables of 2,5 mm^2 nominal cross section are placed on top of the larger cables to achieve the total load within a tolerance of ±100 g.

To allow for settlement of the sample, a pre-load of approximately 10 % of the load is applied and removed after approximately 5 min. The measurement apparatus is then calibrated to zero.

After 1 h $^{+5}_{0}$ min, with the load still applied, the deflection is measured,

– for service poles on the lower surface, at mid length and in the middle of the width, and
– for service posts on the lower surface, at the free end and in the middle of the width.

The deflection shall not exceed,

– for service poles, 1 % of the length of the service pole, and
– for service posts, 5 % of the length of the service post.

Access covers of the service pole/service post and cable separators shall remain adequately fixed so as to fulfil their intended function, and electrical safety shall not be impaired.

In case of doubt, the test of 14.1.3 is carried out on the loaded test sample to check that the declared degree of protection against access to hazardous parts is maintained. The declared degree of protection against access to hazardous parts is either the additional letter directly declared by the manufacturer according 6.7.3, if any, or the degree of protection against access to hazardous parts indirectly declared by the manufacturer according 6.7.1.

10.5 External load test

Additional subclauses:

10.5.101 Horizontal load test for service poles not likely to be moved during use

NOTE A clamped service pole is considered not likely to be moved during use. A service pole with a weighted base is an example of service pole likely to be moved during use.

The test is carried out on a complete service pole mounted between two rigid parallel surfaces.

For service poles which differ only in length, the test is carried out on the shortest and the longest ones. Other service poles within the range are deemed to comply with the requirements for this test.

The service pole is mounted according to the manufacturer's instruction.

For service poles intended to be clamped between floor and ceiling:

– unless otherwise specified in the manufacturer's instructions, the test surfaces are of stainless steel X5CrNi18-9, with a thickness of at least 2 mm according to ISO 9328-7, and a surface quality of 2B, mounted on a rigid base, for example concrete;

– after mounting, the distance between floor and ceiling is increased by 5 mm ± 1 mm without any further clamping of the service pole.

A push force of 400 N ± 20 N is applied perpendicular to the longitudinal axis of the sample in the most unfavourable position and direction.

The force is applied for 60 s ± 5 s on a surface measuring approximately 80 mm × 80 mm using an intermediate rigid element. If it is not possible to apply the force on an 80 mm × 80 mm surface using a square intermediate element, one of appropriate shape with approximately the same projective area is used.

During the test, mechanical and electrical safety shall not be impaired.

After the test, the service pole shall remain in place and electrical safety shall not be impaired. In particular, access covers, cable separators, cable retainers and the like shall remain adequately fixed so as to fulfil their intended function.

Immediately after this test, the service pole is subjected to a torque of 10 Nm ± 1 Nm around its longitudinal axis for 60 s ± 5 s.

During the test, mechanical and electrical safety shall not be impaired.

After the test, the service pole shall remain in place and electrical safety shall not be impaired. In particular, access covers, cable separators, cable retainers and the like shall remain adequately fixed so as to fulfil their intended function.

Each time there is doubt about possible impairment of electrical safety, the test of 14.1.3 is carried out on the samples to check that the declared degree of protection against access to hazardous parts is maintained. The declared degree of protection against access to hazardous parts is either the additional letter directly declared by the manufacturer according to 6.7.3, if any, or the degree of protection against access to hazardous parts indirectly declared by the manufacturer according to 6.7.1.

The above test is repeated in the opposite rotation direction.