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INTERNATIONAL STANDARD

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Conduit systems for cable management –
Part 23: Particular requirements – Flexible conduit systems

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONDUIT SYSTEMS FOR CABLE MANAGEMENT –

Part 23: Particular requirements – Flexible conduit systems

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International Standard IEC 61386-23 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 2002. This edition constitutes a technical revision.

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

a) Annex AA has been added to provide guidance on the application of a constantly increasing force.

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

FDIS	Report on voting
23A/952/FDIS	23A/957/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 the parts in the IEC 61386 series, published under the general title *Conduit systems for cable management*, can be found on the IEC website.

This document is to be used in conjunction with IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017.

This document supplements or modifies the corresponding clauses of IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017. Where a particular clause or subclause of IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017 is not mentioned in this document, that clause or subclause applies as far as is reasonable. Where this document states "addition", "modification" or "replacement", the relevant text of IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017 is to be adapted accordingly.

Subclauses, tables and figures which are in addition to those in IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017 are numbered starting with 101. Annexes which are additional to those in IEC 61386-1:2008 and IEC 61386-1:2008/AMD1:2017 are lettered AA, BB, etc.

In this document, the following print types are used:

– Requirements proper: in roman type.
– *Test specifications: in italic type.*
– Explanatory matter: in smaller roman type.

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CONDUIT SYSTEMS FOR CABLE MANAGEMENT –

Part 23: Particular requirements – Flexible conduit systems

1 Scope

~~This clause of part 1 is applicable, except as follows:~~

Clause 1 of IEC 61386-1:2008 is applicable, except as follows:

Addition:

This part of IEC 61386 specifies the requirements for flexible conduit systems.

2 Normative references

~~This clause of part 1 is applicable.~~

Clause 2 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable, except as follows:

Addition:

IEC 61386-1:2008, *Conduit systems for cable management – Part 1: General requirements*
IEC 61386-1:2008/AMD1:2017

3 Terms and definitions

~~This clause of part 1 is applicable.~~

Clause 3 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable.

4 General requirements

~~This clause of part 1 is applicable.~~

Clause 4 of IEC 61386-1:2008 is applicable.

5 General conditions for tests

~~This clause of part 1 is applicable.~~

Clause 5 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable.

6 Classification

~~This clause of part 1 is applicable, except as follows:~~

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Clause 6 of IEC 61386-1:2008 is applicable, except as follows:

~~Subclauses~~ Classifications 6.1.3, 1; 6.1.3, 2 and 6.1.3, 3 are not applicable.

NOTE Flexible conduit systems according to 6.1.1, 1; 6.1.1, 2; 6.1.2, 1; 6.1.2, 2 and classification ~~1X~~ 1 from 6.2.1, Table 1 are not allowed in France.

7 Marking and documentation

~~This clause of part 1 is applicable, except as follows:~~

Clause 7 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable, except as follows:

Addition:

7.1.101 The conduit shall be marked in accordance with 7.1 along its entire length at regular intervals of preferably 1 m but not longer than 3 m. Where this is technically impractical, the mark shall be on a label attached to the product at each end, or on the packaging.

Compliance is checked by inspection.

7.1.102 The manufacturer shall document or ~~add to~~ include in the packaging ~~for the system~~, the minimum inside diameter, the minimum bend radius and the classification in accordance with Clause 6 for the conduit system.

Compliance is checked by inspection of the documentation.

8 Dimensions

Replacement:

8.1 Threads shall comply with IEC 60423.

Compliance is checked by means of the gauges specified in IEC 60423.

8.2 The minimum inside diameter of the conduit system shall be as declared by the manufacturer.

Compliance is checked by measurement.

9 Construction

~~This clause of part 1 is applicable.~~

Clause 9 of IEC 61386-1:2008 is applicable.

10 Mechanical properties

~~This clause of part 1 is applicable, except as follows:~~

~~**10.1 Mechanical strength**~~

~~**10.1.1** *Addition:*~~

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~~NOTE Very light flexible conduits should not be considered as providing adequate mechanical protection and should not be used within the construction of buildings.~~

Clause 10 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable, except as follows:

10.2 Compression test

Subclause 10.2 is applicable with the following addition:

10.2.4 *Add the following note at the end of Subclause 10.2.4:*

NOTE In order to achieve a uniformly increasing compression force, the force indicated in Table 4 is divided by time; this value is the required rate per second to fulfil the requirement.

Example: For a test force of 750 N an increase of the test force of 25 N/s is required (750 divided by 30 equals 25). Informative Annex AA gives detailed calculations including tolerances for time and force.

10.4 Bending test

~~This subclause of part 1 is not applicable.~~

Subclause 10.4 of IEC 61386-1:2008 is not applicable.

10.5 Flexing test

Addition:

10.5.101 An assembly consisting of a conduit with a terminating conduit fitting, assembled in accordance with the manufacturer's instructions, shall be subjected to a flexing test by means of the apparatus shown in Figure 101.

10.5.102 The test shall be made on six samples of conduit of an appropriate length. Three of the samples shall be tested at the minimum declared temperature for transport, application and installation ~~temperature~~ as given in Table 1 with a tolerance of ±2 °C. The other three samples shall be tested at the maximum declared application and installation temperature as given in Table 2 with a tolerance of ±2 °C.

A manufacturer may declare that a flexible conduit is suitable for transport and installation according to Table 1 but may only be suitable for flexing at ambient temperature as a minimum. In this case the test shall be carried out at (20 ± 2) °C and the third digit of the classification code shall be X. The manufacturer shall clearly declare in its literature both the minimum transport and installation temperature in accordance with Table 1, the minimum application temperature which is ambient and the maximum installation and application temperature in accordance with Table 2.

10.5.103 The sample shall be fixed to the oscillating member by means of the terminating conduit fitting as shown in Figure 101, so that when the conduit is at the middle of its travel, the axis of the conduit is vertical and passes through the axis of the oscillation. The apparatus with the sample shall be conditioned for 2 h or until the sample has attained the declared temperature, whichever period is the longer.

10.5.104 The oscillating member shall be moved backwards and forwards through a total angle of (180 ± 5)° divided equally about the vertical axis. The assembly shall be subjected to 5 000 flexings at a rate of (40 ± 5) flexings per minute. A flexing constitutes, starting from the vertical position, one continuous cycle of movement of essentially sinusoidal forms.

10.5.105 After the test, the sample shall show no ~~sign of disintegration, nor shall there be any~~ cracks visible to normal or corrected vision without magnification and it shall be possible to

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pass the appropriate gauge, as shown in Figure 102, through the sample under its own weight and without any initial speed.

10.6 Collapse test

~~This subclause of part 1 is not applicable.~~

Subclause 10.6 of IEC 61386-1:2008 is not applicable.

10.7 Tensile ~~strength~~ test

~~This subclause of part 1 is applicable, except as follows:~~

Subclause 10.7 of IEC 61386-1:2008 is applicable, except as follows:

10.7.3 *Replacement:*

For conduit systems where tensile strength is not declared, the tensile strength of the joint shall comply with classification 1 in Table 6.

11 Electrical properties

~~This clause of part 1 is applicable, except as follows:~~

Clause 11 of IEC 61386-1:2008 and of IEC 61386-1:2008/AMD1:2017 are applicable, except as follows:

11.2 Bonding test

Replacement:

A sample of a conduit and terminating conduit fitting shall be assembled in accordance with the manufacturer's instructions and mounted as shown in Figure 103. A current of 25 A, having a frequency of 50 Hz to 60 Hz, derived from an AC source having a no-load voltage not exceeding 12 V, shall be passed through the assembly for (60^{+5}_{0}) s. Then the voltage drop shall be measured between the points shown in Figure 103 and the resistance calculated from the current and this voltage drop.

The resistance shall not exceed 0,05 Ω.

~~Where special devices are required for the coupling of conduit and conduit fittings, they shall be sufficient to remove the protective coating from the conduit, or the protective finish shall be removed in accordance with the manufacturer's instructions.~~

12 Thermal properties

~~This clause of part 1 is applicable, except as follows:~~

Clause 12 of IEC 61386-1:2008 is applicable, except as follows:

~~**12.2.4**~~ **12.3** *Replacement*:

The load is then removed and immediately after its removal it shall be possible to pass the appropriate gauge, in accordance with Figure 102, through the conduit under its own weight and without any initial speed, with the sample in the vertical position.

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