IEC 61386-21

Edition 2.0 2021-04
REDLINE VERSION

INTERNATIONAL STANDARD

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Conduit systems for cable management – Part 21: Particular requirements – Rigid conduit systems

IEC 61386-21:2021-04 RLV(en)

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Conduit systems for cable management –
Part 21: Particular requirements – Rigid conduit systems

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.120.10

ISBN 978-2-8322-9704-9

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONDUIT SYSTEMS FOR CABLE MANAGEMENT –

Part 21: Particular requirements – Rigid conduit systems

FOREWORD

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International Standard IEC 61386-21 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) Subclause 7.1.103 has been added requiring the manufacturer to declare whether the conduit is bendable;

b) 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/950/FDIS	23A/955/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 21: Particular requirements – Rigid 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 rigid 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:

Classifications 6.1.1, 1; 6.1.2, 1; 6.1.3, 2; 6.1.3, 3; 6.1.3, 4; 6.1.4, 1; and 6.1.5, 1 are not applicable.

NOTE Rigid conduit systems according to 6.1.1, 2 and 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 and each length shall be marked at least once.

Compliance is checked by inspection.

7.1.102 The manufacturer shall document, for the conduit system, the minimum inside diameter and the classification in accordance with Clause 6.

Compliance is checked by inspection of the documentation.

7.1.103 The manufacturer shall declare whether the conduit is bendable and provide all information, instructions and, if necessary, bending aids for proper and safe bending of the conduit.

Compliance is checked by inspection and by the tests specified in 10.4 and 10.6.

8 Dimensions

Replacement:

8.1 Threads and outside diameters shall comply with IEC 60423.

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

8.2 Threadable conduits and threadable conduit fittings, except terminating conduit fittings, shall comply with Table 101. Non-threadable conduit fittings, except fittings which are part of a conduit system declaring tensile strength, shall comply with Table 102. The minimum inside diameter of the conduit system shall be as declared by the manufacturer.

Compliance is checked by measurement.

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Table 101 – Thread lengths

Size	External thread	Internal thread
	Minimum length	Minimum length
mm	mm	mm
6	05,5	06,5
8	06,5	07,5
10	08,5	09,5
12	10,5	11,5
16	12,5	13,5
20	14,0	15,0
25	17,0	18,0
32	19,0	20,0
40	19,0	20,0
50	19,0	20,0
63	19,0	20,0
75	19,0	20,0

Table 102 – Maximum entry diameter and minimum entry length details

~~Size~~	~~External thread~~	~~Internal thread~~
	~~Maximum entry diameter~~	~~Minimum entry length~~
	~~mm~~	~~mm~~
~~6~~	~~06,5~~	~~06,0~~
~~8~~	~~08,5~~	~~08,0~~
~~10~~	~~10,5~~	~~10,0~~
~~12~~	~~12,5~~	~~12,0~~
~~16~~	~~16,5~~	~~16,0~~
~~20~~	~~20,5~~	~~20,0~~
~~25~~	~~25,5~~	~~25,0~~
~~32~~	~~32,6~~	~~30,0~~
~~40~~	~~40,7~~	~~32,0~~
~~50~~	~~50,8~~	~~42,0~~
~~63~~	~~63,9~~	~~50,0~~
~~75~~	~~75,9~~	~~50,0~~

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Size mm	Maximum entry diameter mm	Minimum entry length mm
6	06,5	06,0
8	08,5	08,0
10	10,5	10,0
12	12,5	12,0
16	16,5	16,0
20	20,5	20,0
25	25,5	25,0
32	32,6	30,0
40	40,7	32,0
50	50,8	42,0
63	63,9	50,0
75	75,9	50,0

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:~~

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

Replacement:

Conduits which are declared by the manufacturer as being bendable are tested in accordance with 10.4.101, 10.4.102 or 10.4.103.

Addition:

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10.4.101 Metallic conduits

10.4.101.1 *Conduit sizes 16, 20 and 25 are subjected to a bending test by means of the apparatus shown in Figure 101. Testing of other sizes is in accordance with the manufacturer's instructions.*

10.4.101.2 *Samples having a length equal to 30 times the nominal diameter, are bent so that when released, they have an angle of (90 ± 5)°, so that the inside radius of the bend is equal to six times the nominal diameter.*

10.4.101.3 *For conduits with welded seams, six samples are tested, three with the seam on the outside of the bend, three with the seam on the side.*

10.4.101.4 *After the test:*

- *the basic material of the conduits and the protective coating of the conduits shall show no cracks visible to normal or corrected vision without magnification;*
- *seams, if any, shall not have opened;*
- *the section of the conduit shall not have distorted unduly.*

The distortion of the section is checked as follows:

When the bent conduit is held in such a position that the straight portions are at an angle of approximately 45° to the vertical, one end of the sample pointing upwards and the other downwards, it shall be possible to pass the appropriate gauge as shown in Figure 102 through the sample under its own weight and without any initial speed.

10.4.102 Non-metallic conduits

10.4.102.1 *Conduit sizes 16, 20 and 25 are subjected to a bending test by means of the apparatus shown in Figure 103. The length of the sample is ~~approximately~~ 500 mm ± 10 mm. Testing of other sizes is in accordance with the manufacturer's instructions.*

10.4.102.2 *A bending aid, in the form of a coiled spring of square section metal wire, without burrs and having an overall diameter between 0,7 mm and 1,0 mm less than the specified minimum inside diameter of the conduit, or a bending aid recommended by the manufacturer, is inserted into each sample before bending.*

10.4.102.3 ~~*Before the test,*~~ *The sample with the bending aid inserted is conditioned for at least 2 h in a refrigerator within which the temperature is maintained at the declared temperature as given in Table 1 with a tolerance of ±2 °C.*

~~*The bending apparatus is placed beside the refrigerator and*~~ *The test is carried out within ~~10~~ 12 s ± 2 s after the removal of the sample from the refrigerator.*

10.4.102.4 *Each sample is placed in position as shown in Figure 103, and held lightly in the groove of the former by means of the clamp. The sample is bent round the former by moving the bending rollers so that, when released, it has an angle of (90 ± 5)°. In this position, it shall be possible to remove the bending aid without damage to the sample or the aid.*

After the test, the sample shall show no cracks visible to normal or corrected vision without magnification and it shall be possible to pass the appropriate gauge, as shown in Figure 102, through the sample under its own weight and without any initial speed.

10.4.103 Composite conduits

Composite conduits which are declared by the manufacturer as being bendable are tested both in accordance with 10.4.101 and 10.4.102, using new samples for each test.

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