

Conduit systems for cable management —

Part 21: Particular requirements — Rigid conduit systems

The European Standard EN 61386-21:2004 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN 61386-21:2004. It is identical with IEC 61386-21:2002. It supersedes BS EN 50086-2-1:1996 which will be withdrawn on 30 June 2008.

The UK participation in its preparation was entrusted to Technical Committee PEL/213, Cable management, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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Conduit systems for cable management
Part 21: Particular requirements –
Rigid conduit systems
(IEC 61386-21:2002)

Systèmes de conduits pour la gestion
du câblage
Partie 21: Règles particulières –
Systèmes de conduits rigides
(CEI 61386-21:2002)

Elektroinstallationsrohrsysteme für
elektrische Energie und für Informationen
Teil 21: Besondere Anforderungen für
starre Elektroinstallationsrohrsysteme
(IEC 61386-21:2002)

This European Standard was approved by CENELEC on 2003-09-23. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 61386-21:2002, prepared by SC 23A, Cable management systems, of IEC TC 23, Electrical accessories, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 61386-21 on 2003-09-23.

This European Standard supersedes EN 50086-2-1:1995 + corrigendum February 2001 + A11:1998 + A11:1998/corrigendum February 2001.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-06-30

This part 21, which specifies particular requirements for rigid conduit systems, is to be used in conjunction with EN 61386-1:2004.

This part 21 supplements or modifies the corresponding clauses of EN 61386-1. Where a particular clause or subclause of part 1 is not mentioned in this part 21, that clause or subclause applies as far as is reasonable. Where this part 21 states "addition", "modification" or "replacement", the relevant text of part 1 is to be adapted accordingly.

Subclauses, tables and figures which are in addition to those in part 1 are numbered starting with 101. Additional annexes are lettered AA, BB, etc.

A conduit system which complies with this standard is deemed safe for use when installed in accordance with national wiring regulations, whilst applying the manufacturer's installation instructions and conduit classification.

In this standard, the following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in smaller roman type.

Annexes ZAA and ZBB have been added by CENELEC.

The contents of the corrigendum of April 2004 have been included in this copy.

Endorsement notice

The text of the International Standard IEC 61386-21:2002 was approved by CENELEC as a European Standard without any modification.

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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:

Addition:

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

2 Normative references

This clause of part 1 is applicable.

3 Definitions

This clause of part 1 is applicable.

4 General requirements

This clause of part 1 is applicable.

5 General conditions for tests

This clause of part 1 is applicable.

6 Classification

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

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 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:

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 system the minimum inside diameter and the classification in accordance with clause 6.

Compliance is checked by inspection.

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.

Table 101 – Thread lengths

Size	External thread	Internal thread
	Minimum length	Minimum length
	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 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.

10 Mechanical properties

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

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.

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 $(90 \pm 5)^\circ$, 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. 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 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 $(90 \pm 5)^\circ$. 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.

The test is carried out at the declared temperature as given in table 1 with a tolerance of ± 2 °C.

10.5 Flexing test

This subclause of part 1 is not applicable.

10.6 Collapse test

Replacement:

10.6.101 Metallic conduits

Metallic conduits are not subjected to a collapse test.

10.6.102 Non-metallic and composite conduits

10.6.102.1 *Conduits which are declared by the manufacturer as being bendable shall be tested in accordance with 10.4.102 with the exception of 10.4.102.3.*

10.6.102.2 *The samples are fixed to a rigid support by means of four straps, as shown in figure 104, after having removed the bending spring or any other bending aids recommended by the manufacturer.*

The support with the sample in position is kept for 24 h ± 15 min in a heating cabinet at the declared temperature as given in table 2 with a tolerance of ±2 °C.

After this period, with the support in such a position that the straight portions of the sample 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.

10.7 Tensile strength

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

10.7.3 Not applicable.

11 Electrical properties

This clause of part 1 is applicable.

12 Thermal properties

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

12.3 *Replacement:*

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

13 Fire hazard

This clause of part 1 is applicable.

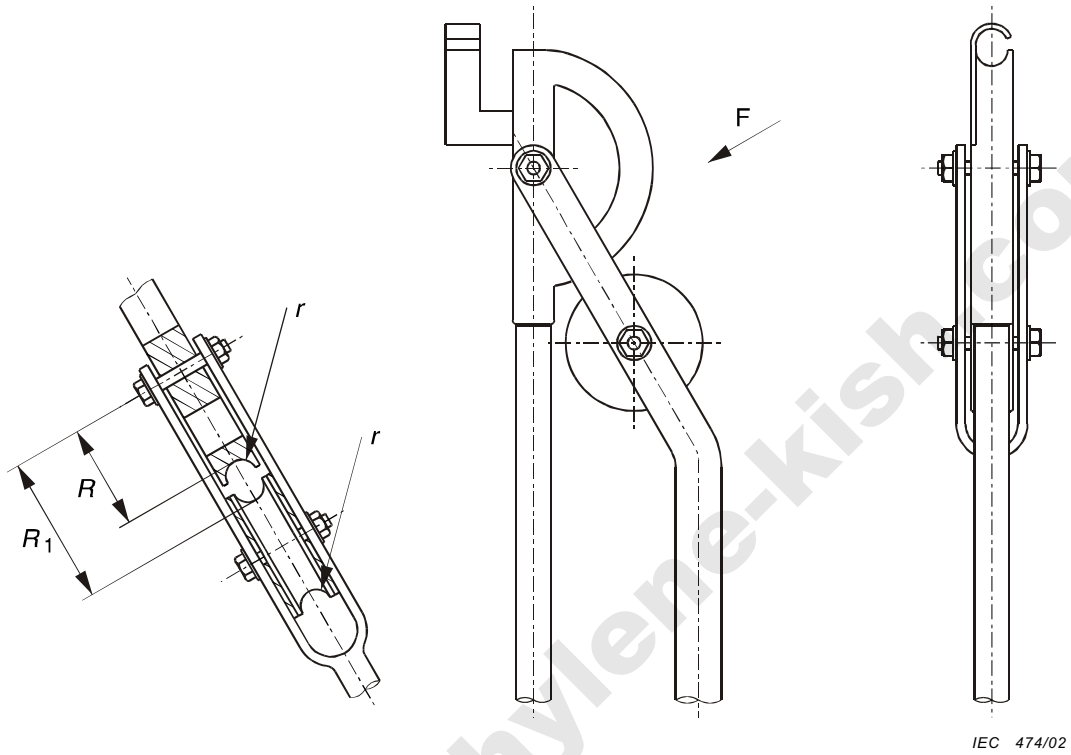
14 External influences

This clause of part 1 is applicable.

15 Electromagnetic compatibility

This clause of part 1 is applicable.

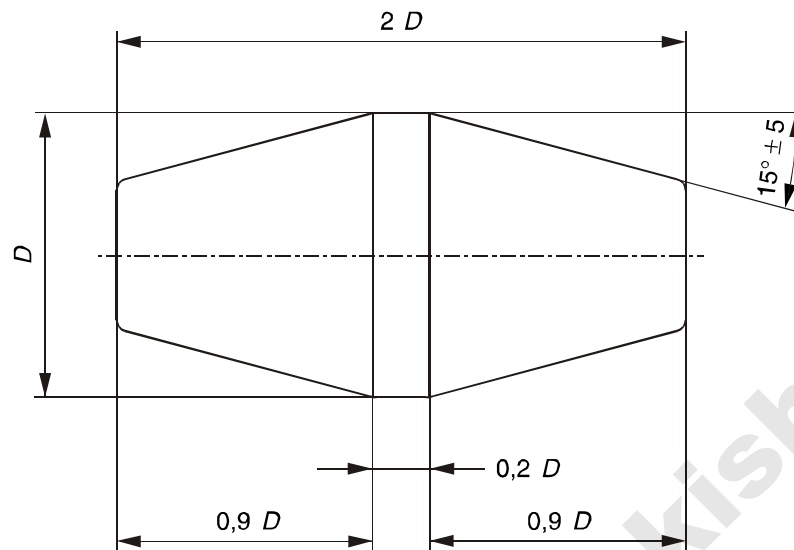
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Size	Bending radius		Radius of groove
	Inside radius <i>R</i> mm	Outside radius <i>R</i> ₁ mm	<i>r</i> mm
16	96	113	8,1
20	120	141	10,1
25	150	178	12,7

NOTE This drawing is not intended to govern design except as regards the dimensions shown.

Figure 101 – Bending apparatus for metallic and composite conduits

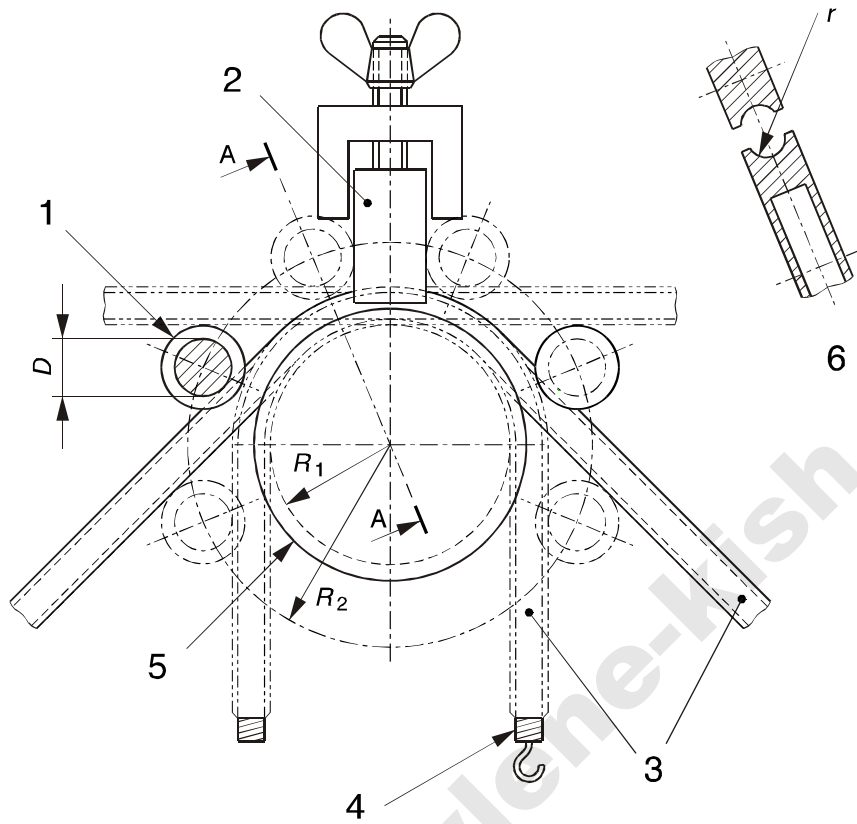


IEC 475/02

D	80 % of the manufacturer's declared minimum inside diameter of the conduit system
Material	Steel, hardened and polished, edges slightly rounded
Manufacturing tolerance	$+0,05$ 0 mm
Tolerance and axial dimension	$\pm 0,2$ mm
Admissible wear	0,01 mm

NOTE The drawing is not intended to govern design except as regards the dimensions shown

Figure 102 – Gauge for checking the minimum inside diameter of the conduit system after impact, bending, collapse and resistance to heat tests

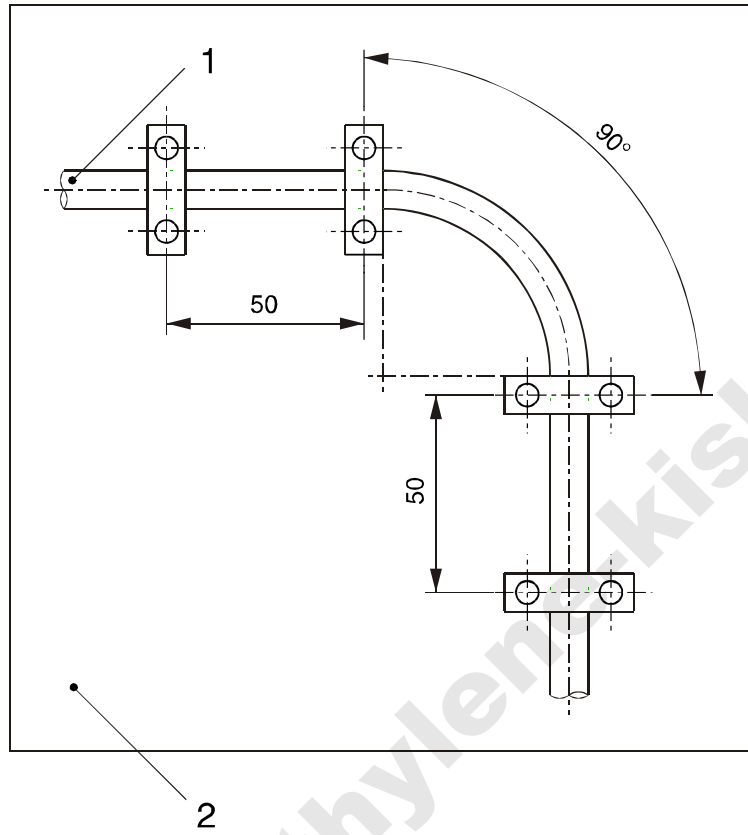


- Key**
- 1 Bending roller
 - 2 Clamp
 - 3 Sample
 - 4 Bending spring
 - 5 Former
 - 6 Section A – A

Size	Radius to bottom of groove of former R_1 mm	Radius of arc traced out by centre of bending roller R_2 mm	Radius of groove of former and bending roller r mm	Diameter to bottom of groove of bending roller D mm
16	48	84	8,1	24
20	60	105	10,1	30
25	75	131,25	12,6	37,5

NOTE This drawing is not intended to govern design except as regards the dimensions shown.

Figure 103 – Bending apparatus for non-metallic and composite conduit



IEC 477/02

Key:

- 1 Sample
- 2 Rigid Support

NOTE This drawing is not intended to govern design except as regards the dimensions shown.

Figure 104 – Arrangement for collapse test

Annex A
(normative)

This annex of part 1 is applicable

Annex B
(normative)

This annex of part 1 is applicable

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Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

Annex ZA of part 1 is applicable.

Annex ZAA
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause Special national condition

6.5.2 **Finland** (Finnish wiring rules SFS 6000-5-52:2002 (= HD 384.5.52 S1))

Flame propagating conduit systems are allowed to be used only if they are completely enclosed in suitable non-combustible building materials.

United Kingdom (British wiring regulations BS7671: 2001 HD 384).

Flame propagating conduit systems are allowed to be used in buildings only if they are completely enclosed in suitable non-combustible building materials.

Annex ZBB
(informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC national member.

This European Standard falls under Directive 73/23/EEC.

NOTE (from CEN/CENELEC IR Part 2, 2.17) Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No C 59, 1982-03-09) that the effect of the decision of the Court of Justice in Case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p. 3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted within the EC except under the safeguard procedure provided for in the relevant Directive.

A-deviations in an EFTA-country are **valid instead** of the relevant provisions of the European Standard in that country until they have been removed.

<u>Clause</u>	<u>Deviation</u>
6.1.1.2 and 6.1.2.2	France (Decree from Equipment and Accommodation Minister for low voltage installations dated 22 October 1969)
6.1.1.2, 6.1.1.3, 6.1.2.2 and 6.5.2	Spain (Real Decreto 842/2002 dated 2 August 2002 and Real Decreto 401/2003 dated 14 May 2003) Classifications not allowed.
6.2.1	Austria (Austrian Electrotechnical Law (ETG) BGBl. 106/1992 dated February 12, 1993 and Austrian Electrotechnical Decree (ETV 2002) BGBl. 222, Part II dated June 13, 2002) France (Decree from Equipment and Accommodation Minister low voltage installations dated 22 October 1969) Classification 1X according to Table 1 not allowed.
6.5.2	Austria (Austrian Electrotechnical Law (ETG) BGBl. 106/1992 dated February 12, 1993 and Austrian Electrotechnical Decree (ETV 2002) BGBl. 222, Part II dated June 13, 2002) Classification is not allowed for installations in buildings.

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