

# Conduit systems for cable management —

## Part 22: Particular requirements — Pliable conduit systems

The European Standard EN 61386-22:2004 has the status of a  
British Standard

ICS 29.120.10

## National foreword

This British Standard is the official English language version of EN 61386-22:2004. It is identical with IEC 61386-22:2002. It supersedes BS EN 50086-2-2:1996 which will be withdrawn on 30 June 2008.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 14, an inside back cover and a back cover.

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NORME EUROPÉENNE

EUROPÄISCHE NORM

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Incorporates Corrigendum April 2004

English version

**Conduit systems for cable management**  
**Part 22: Particular requirements –**  
**Pliable conduit systems**  
(IEC 61386-22:2002)

Systèmes de conduits pour la gestion  
du câblage  
Partie 22: Règles particulières –  
Systèmes de conduits cintrables  
(CEI 61386-22:2002)

Elektroinstallationsrohrsysteme für  
elektrische Energie und für Informationen  
Teil 22: Besondere Anforderungen für  
biegsame Elektroinstallationsrohrsysteme  
(IEC 61386-22:2002)

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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### Foreword

The text of the International Standard IEC 61386-22:2002, 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 61386-22 on 2003-09-23.

This European Standard supersedes EN 50086-2-2:1995 + 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 22, which specifies particular requirements for pliable conduit systems, is to be used in conjunction with EN 61386-1:2004.

This part 22 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 22, that clause or subclause applies as far as is reasonable. Where this part 22 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.

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### Endorsement notice

The text of the International Standard IEC 61386-22:2002 was approved by CENELEC as a European Standard without any modification.

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## CONDUIT SYSTEMS FOR CABLE MANAGEMENT –

### Part 22: Particular requirements – Pliable conduit systems

#### 1 Scope

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

*Addition:*

This part of IEC 61386 specifies the requirements for pliable conduit systems including self-recovering 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 1, 6.1.3 4, 6.1.4 1 and 6.1.5 1** are not applicable.

NOTE Pliable 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. 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 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 shall comply with IEC 60423.

Outside diameters of non-metallic conduit shall comply with IEC 60423.

Outside diameters of metallic and composite conduits need not comply with IEC 60423, provided that they are designed to be installed only with terminating conduit fittings having threads complying 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 mm	Minimum length 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:

### 10.2 Compression test

For self-recovering conduits, replace paragraphs **10.2.4**, **10.2.5**, **10.2.6**, **10.2.7** and **10.2.8**, by the following:

**10.2.101** The intermediate steel piece shall be subjected to a uniformly increasing compression force ( $N$ ) reaching the force indicated in table 4 after  $(30 \pm 3)$  s. The sample shall flatten by between 25 % and 50 % of its initial outside diameter.

If the sample flattens by less than 25 %, an additional test is carried out whereby the intermediate steel piece is lowered onto the sample at constant speed until the sample is flattened by  $(30 \pm 3)$  % after  $(30 \pm 3)$  s and the resultant force is measured.

A new sample is subjected to the uniformly increasing force ( $N$ ) reaching the force measured above after  $(30 \pm 3)$  s. The sample shall flatten by between 25 % and 50 % of its initial outside diameter.

The force and the intermediate steel piece shall then be removed. Fifteen minutes after removal, the outside diameter of the sample, where it has flattened, shall be measured again.



After the test, the difference between the initial outside diameter and the outside diameter of the flattened sample shall not exceed 10 % of the outside diameter, as measured before the test, and the sample shall show no cracks visible to normal or corrected vision without magnification.

#### **10.4 Bending test**

*Replacement:*

**10.4.101** Conduits shall be subjected to a bending test by means of the apparatus as shown in figure 101.

**10.4.102** The test shall be made on six samples of conduit, the length of each sample being at least:

- a) 30 times the nominal outside diameter for plain conduits;
- b) 12 times the nominal outside diameter for corrugated conduits.

Three of the samples shall be tested at ambient temperature; the other three shall be tested at the minimum declared transport, application and installation temperature according to table 1, with a tolerance of  $\pm 2$  °C.

**10.4.103** For the test at ambient temperature, the sample shall be clamped vertically in the bending apparatus as shown in figure 101. The sample shall be slowly bent by hand to the left through an angle of  $(90 \pm 5)^\circ$ , back to the vertical position, to the right through an angle of  $(90 \pm 5)^\circ$ , and back to the vertical position. This sequence of operations shall be repeated three more times but at the end the sample shall not be bent back to the vertical position. The sample shall be maintained in the bent position for 5 min, after which it shall be placed in such a position that the straight portions are at an angle of  $(45 \pm 5)^\circ$  to the vertical, one end of the sample pointing upwards and the other downwards.

For the test at the minimum declared transport, application and installation temperature according to table 1, the sample clamped in the bending apparatus as shown in figure 101 shall be conditioned for 2 h in a cold chamber at this temperature with a tolerance of  $\pm 2$  °C.

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.

#### **10.5 Flexing test**

This subclause of part 1 is not applicable.

#### **10.6 Collapse test**

This subclause of part 1 is not applicable.

#### **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, 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 a.c. source having a no-load voltage not exceeding 12 V, shall be passed through the assembly for  $1 \text{ min}^{+5}_0 \text{ s}$ . Then the voltage drop shall be measured between the points as shown in figure 103 and the resistance calculated from the current and this voltage drop.

The resistance shall not exceed 0,05  $\Omega$ .

Where special devices are required for the coupling of conduit and terminating 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:

### **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 effects**

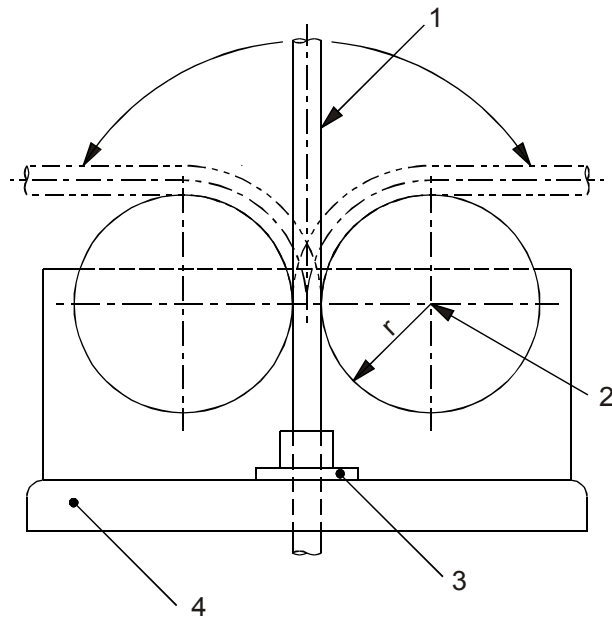
This clause of part 1 is applicable.

## **14 External influences**

This clause of part 1 is applicable

## **15 Electromagnetic compatibility**

This clause of part 1 is applicable.



IEC 478/02

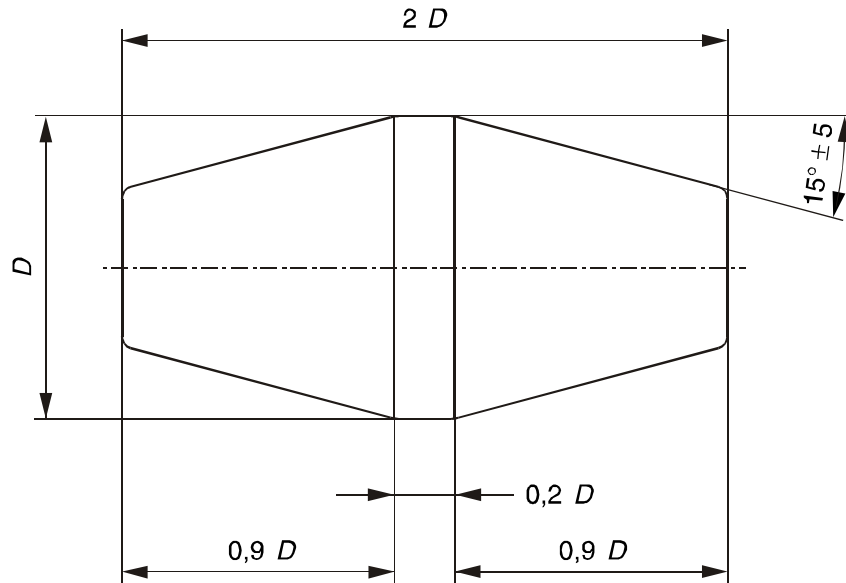
**Key**

- 1 Sample
- 2 Centre
- 3 Guide for conduit
- 4 Support

Size	Radius <i>r</i> mm	
	Plain conduits	Corrugated conduits
6	40	20
8	50	25
10	60	30
12	80	40
16	96	48
20	120	60
25	150	75
32	192	96
40	300	160
50	480	200
63	600	252
75	720	300

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

**Figure 101 – Bending test apparatus**

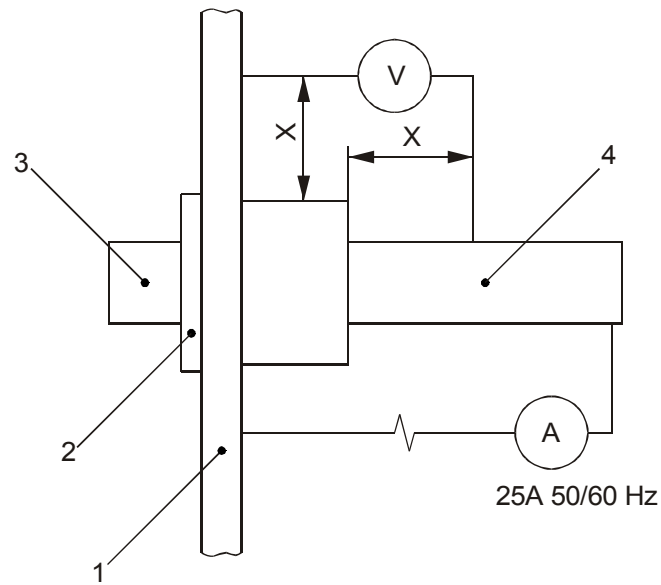


IEC 475/02

<i>D</i> :	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, and resistance to heat tests**



IEC 479/02

**Key**

X = 12 mm ± 2 mm

1 3 mm steel plate

2 Optional lock nut

3 Terminating conduit fitting secured to plate by tapped hole or by locknut on fitting thread

4 Conduit

**Figure 103 – Assembly of conduit and terminating conduit fitting for bonding test**

**Annex A**  
(normative)

This annex of part 1 is applicable

**Annex B**  
(normative)

This annex of part 1 is applicable.

**Annex ZA**  
(normative)

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

Annex ZA of part 1 is applicable.

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**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.

<u>Clause</u>	<u>Special national condition</u>
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<b>6.5.2</b>	<b>Finland</b> (Finnish wiring rules SFS 6000-5-52:2002 (= HD 384.5.52 S1))
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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.

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## 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>
<b>6.1.1.2</b> and <b>6.1.2.2</b>	<b>France</b> (Decree from Equipment and Accommodation Minister for low voltage installations dated 22 October 1969)
<b>6.5.2</b>	<b>Spain</b> (Real Decreto 842/2002 dated 2 August 2002 and Real Decreto 401/2003 dated 14 May 2003)  Classifications not allowed.
<b>6.2.1</b>	<b>Austria</b> (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)  <b>France</b> (Decree from Equipment and Accommodation Minister low voltage installations dated 22 October 1969)  Classification 1X according to Table 1 not allowed.
<b>6.5.2</b>	<b>Austria</b> (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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