

# INTERNATIONAL STANDARD

# IEC 60981

Second edition  
2004-05

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## Extra-heavy duty electrical rigid steel conduits

Preview



Reference number  
IEC 60981:2004(E)

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## EXTRA HEAVY-DUTY ELECTRICAL RIGID STEEL CONDUITS

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International Standard IEC 60981 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 1989. This edition constitutes a technical revision. It incorporates two main changes to the first edition, including:

- the addition of provisions for alternative coatings to zinc, and
- revisions to ductility requirements.

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

FDIS	Report on voting
23A/443/FDIS	23A/445/RVD

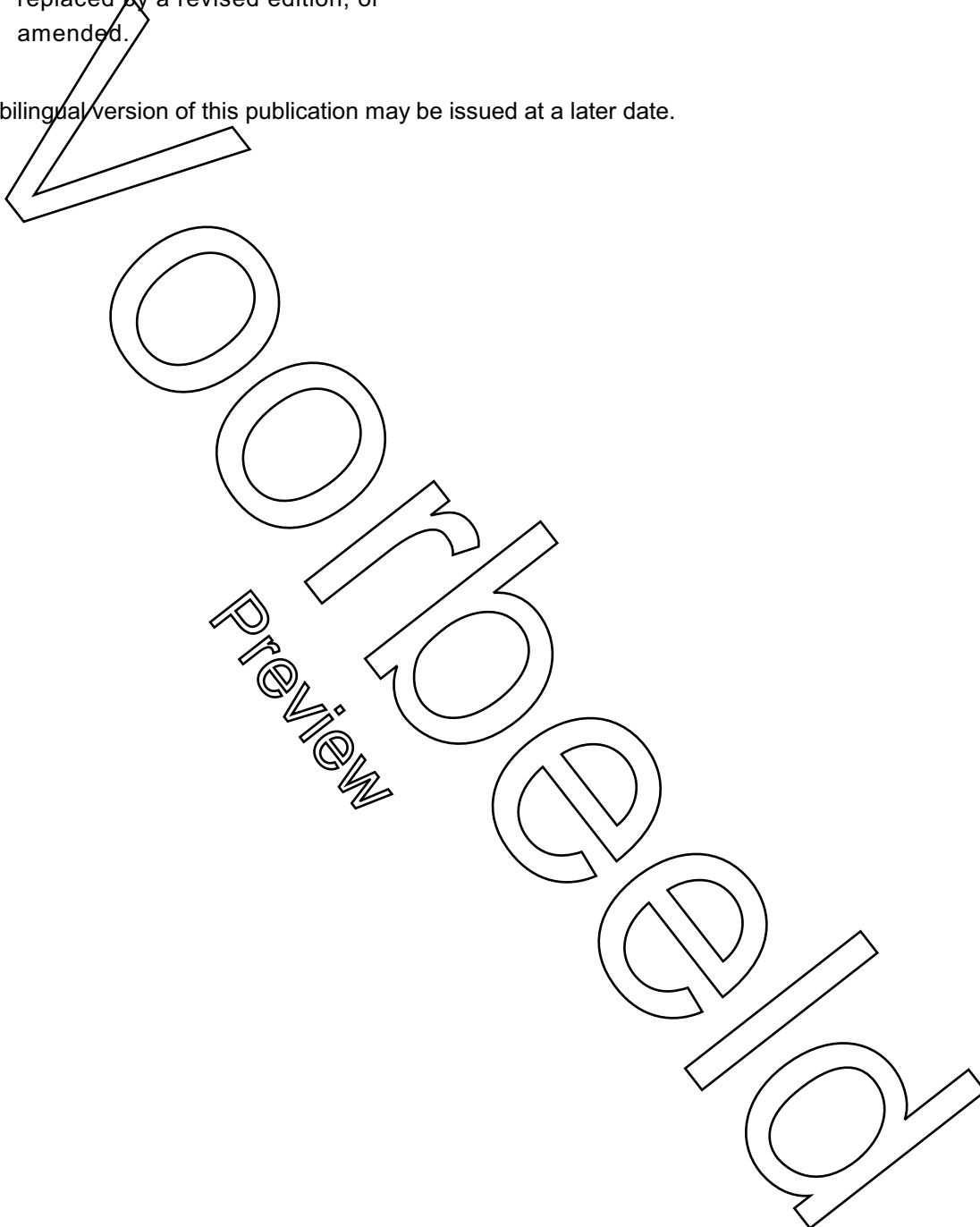
Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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- withdrawn;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

A bilingual version of this publication may be issued at a later date.



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Preview

## EXTRA HEAVY-DUTY ELECTRICAL RIGID STEEL CONDUITS

### 1 Scope

This International Standard specifies requirements for EHDERS (extra heavy-duty electrical rigid steel) conduits, couplings, nipples and elbows for electrical installations, including communications and fibre optics. This standard also specifies threads for these components.

It is not applicable to the conduits specified in IEC 60423.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61950, *Cable management systems – Specification for conduit fittings for electrical installations for extra-heavy duty metal conduit*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **extra heavy-duty electrical rigid steel conduit (EHDERS)**

part of a closed wiring system of circular cross-section made of welded steel construction capable of providing extra heavy mechanical protection to conductors or cables in electrical installations and used as an equipment earthing conductor when installed utilizing appropriate fittings

#### 3.2

##### **straight conduit**

straight length of EHDERS without a coupling

#### 3.3

##### **finished conduit**

straight length of EHDERS with one coupling attached

#### 3.4

##### **threaded coupling**

internally threaded steel cylinder for connecting two sections of EHDERS conduit.

#### 3.5

##### **elbow**

curved section of EHDERS conduit threaded at each end

#### 3.6

##### **nipple**

straight section of EHDERS conduit not more than 0,6 m long and threaded at each end

#### 3.7

##### **type test**

test made on a specimen for the conformity of the design of a given product to the requirements of the relevant standard

## 4 General requirements

### 4.1 Tests

Tests according to this standard shall be type tests.

Unless otherwise specified, the tests shall be carried out at an ambient temperature of  $(20 \pm 5) ^\circ\text{C}$ .

Unless otherwise specified, each test shall be carried out on two new samples. If a sample tested in accordance with this standard fails, two additional samples shall be tested, both of which shall comply with all the requirements of this standard.

### 4.2 Circular cross-section

An EHDERS conduit shall have a circular cross-section sufficiently accurate to permit the cutting of threads in accordance with Figure 1.

### 4.3 Wall thickness

The wall thickness shall comply with the dimensions given in Table 1.

### 4.4 Surface condition

#### 4.4.1 General

Surfaces of a conduit shall be free from slivers, burrs, scale and other defects likely to cause damage to conductors or cables. Compliance shall be checked by visual inspection of the external and internal surfaces.

#### 4.4.2 Localized surface imperfections

Localized surface imperfections shall not exceed a depth of 12,5 % of the nominal wall thickness given in Table 1. Compliance of localized surface imperfections shall be checked by measurement.

### 4.5 Welding

The welding of all seams shall be continuous and carried out in a workmanlike manner. Compliance is checked by visual inspection.

### 4.6 Cleaning

The conduit shall be adequately cleaned before the application of the protective coating. The cleaning process shall leave the exterior and interior surfaces of the conduit in such a condition that the protective coating will be firmly adherent and smooth, as defined in 4.4.

### 4.7 Protective coating

#### 4.7.1 Primary coating

The exterior surface shall be thoroughly and evenly coated with metallic zinc applied directly to the surface of the steel so that metal-to-metal contact and galvanic protection against corrosion are provided.

The interior surface shall be protected by a zinc or other suitable corrosion-resistant coating.



#### 4.7.2 Secondary coating

When an additional coating is applied to enhance the primary coating, the evaluation for its degree of protection shall be optional.

#### 4.7.3 Alternative coating

When an alternative coating is applied to enhance or replace the primary coating, the evaluation of the amount of corrosion protection provided shall be the subject of a separate standard.

### 5 Dimensions

#### 5.1 Dimensions

The dimensions and mass of EHDERS conduit shall be in accordance with those given in Table 1.

#### 5.2 Threads

##### 5.2.1 General

The pitch and the length of the threaded portion at each end of each length of conduit, nipple, and elbow shall be as indicated in Figure 1 and shall be compatible with IEC 61950. The complete thread shall be tapered for its entire length, and the taper shall have a ratio of 1 to 16.

##### 5.2.2 Pitch form

The form of thread profile, the dimensional relationships for form of thread and general notation are shown in Figure 2.

##### 5.2.3 Angle of thread

The angle between the sides of the thread, measured in the axial plane, shall be 60°. The line bisecting this angle is perpendicular to the axis.

### 6 Zinc coating

The zinc coating on the outside surface shall have a minimum thickness of 0,02 mm. Compliance shall be checked by measurement. In case of a dispute, the minimum acceptable thickness shall be determined using the method described in Annex A.

### 7 Threading and chamfering

7.1 Each length of conduit, as well as each nipple and elbow shall be threaded at both ends. Each end shall be chamfered or otherwise treated to remove burrs and sharp edges.

7.2 Threads shall comply with the requirements of 5.2. If threads are cut after the zinc coating has been applied, the threads, before installation, shall be treated with a protective coating to prevent corrosion. This treatment shall not impair electrical continuity through the joint after installation.

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