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**Oplaščeni vodniki za nadzemne vode in ustrezni pribor za nazivne izmenične napetosti nad 1 kV, ki ne presegajo 36 kV - 3. del: Vodilo za uporabo**

Covered conductors for overhead lines and the related accessories for rated voltages above 1 kV a.c. and not exceeding 36 kV a.c. - Part 3: Guide to use

Kunststoffumhüllte Leiter und zugehörige Armaturen für Freileitungen mit Nennspannungen über 1 kV und nicht mehr als 36 kV Wechselspannung - Teil 3: Leitfaden für die Verwendung

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Conducteurs gainés pour lignes aériennes et accessoires associés pour des tensions assignées supérieures à 1 kV c.a. et ne dépassant pas 36 kV c.a. - Partie 3: Guide d'emploi

**Ta slovenski standard je istoveten z: EN 50397-3:2010**

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EUROPEAN STANDARD  
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**EN 50397-3**

February 2010

ICS 29.240.20

English version

**Covered conductors for overhead lines and the related accessories  
for rated voltages above 1 kV a.c. and not exceeding 36 kV a.c. -  
Part 3: Guide to use**

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et accessoires associés pour des tensions  
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Teil 3: Leitfaden für die Verwendung

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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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CENELEC**

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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 20, Electric cables. It was submitted to the formal vote and was approved by CENELEC as EN 50397-3 on 2010-02-01.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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) 2011-02-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2013-02-01

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## Introduction

EN 50397 "Covered conductors for overhead lines and the related accessories for rated voltages above 1 kV a.c. and not exceeding 36 kV a.c." is in three parts. These are:

Part 1: Covered conductors;

Part 2: Accessories for covered conductors - Tests and acceptance criteria;

Part 3: Guide to use.

This Part 3 "Guide to use" assumes that the user will benefit from a single document that gives guidance on all the equipment specified within the other two parts.

## 1 Scope

This part of EN 50397 provides general recommendations for the selection, storage, transportation and installation of the covered conductors and the related accessories specified in Parts 1 and 2 of the standard, unless otherwise specified. Safety regulations and environmental regulations as well as rules for installation and mechanical design are not considered in this Guide to use, as they are covered by relevant national regulations and laws. Relevant national regulations are not considered in this guide, but shall always be consulted as appropriate.

NOTE The term "national regulations" is used throughout this guide. It may include specific safety regulations, rules of installation and other relevant instructions which, depending upon the particular country or district, may exist in a legislative (mandatory) form, or as a non-mandatory code of practice. In addition certain specific utilities may have their own safety practices.

It is assumed that the design of installations, the purchase and installation of covered conductors and of the related accessories specified in this EN is entrusted to suitably skilled and competent people. In case of doubt as to the suitability of covered conductors and the related accessories for a particular use, further specific information shall be obtained from the manufacturer.

## 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.

EN 50397-1:2006, *Covered conductors for overhead lines and the related accessories for rated voltages above 1 kV a.c. and not exceeding 36 kV a.c. - Part 1: Covered conductors*

EN 50397-2, *Covered conductors for overhead lines and the related accessories for rated voltages above 1 kV a.c. and not exceeding 36 kV a.c. - Part 2: Accessories for covered conductors - Tests and Acceptance criteria*

EN 50182:2001, *Conductors for overhead lines - Round wire concentric lay stranded conductors*

### 3 Terms and definitions

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

#### 3.1

##### **Rated Tensile Strength (RTS)**

an estimate of the conductor breaking load calculated using the specified tensile properties of the components wires (see EN 50397-1:2006, 4.2.1)

#### 3.2

##### **Specified Minimum Failure Load (SMFL)**

minimum load, specified by the purchaser or declared by the supplier, at which mechanical failure will not take place

NOTE From the probabilistic point of view, the specified minimum failure load corresponds to the value having the probability of  $e$  % in the distribution function of the strength of the fitting. The exclusion limit  $e$  % is usually taken within 2 % to 5 % with 10 % being the upper limit (see IEC 60826).

#### 3.3

##### **slippage factor (X-value)**

the ratio between the tensile force on the covering of the conductor when a certain slippage starts to occur and the RTS of the conductor (see EN 50397-1:2006, Annex D)

NOTE A X-value of e.g. 100 % means that at a force up to RTS no relative slippage between the covering and the conductor occurs.

### 4 Covered conductors

#### 4.1 Recommendations for selection of covered conductors

##### 4.1.1 General

Covered conductors specified in EN 50397-1 are equipped with a polymeric covering as protection against accidental contact with grounded parts or other live covered conductors. Covered conductors are not touch proof, so they shall to be treated as non-protected plain conductors with regard to protection against electric shock.

The use of covered conductors is only permissible in air and mounted on suitable insulators, which are at least specified for the rated voltage of the overhead line.

##### 4.1.2 Power frequency range

Covered conductors are intended to be used in the power frequency range of 49 Hz to 61 Hz.

##### 4.1.3 Current rating

Reference shall be made either to Annex A of EN 50397-1:2006, to EN 50182 or to the manufacturer's specifications to obtain the current ratings of the selected conductor cross sections and the maximum permissible conductor temperature for the covering material as given in 4.2.3 of EN 50397-1:2006.

If covered conductors in accordance with EN 50397-1 are exposed to strong solar radiation or high temperature ambient conditions, the current carrying capacity shall be reduced accordingly.



#### 4.1.4 Operating conditions

In addition to the current ratings, due regard shall be given to:

- a) the capability of the covered conductor to withstand the worst anticipated fault conditions of the system;
- b) the earth loop impedance;
- c) the operating characteristics of the connected equipment;
- d) the voltage drop requirements for long distance conditions.

In certain cases longitudinal watertight conductor constructions can be necessary to avoid corrosive effects to the conductor and to obtain a sufficient life time of the overhead line system.

## 4.2 Recommendation for storage and transport

### 4.2.1 General

Suitable protection, appropriate to the choice of covered conductors and the installation conditions, shall be provided against mechanical damage.

Covered conductors stored at temperatures which are below those recommended for installation shall not be subject to any mechanical stress including shocks, impact, bending and torsion. It is recommended not to store complete reels in conditions where the maximum permissible conductor temperature as given in 4.2.3 of EN 50397-1:2006 is exceeded.

### 4.2.2 Sealing and drumming

#### 4.2.2.1 Clearance and lagging

In general it is recommended to use lagging or other equivalent protection to avoid damage to the covered conductor. If lagging is used the thickness shall be appropriate.

The distance between the outer layer of the covered conductor on the filled drum and the ground or lagging shall be sufficient to avoid damage to the covered conductor. It is recommended to use a clearance of at least 50 mm.

#### 4.2.2.2 Barrel diameter

The barrel diameter of delivery drums shall not be smaller than  $30 \times D$ , where  $D$  is the outer diameter of the covered conductor.

#### 4.2.2.3 Sealing

The ends of covered conductors shall be sealed to prevent ingress of moisture during transport and storage. The possibility of damage to moisture seals during transport and storage shall be borne in mind. Where such damage may have occurred, the conductor end shall be inspected and the seal remade.

#### 4.2.2.4 Handling

When handling drums, suitable precautions shall be taken to avoid damage to the covered conductor and injury to people. Due regard shall be paid to the mass of the drum, the method and direction of rolling and the method of lifting. Drums shall be stored only on even and solid ground.

#### 4.2.2.5 Drum condition

Drums shall be regularly inspected during storage to assess their physical condition. Care shall be taken to avoid damage to the covered conductor caused by nails and staples used either in drum manufacturing or when applying laggings. Laggings, where applied, shall not be removed from drums until the covered conductor is about to be installed.

Care shall be taken to avoid deterioration of the drums. Drums shall be stored so that the drum flanges do not contact products on other drums. See Figure 1.

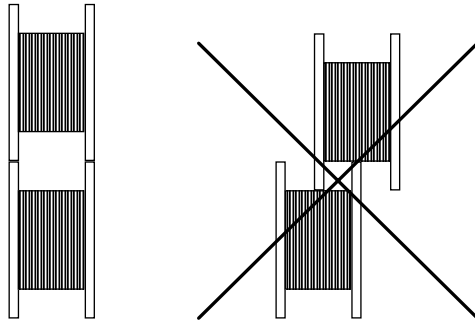


Figure 1 – View from the top

Drums shall be stored with the drum axis horizontal. See Figures 2, 3 and 4.

#### 4.2.3 Transport

##### 4.2.3.1 Carriers

Only suitable carriers shall be used.

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##### 4.2.3.2 Drum axis position

Drums shall be transported with the drum axis horizontal and any drum movement shall be avoided.

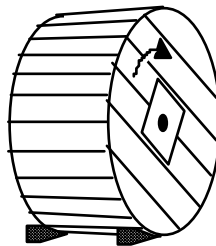
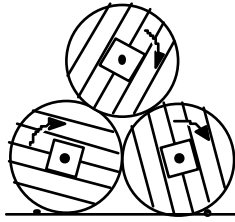
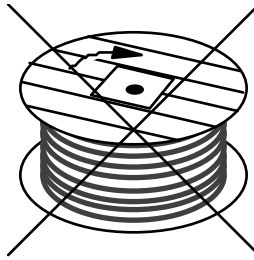


Figure 2 - Keep the drum standing upright, using wedges in the heels of the flanges



**Figure 3 - Only drums with protection lashing may be piled flange on flange. Lower layer to be secured over full drum width**

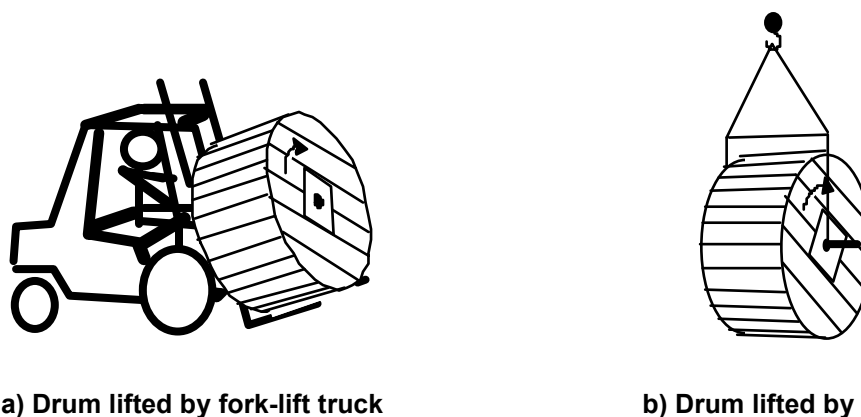


**Figure 4 - Not recommended**

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### 4.2.3.3 Loading and unloading

For loading and unloading of drums, suitable lifting and hoisting equipment shall be used. See Figure 5. Drums shall not be dropped.



**Figure 5 - Drums may be lifted either by crane or fork-lift truck**

### 4.2.3.4 Rolling of drums

Drums shall be rolled only for short distances over flat solid ground in the direction indicated on the flange. See Figure 6.