
**Stisljivi in vijačni konektorji za električne kable za naznačene napetosti do 36 kV
(Um = 42 kV) - 1. del: Preskusne metode in zahteve**

Compression and mechanical connectors for power cables for rated voltages up to 36 kV
(Um = 42 kV) - Part 1: Test methods and requirements

Pressverbinder und Schraubverbinder für Starkstromkabel für Nennspannungen bis
einschließlich 36 kV (Um = 42 kV) -- Teil 1: Prüfverfahren und Anforderungen

Raccords sertis et à serrage mécanique pour câbles d'énergie de tensions assignées
inférieures ou égales à 36 kV (Um = 42 kV) -- Partie 1: Méthodes et prescriptions
d'essais

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Ta slovenski standard je istoveten z: EN 61238-1:2003

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29.060.20	Kabli	Cables
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EUROPEAN STANDARD

EN 61238-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2003

ICS 29.060.20

English version

**Compression and mechanical connectors for power cables
for rated voltages up to 36 kV ($U_m = 42$ kV)
Part 1: Test methods and requirements
(IEC 61238-1:2003, modified)**

Raccords sertis et à serrage mécanique
pour câbles d'énergie de tensions
assignées inférieures ou égales
à 36 kV ($U_m = 42$ kV)
Partie 1: Méthodes et prescriptions
d'essais
(CEI 61238-1:2003, modifiée)

Pressverbinder und Schraubverbinder
für Starkstromkabel für Nennspannungen
bis einschließlich 36 kV ($U_m = 42$ kV)
Teil 1: Prüfverfahren und Anforderungen
(IEC 61238-1:2003, modifiziert)

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This European Standard was approved by CENELEC on 2003-06-01. 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.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 20/599/FDIS, future edition 2 of IEC 61238-1, prepared by IEC TC 20, Electric cables, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61238-1 on 2003-06-01.

A draft amendment, prepared by the Technical Committee CENELEC TC 20, Electric cables, was submitted to the formal vote and was approved by CENELEC for inclusion into EN 61238-1 on 2003-06-01.

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) 2004-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-06-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B, E and ZA are normative and annexes C, D, F, G and H are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61238-1:2003 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

Title

Amend the title to show the following upper voltage limit:

“.....for rated voltages up to 36 kV ($U_m = 42$ kV)”

Introduction

Amend the end of the first sentence of paragraph 1 to read:

“.....for rated voltages up to 36 kV ($U_m = 42$ kV)”

Scope and object

Amend the voltage reference in paragraph 1 to read:

“.....for rated voltages up to 36 kV ($U_m = 42$ kV),.....”

In the Bibliography, **add** the following note for the standard indicated:

IEC 60694 NOTE Harmonized as EN 60694:1996 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-461	1984	International Electrotechnical Vocabulary (IEV) Chapter 461: Electric cables	-	-
A1	1993		-	-
IEC 60228 (mod) + IEC 60228A (mod)	1978 1982	Conductors of insulated cables First supplement: Guide to the dimensional limits of circular conductors	HD 383 S2	1986
IEC 60493-1	1974	Guide for the statistical analysis of ageing test data Part 1: Methods based on mean values of normally distributed test results	-	-

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

61238-1

Deuxième édition
Second edition
2003-05

**Raccords sertis et à serrage mécanique
pour câbles d'énergie de tensions assignées
inférieures ou égales à 30 kV ($U_m = 36$ kV) –**

Partie 1:

Méthodes et prescriptions d'essais

(standards.iteh.ai)

**Compression and mechanical connectors
for power cables for rated voltages
up to 30 kV ($U_m = 36$ kV) –**

Part 1:

Test methods and requirements

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMPRESSION AND MECHANICAL CONNECTORS
FOR POWER CABLES FOR RATED VOLTAGES
UP TO 30 kV ($U_m = 36$ kV) –**

Part 1: Test methods and requirements

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61238-1 has been prepared by IEC technical committee 20: Electric cables.

This second edition cancels and replaces the first edition published in 1993 and constitutes a technical revision.

Significant technical changes with respect to the previous edition are as follows:

- a) The scope is now restricted to connectors to be used on power cables for rated voltages up to 30 kV ($U_m = 36$ kV);
- b) The concept of direct measurement of resistance has been introduced as an alternative to the indirect measurement, with associated tolerances;
- c) Temperature limits have been given for insulation piercing connectors, depending on the type of cable insulation;
- d) For short-circuit tests, tolerances have been given on the duration and recommendations have been given for large cross-sections;
- e) Some approval criteria have been revised and harmonized between mechanical connectors and compression connectors;
- f) The information to be included in the test report has been added;
- g) Informative annexes have been added, with information on measuring accuracy, the calculation method, the temperature profile and the statistical method.

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

FDIS	Report on voting
20/599/FDIS	20/632/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 2012. At this date, the publication will be

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

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INTRODUCTION

This part of IEC 61238 deals with type tests for compression and mechanical connectors for use on copper or aluminium conductors of power cables for rated voltages up to 30 kV ($U_m = 36$ kV). When a design of connector meets the requirements of this standard, then it is expected that in service:

- a) the resistance of the connection will remain stable;
- b) the temperature of the connector will be of the same order or less than that of the conductor;
- c) the mechanical strength will be fit for the purpose;
- d) if the intended use demands it, application of short-circuit currents will not affect a) and b).

It should be stressed that, although the electrical and mechanical tests specified in this standard are to prove the suitability of connectors for most operating conditions, they do not necessarily apply to situations where a connector may be raised to a high temperature by virtue of connection to highly rated plant, or where the connector is subjected to excessive mechanical vibration or shock or to corrosive conditions. In these instances, the tests in this standard may need to be supplemented by special tests agreed between supplier and purchaser.

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COMPRESSION AND MECHANICAL CONNECTORS FOR POWER CABLES FOR RATED VOLTAGES UP TO 30 kV ($U_m = 36$ kV) –

Part 1: Test methods and requirements

1 Scope and object

This part of IEC 61238 applies to compression and mechanical connectors for power cables for rated voltages up to 30 kV ($U_m = 36$ kV), e.g. buried cables or cables installed in buildings, having

- a) conductors complying with IEC 60228 and IEC 60228A with cross-sectional areas 10 mm² and greater for copper and 16 mm² and greater for aluminium,
- b) a maximum continuous conductor temperature not exceeding 90 °C.

This standard is not applicable to connectors for overhead conductors, which are designed for special mechanical requirements, or to separable connectors with a sliding contact or multi-core connectors (i.e. ring connectors).

Although it is not possible to define precisely the service conditions for all applications, two broad classes of connectors have been identified.

Class A

These are connectors intended for electricity distribution or industrial networks in which they can be subjected to short-circuits of relatively high intensity and duration. As a consequence, Class A connectors are suitable for the majority of applications.

Class B

These are connectors for networks in which overloads or short-circuits are rapidly cleared by the installed protective devices, e.g. fast-acting fuses.

Depending on the application, the connectors are subjected to the following tests:

Class A: heat cycle and short-circuit tests;

Class B: heat cycle tests only.

The object of this standard is to define the type test methods and requirements, which apply to compression and mechanical connectors for power cables with copper or aluminium conductors.

Formerly, approval for such products has been achieved on the basis of national standards and specifications and/or the demonstration of satisfactory service performance. The publication of this IEC standard does not invalidate existing approvals. However, products approved according to these earlier standards or specifications cannot claim approval to this IEC standard unless specifically tested to it.

After they have been made, these tests need not be repeated unless changes are made in the connector material, design or manufacturing process which might affect the performance characteristics.

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 60050(461):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 461: Electric cables*

Amendment 1 (1993)

IEC 60228:1978, *Conductors of insulated cables*

IEC 60228A:1982, First supplement – *Conductors of insulated cables – Guide to the dimensional limits of circular conductors*

IEC 60493-1:1974, *Guide for the statistical analysis of ageing test data – Part 1: Methods based on mean values of normally distributed test results*

3 Definitions

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For the purposes of part of IEC 61238, the following definitions apply. Where possible, the definitions used are in accordance with IEC 60050(461).

3.1

connector (of cables)

metallic device for connecting a conductor to an equipment terminal or for connecting two or more conductors to each other

[IEV 461-17-03, modified]

3.2

through connector

metallic device for connecting two consecutive lengths of conductor

[IEV 461-17-04]

3.3

branch connector

metallic device for connecting a branch conductor to a main conductor at an intermediate point on the latter

[IEV 461-17-05]

3.4

(terminal) lug

metallic device to connect a cable conductor to other electrical equipment

[IEV 461-17-01]

3.5**palm (of terminal lug)**

part of a terminal lug used to make the connection to electrical equipment

[IEV 461-17-07]

3.6**barrel (of terminal lug, of connector, etc.)**

part of a device into which the conductor to be connected is introduced

[IEV 461-17-06]

3.7**reference conductor**

length of unjointed bare conductor or conductor with the insulation removed, which is included in the test loop and which enables the reference temperature and reference resistance to be determined

3.8**equalizer**

arrangement used in the test loop to ensure a point of equipotential in a stranded conductor

3.9**compression jointing**

method of securing a connector to a conductor by using a special tool to produce permanent deformation of the connector and the conductor

3.10**mechanical jointing**

method of securing a connector to a conductor, for example by means of a bolt or screw acting on the latter or by alternative methods

3.11**median connector**

connector which during the first heat cycle records the third highest temperature of the six connectors in the test loop

3.12**insulation piercing connector (IPC)**

connector in which electrical contact with the conductor is made by metallic protrusions which pierce the insulation of the cable core

[IEV 461-11-08]

NOTE The abbreviation IPC will be used throughout the standard.