

**KÕRGEPINGEJAOTLA JA JUHTIMISAPARATUUR.
OSA 202: TEHASETOOTELINE
KÕRGEPINGE-/MADALPINGEALAJAAM**

**High-voltage switchgear and controlgear - Part 202:
High-voltage/low-voltage prefabricated substation**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 62271-202:2014 sisaldab Euroopa standardi EN 62271-202:2014 ja selle paranduste AC:2014 ja AC:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 62271-202:2014 consists of the English text of the European standard EN 62271-202:2014 and its corrigendums AC:2014 and AC:2015.
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English Version

High-voltage switchgear and controlgear - Part 202: High-voltage/low-voltage prefabricated substation (IEC 62271-202:2014)

Appareillages à haute tension - Partie 202: Postes
préfabriqués haute tension/basse tension
(CEI 62271-202:2014)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil
202: Fabrikfertige Stationen für
Hochspannung/Niederspannung
(IEC 62271-202:2014)

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Foreword

The text of document 17C/595/FDIS, future edition 2 of IEC 62271-202, prepared by SC 17C "High-voltage switchgear and controlgear assemblies" of IEC TC 17 "Switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-202:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-11-01
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This document supersedes EN 62271-202:2007.

EN 62271-202:2014 includes the following significant technical changes with respect to EN 62271-202:2007:

- a) regarding temperature-rise test an alternative method for liquid filled transformers is (re)introduced and the temperature-rise test method for dry-type transformers is specified more precisely;
- b) testing procedure for short time and peak withstand current tests are specified more precisely;
- c) assessment of electromagnetic fields is considered including a type test (optional) according CLC/TR 62271-208:2010;
- d) influence of the product on the environment is considered (Clause 12);
- e) internal arc test requirements have been adapted to EN 62271-200:2012 and requirements for the assessment of pressure relief volumes below the floor / ground has been assigned;
- f) the method for defining the load factor in an enclosure for liquid filled transformers is extended with different temperature rises for the transformer outside the enclosure (Annex DD);
- g) for the calculation of the load factor of dry-type transformers in an enclosure the insulation systems according to EN 60076-1:2011, Tables B.1 and B.2 are worked out in detail.

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Endorsement notice

The text of the International Standard IEC 62271-202:2014 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60059:1999	NOTE	Harmonized as EN 60059:1999.
IEC 60068 (Series)	NOTE	Harmonized as EN 60068 (Series).
IEC 60076 (Series)	NOTE	Harmonized as EN 60076 (Series).
IEC 60243-1:2013	NOTE	Harmonized as EN 60243-1:2013.
IEC 61936-1:2010	NOTE	Harmonized as EN 61936-1:2010.
IEC 62271-4:2013	NOTE	Harmonized as EN 62271-4:2013.
IEC/TS 62271-304:2008	NOTE	Harmonized as CLC/TS 62271-304:2008.
ISO 1460	NOTE	Harmonized as EN ISO 1460.

ISO 1461	NOTE	Harmonized as EN ISO 1461.
ISO 2081	NOTE	Harmonized as EN ISO 2081.
ISO 2409	NOTE	Harmonized as EN ISO 2409.
ISO 3231:1993	NOTE	Harmonized as EN ISO 3231:1997.
ISO 7784 (Series)	NOTE	Harmonized as EN ISO 7784 (Series).
ISO 9227	NOTE	Harmonized as EN ISO 9227.
ISO 10546	NOTE	Harmonized as EN ISO 1460.
ISO 11997 (Series)	NOTE	Harmonized as EN ISO 11997 (Series).
ISO 12944 (Series)	NOTE	Harmonized as EN ISO 12944 (Series).
ISO 13732-1:2006	NOTE	Harmonized as EN ISO 13732-1:2008.

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INTRODUCTION

Prefabricated substations are defined as a type-tested assembly comprising an enclosure containing in general transformers, low-voltage and high-voltage switchgear, connections and auxiliary equipment to supply low-voltage energy from a high-voltage system or vice versa. These substations are in locations accessible to the public and should ensure protection to persons according to the specified service conditions.

This means that, in addition to the specified characteristics, ratings and relevant test procedures, particular attention has been paid to the specification concerning the protection of persons, both operators and general public. Use of type-tested components and suitable design and construction of the enclosure ensure this protection. The correct design and performance of the prefabricated substation are verified by means of relevant type tests described in this standard, including internal arc tests.

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 202: High-voltage/low-voltage prefabricated substation

1 General

1.1 Scope

This part of IEC 62271 specifies the service conditions, rated characteristics, general structural requirements and test methods of high voltage/low voltage or low voltage/high voltage prefabricated substations, which are cable-connected, to be operated from inside (walk-in type) or outside (non-walk-in type) for alternating current of rated voltages above 1 kV and up to and including 52 kV on the high voltage side, and for one or more transformers for service frequencies up to and including 60 Hz for outdoor installation at locations with public accessibility and where protection of personnel is provided.

Prefabricated substations can be situated at ground level or partially or completely below ground level.

In general a prefabricated substation comprises an enclosure containing the following electrical components:

- power transformers;
- high voltage and low voltage switchgear and controlgear;
- high voltage and low voltage interconnections;
- auxiliary equipment and circuits.

However, relevant provisions of this standard are applicable to designs where not all these electrical components exist (for example, an installation consisting of power transformer and low voltage switchgear).

Non-prefabricated substations should comply with the applicable requirements of IEC 61936-1:2010.

1.2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 (all parts), *International Electrotechnical Vocabulary* (available at www.electropedia.org)

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60076-1:2011, *Power transformers – Part 1: General*

IEC 60076-2:2011, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60076-3:2013, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-5:2006, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-7:2005, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-10:2001, *Power transformers – Part 10: Determination of sound levels*

IEC 60076-11:2004, *Power transformers – Part 11: Dry-type transformers*

IEC 60076-12:2008, *Power transformers – Part 12: Loading guide for dry-type power transformers*

IEC 60076-13:2006, *Power transformers – Part 13: Self-protected liquid-filled transformers*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

Amendment 1:1999

Amendment 2:2013

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60721-1:1990, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

Amendment 1:1992

Amendment 2:1995

IEC 60721-2-2:2012, *Classification of environmental conditions – Part 2-2: Environmental conditions appearing in nature – Precipitation and wind*

IEC 60721-2-4:1987, *Classification of environmental conditions – Part 2: Environmental conditions appearing in nature – Solar radiation and temperature*

Amendment 1:1988

IEC/TS 60815-1:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61180-1:1992, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 61439-2:2011, *Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62271-1:2007, *High-voltage switchgear and controlgear – Part 1: Common specifications*
Amendment 1:2011

IEC 62271-200:2011, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-201:2006, *High-voltage switchgear and controlgear – Part 201: AC insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC/TR 62271-208:2009, *High-voltage switchgear and controlgear – Part 208: Methods to quantify the steady state, power-frequency electromagnetic fields generated by HV switchgear assemblies and HV/LV prefabricated substations*

IEC/TR 62271-300:2006, *High-voltage switchgear and controlgear – Part 300: Seismic qualification of alternating current circuit-breakers*

ISO/IEC Guide 51:1999, *Safety aspects – Guidelines for their inclusion in standards*

ISO 1052:1982, *Steels for general engineering purposes*

ISO 1182:2010, *Reaction to fire tests for products – Non-combustibility tests*

ISO 1716:2010, *Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value)*

ISO 6508-1:2005, *Metallic materials – Rockwell hardness test – Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

2 Normal and special service conditions

Clause 2 of IEC 62271-1:2007 is applicable, except as follows.

2.1 Normal service conditions

Unless otherwise specified in this standard, the prefabricated substation is designed to be used under normal service conditions for outdoor switchgear and controlgear according to IEC 62271-1:2007.

Inside the enclosure it is assumed that normal indoor conditions prevail according to IEC 62271-1:2007. However, the ambient temperature inside the enclosure of the prefabricated substation will be different from the ambient temperature as defined in 3.111.

If the ambient temperature inside the substation is higher than the limits fixed for the components in their respective product standards, de-rating may be necessary.

2.1.1 Indoor switchgear and controlgear

Subclause 2.1.1 of IEC 62271-1:2007 is applicable.

Additional subclauses:

2.1.1.101 Low-voltage switchgear and controlgear

Subclause 7.1 of IEC 61439-1:2011 is applicable.

2.1.1.102 Transformer

IEC 60076-1:2011 is applicable.