**IS/IEC 62271-202 : 2022**

***भारतीयमानक***

***Indian Standard***

 **उच्च-वोल्टता के स्विचगियर और**

**नियंत्रणगियर**

**भाग 202: 1 केवी से ऊपर और 52 केवी तक के लिए रेटित वोल्टता हेतु ए.सी.**

**पूर्व संरचित उप-विद्युत केन्द्र**

**(*पहला पुनरीक्षण*)**

**High-voltage switchgear and controlgear**

**Part 202: AC prefabricated substations for rated voltages above 1 kV and up to and including 52 kV**

 **(*First Revision*)**

ICS 29.130.10

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**November 2024 Price Group X**

High Voltage Switchgear and Controlgear Sectional Committee, ETD 08

NATIONAL FOREWORD

#### This Indian Standard (First Revision) which is identical with IEC 62271-202:2022 “High-voltage switchgear and controlgear – Part 202: AC prefabricated substations for rated voltages above 1 kV and up to and including 52 kV” issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the High Voltage Switchgear and Controlgear Sectional Committee and approval of the Electrotechnical Division Council.

This standard is published in various parts. Other parts in this series are:

Part 1 High-Voltage Switchgear and Controlgear Part 1 Common Specifications for Alternating Current Switchgear and Controlgear

Part 100 High-voltage switchgear and controlgear Part 100 Alternating-current circuit-breakers

Part 101 High-Voltage Switchgear and Controlgear Part 101: Synthetic Testing

Part 102 High-Voltage Switchgear and Controlgear Part 102 Alternating Current Disconnectors and Earthing Switches

Part 103 High-voltage switchgear and controlgear Part 103 Alternating current switches for rated voltages above 1 kV up to and including 52 kV

Part 104 High-Voltage Switchgear and Controlgear: Part 104 Alternating Current Switches for Rated Voltages Higher than 52 kV

Part 105 High-voltage switchgear and controlgear: Part 105 Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV

Part 106 High-voltage switchgear and controlgear Part 106: Alternating current contactors contactor-based controllers and motorstarters

Part 109 High-Voltage switchgear and Controlgear: Part 109 Alternating-current series capacitor by-pass switches

Part 110 High-voltage switchgear and controlgear Part 110: Inductive load switching

Part 111 High Voltage Switchgear and Controlgear: Part 111 Automatic circuit reclosers for alternating current systems up to and including 38 kV

Part 201 High-Voltage Switchgear and Controlgear Part 201 ac Solid-Insulation Enclosed Switchgear and Controlgear for Rated Voltages Above 1 kV up to and Including 52 kV

Part 203 High-voltage switchgear and controlgear Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 kV

Part 207 High - Voltage switchgear and controlgear: Part 207 seismic qualification for gas - Insulated switchgear assemblies for rated voltages above 52 kV

Part 300 High-Voltage Switchgear and Controlgear Part 300 Seismic Qualification of Alternating Current Circuit-Breakers

Part 301 High Voltage Switchgear & Controlgear Part 301 Dimensional Standardization of High Voltage Terminals

This standard was first published in 2016 and was identical with IEC 62271-202: 2014. This revision has now been undertaken to align this standard with the latest international practices. This edition includes the following significant technical changes with respect to the previous edition:

* modification of the title and scope to include high-voltage switchgear prefabricated substations;
* in 7.2.101, the possible influence of surrounding elements on the dielectric performance of high-voltage components as high-voltage switchgear and controlgear and high-voltage interconnections non-metal-enclosed or without earthed screen are now considered;
* new informative Annex G with testing procedure to evaluate the impact of solar radiation in temperatures inside the enclosure and how to apply it;
* new informative Annex H for appropriate consideration of installation conditions of electronic equipment;
* the rated power of a prefabricated substation is now defined as a three-parameter rated value. See 5.101.1;
* minimum dimensions for access doors to the prefabricated substation in 6.104.4 and for free height of operation aisle in 6.105.3 have been introduced;
* continuous current (temperature rise) test methods have been revised/clarified where necessary;
Figure D.1, which shows the mineral-oil-immersed power transformer load factor inside the enclosure, has been corrected.

The text of IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

1. Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’.
2. Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to International Standards for which Indian Standards also exists. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

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| *International Standard* | *Corresponding Indian Standard* | *Degree of Equivalence* |
| IEC 60050-441, International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear,controlgear and fuses (available at www.electropedia.org) | IS 1885 (Part 17): 1979/IEC 60050-441: 1984 Electrotechnical vocabulary: Part 17 switchgear and control gear (*Second Revision*) | Identical with IEC 60050-441: 1984 |
| IEC 60050-461:2008, International Electrotechnical Vocabulary (IEV) – Part 461: Electric Cables | IS 1885 (Part 32): 2019/ IEC 60050-461: 2008 Electrotechnical Vocabulary Part 32 Electric Cables (*Second Revision*) | Identical With IEC 60050-461:2008 |
| IEC 60068-2-5:2018, Environmental testing – Part 2-5: Tests – Tests: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering | IS/IEC 60068-2-5: 2018Environmental Testing Part 2 Tests Section 5 Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering | Identical with IEC 60068-2-5:2018 |
| IEC 60071-1:2019, Insulation co-ordination – Part 1: Definitions, principles and rules | IS/IEC 60071-1: 2019 Insulation co - Ordination: Part 1 definitions, principles and rules (*First Revision*) | Identical with IEC 60071-1:2019 |
| IEC 60076-1:2011, Power transformers – Part 1: General | IS 2026 (Part 1): 2011 Power transformers: Part 1 general (*Second Revision*) | Technically Equivalent |
| IEC 60076-2:2011, Power transformers – Part 2: Temperature rise for liquid-immersed Transformers | IS 2026 (Part 2): 2010 Power transformers: Part 2 temperature - Rise (*First Revision*) | Technically Equivalent |
| IEC 60076-5:2006, Power transformers – Part 5: Ability to withstand short circuit | IS 2026 (Part 5): 2011 Power transformers: Part 5 ability to with stand short circuit (*First Revision*) | Technically Equivalent |
| IEC 60076-7:2018, Power transformers – Part 7: Loading guide for mineral-oil-immersed power Transformers | IS 2026 (Part 7): 2009/IEC 60076-7: 2018 Power transformers: Part 7 loading guide for oil - Immersed power transformers | Identical with IEC 60076-7:2018 |
| IEC 60076-10:2016, Power transformers – Part 10: Determination of sound levels | IS 2026 (Part 10): 2009IEC 60076 -10: 2001 Power transformers: Part 10 determination of sound levels | Identical with IEC 60076-10:2001 |
| IEC 60076-11:2018, Power transformers – Part 11: Dry-type transformers | IS 2026 (Part 11): 2021/IEC 60076-11: 2018 Power Transformers Part 11 Dry-Type Transformers | Identical with IEC 60076-11:2018 |
| IEC 60076-12:2008, Power transformers – Part 12: Loading guide for dry-type powerTransformers | IS 2026 (Part 12): 2018/IEC 60076-12: 2008 Power transformers: Part 12 loading guide for dry - Type power transformers | Identical with IEC 60076-12:2008 |
| IEC 60529:1989, Degrees of protection provided by enclosures (IP Code) IEC 60529:1989/AMD1:1999IEC 60529:1989/AMD2:2013 | IS/IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code) | Identical with IEC 60529:1989 |
| IEC 60664-1:2020, Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests | IS 15382 (Part 1) : 2022/IEC 60664-1:2020 Insulation Coordination for Equipment Within Low-Voltage Systems Part 1 Principles Requirements and Tests | Identical with IEC 60664-1:2020 |
| IEC 60721-1:1990, Classification of environmental conditions – Part 1: Environmental parameters and their severitiesIEC 60721-1:1990/AMD1:1992IEC 60721-1:1990/AMD2:1995 | IS 13736 (Part 1) : 2018/IEC 60721-1: 2002 Classification of environmental conditions: Part 1 environmental parameters and their severities (*First Revision*)  | Identical with IEC 60721-1: 2002 |
| IEC 60721-2-2:2012, Classification of environmental conditions – Part 2-2: Environmentalconditions appearing in nature – Precipitation and wind | IS 13736 (Part 2/Sec 2) : 2018/IEC 60721-2-2: 2012 Classification of environmental conditions: Part 2 environmental conditions appearing in nature: Sec 2 precipitation and wind (*First Revision*) | Identical with IEC 60721-2-2:2012 |
| IEC 60721-2-4:2018, Classification of environmental conditions – Part 2-4: Environmentalconditions appearing in nature – Solar radiation and temperature | IS/IEC 60721-2-4 : 2018/IEC 60721-2-4:2018 Classification of Environmental Conditions Part 2 Environmental Conditions appearing in nature Section 4 Solar Radiation and Temperature | Identical with IEC 60721-2-4:2018 |
| IEC 60721-3-4, Classification of environmental conditions – Part 3-4: Classification of groupsof environmental parameters and their severities – Stationary use at non-weather protectedlocations | IS/IEC 60721-3-4 : 2019/IEC 60721-3-4: 2019 Classification of Environmental Conditions Part 3 Classification of groups of environmental parameters and their severities Section 4 Stationary use at non- weather protected locations | Identical with IEC 60721-3-4: 2019 |
| 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 | IS 16683 (Part 1) : 2018IEC TS 60815-1 : 2008 Selection and dimensioning of high - Voltage insulators intended for use in polluted conditions: Part 1 definitions, information and general principles | Identical with IEC TS 60815-1:2008 |
| IEC 60947-1, Low-voltage switchgear and controlgear – Part 1: General rules | IS/IEC 60947-1 : 2020Low-Voltage switchgear and controlgear Part 1 general rules | Identical with IEC 60947-1: 2020 |
| IEC 61439 (all parts), Low-voltage switchgear and controlgear assemblies | IS/IEC 61439 (all parts), Low-voltage switchgear and controlgear assemblies | Identical |
| IEC 61439-1:2020, Low-voltage switchgear and controlgear assemblies – Part 1: General rules | IS/IEC 61439-1 : 2020Low-voltage switchgear and controlgear assemblies Part 1: General rules (*First Revision*) | Identical with IEC 61439-1:2020 |
| IEC 62262:2002, Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) | IS 17050 : 2023/ IEC 62262 : 2002 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts IK Code | Identical with IEC 62262:2002 |
| IEC 62271-1:2017, High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear | IS/IEC 62271-1: 2017 High-Voltage switchgear and controlgear Part 1 common specifications for alternating current switchgear and controlgear | Identical with IEC 62271-1:2017 |
| IEC 62271-200:2021, 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 | IS/IEC 62271-200: 2021High-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 | Identical with IEC 62271-200:2021 |
| IEC 62271-201:2014, High-voltage switchgear and controlgear – Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV | IS/IEC 62271-201 : 2014High-Voltage Switchgear and Controlgear Part 201 ac Solid-Insulation Enclosed Switchgear and Controlgear for Rated Voltages Above 1 kV up to and Including 52 kV (*First Revision*) | Identical with IEC 62271-201:2014 |
| ISO 1182:2010, Reaction to fire tests for products – Non-combustibility tests | IS 3808 : 1979 Method of test for non-combustibility of building materials (*First Revision*) | Technically Equivalent |
| ISO 1716:2018, Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value) | IS/ISO 1716 : 2018 Reaction to Fire Tests for Products - Determination of The Gross Heat of Combustion Calorific Value | Identical with ISO 1716:2018 |
| ISO 6508-1:2016, Metallic materials – Rockwell hardness test – Part 1: Test method | IS 1586 (Part 1) : 2018 Metallic materials - Rockwell hardness test: Part 1 test method (*Fifth Revision*) | Identical with ISO 6508-1:2016 |

The technical committee has reviewed the provisions of the following international standards referred in this adopted standard and decided that they are acceptable for use in conjunction with this standard.

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| *International Standard* | *Title* |
| IEC 62271-212:2016 | High-voltage switchgear and controlgear – Part 212: Compact Equipment Assembly for Distribution Substation (CEADS) |
| IEC 61180-1:1992 | High-voltage test techniques for low voltage equipment – Part 1: Definitions, test and procedure requirements |
| EN 10025-2:2019 | Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels |

Only the English language text has been retained while adopting it in this Indian Standard, and as such, the page numbers given here are not the same as in the IEC Publication.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding of numerical values (*Second* *Revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.