

CCS K 09



**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 36271.2-2021**

---

**Power installations exceeding 1 kV a. c. and 1.5 kV d. c. - Part 2:  
D. c.**

**Issued on: August 20, 2021**

**Implemented on: March 1, 2022**

---

**Issued by: State Administration for Market Regulation, China National  
Standardization Administration**

## Table of Contents

|                                                                            |    |
|----------------------------------------------------------------------------|----|
| 1 Scope .....                                                              | 1  |
| 2 Normative references .....                                               | 1  |
| 3 Terms and definitions .....                                              | 2  |
| 4 Basic requirements .....                                                 | 3  |
| 4.1 General .....                                                          | 3  |
| 4.2 Electrical requirements .....                                          | 3  |
| 4.3 Mechanical requirements .....                                          | 5  |
| 4.4 Climate and environmental conditions .....                             | 5  |
| 4.5 Special requirements .....                                             | 5  |
| 5 Insulation .....                                                         | 5  |
| 5.1 General .....                                                          | 5  |
| 5.2 Choice of insulation level .....                                       | 6  |
| 5.3 Test of withstand voltage .....                                        | 6  |
| 5.4 Minimum electrical clearance of live parts .....                       | 6  |
| 5.5 Minimum electrical clearance under special conditions .....            | 6  |
| 5.6 Test connection area .....                                             | 6  |
| 6 Device .....                                                             | 7  |
| 6.1 General .....                                                          | 7  |
| 6.2 Special requirements .....                                             | 7  |
| 7 Facilities .....                                                         | 8  |
| 7.1 General .....                                                          | 8  |
| 7.2 Outdoor open facilities .....                                          | 9  |
| 7.3 Indoor open facilities .....                                           | 12 |
| 7.4 Pre-installed switchgear .....                                         | 12 |
| 7.5 Building .....                                                         | 12 |
| 7.6 High and low voltage prefabricated substation .....                    | 13 |
| 7.7 Electrical facilities on poles, telephone poles and towers .....       | 13 |
| 8 Safety measures .....                                                    | 13 |
| 8.1 General .....                                                          | 13 |
| 8.2 Protection against direct contact .....                                | 14 |
| 8.3 Protective measures for workers indirectly contacting live parts ..... | 14 |
| 8.4 Protective measures for operators on power facilities .....            | 14 |

|                                                                                                                                 |    |
|---------------------------------------------------------------------------------------------------------------------------------|----|
| 8.5 Preventing the danger of arc fault .....                                                                                    | 14 |
| 8.6 Prevention of direct lightning strike .....                                                                                 | 14 |
| 8.7 Fire protection .....                                                                                                       | 14 |
| 8.8 Prevent leakage of insulating liquid .....                                                                                  | 14 |
| 8.9 Signs and markings .....                                                                                                    | 15 |
| 9 Protection, control and auxiliary systems .....                                                                               | 15 |
| 10 Grounding system .....                                                                                                       | 15 |
| 10.1 General .....                                                                                                              | 15 |
| 10.2 Basic requirements .....                                                                                                   | 15 |
| 10.3 Grounding system design .....                                                                                              | 16 |
| 10.4 Grounding system construction .....                                                                                        | 17 |
| 10.5 Measuring .....                                                                                                            | 17 |
| 10.6 Maintenance .....                                                                                                          | 17 |
| 11 Inspection and test .....                                                                                                    | 17 |
| 11.1 General .....                                                                                                              | 17 |
| 11.2 Special performance inspection .....                                                                                       | 17 |
| 11.3 Installation and commissioning process test .....                                                                          | 18 |
| 11.4 Trial run .....                                                                                                            | 18 |
| 12 Operation and Maintenance Manual .....                                                                                       | 18 |
| Appendix A (informative) Rated insulation level and minimum air gap based on the<br>nominal voltage of some HVDC projects ..... | 19 |
| Appendix B (Normative) Calculation method of allowable contact voltage .....                                                    | 21 |
| References .....                                                                                                                | 22 |

## Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents" Drafting.

This document is the second part of GB/T 36271 "AC 1kV and DC 1.5kV and above power facilities". GB/T 36271 has been issued

The following parts are distributed.

---Part 1. General Rules of Communication;

---Part 2. DC.

This document uses the redrafting method to modify and adopt IEC TS61936-2.2015 "AC 1kV and DC 1.5kV and above power equipment

Implementation Part 2. Direct Current.

Compared with IEC TS61936-2.2015, the structure of this document has changed. Since the suspension section of 5.2 is increased to 5.2.1, the 7.1

The suspension segment was increased to 7.1.1, which led to the extension of the number of subsequent bars. Deleted the 8.2 suspension section. Deleted 6.2.12, 7.5.7, 8.2.1, 10.6

The one-level article is simplified to refer to relevant standards.

The technical differences between this document and IEC TS61936-2.2015 and the reasons are as follows.

---Regarding normative reference documents, this document has made adjustments with technical differences to adapt to my country's technical conditions and adjustments.

The situation is collectively reflected in Chapter 2 "Normative Reference Documents", and the specific adjustments are as follows.

- \* Replace IEC 60071-1 (see 5.1 and 5.3.2) with GB/T 311.1 modified to adopt international standards;

- \* Replace IEC 60071-2.1996 (see 5.3.4) with GB/T 311.2-2013 which is modified to adopt international standards;

- \* Replace IEC 60071-5 (see 5.1) with GB/T 311.3 modified to adopt international standards;

- \* Replace IEC 60529 (see 7.2.2 and 7.2.4) with GB/T 4208 which is equivalent to adopting international standards;

- \* Replace IEC 62271-1 (see 4.2.5 and 6.2.7) with GB/T 11022 modified to adopt international standards;

- \* Replace IEC 60079-10-2 (see 4.4.1) with GB/T 12476.3 which is modified to adopt international standards;

- \* Replace IEC /T S60479-1.2005 with GB/T 13870.1-2008 equivalent to adopting international standards (see 10.2.1 and

Appendix B);

- \* Replace IEC 60060-1 (see 5.3.2) with GB/T 16927.1 modified to adopt international standards;

- \* Replace IEC /T R61000-5-2 (see 10.2.2) with GB /Z 30556.2 which is equivalent to adopting international standards;

\* Replace IEC 61936-1.2010/AMD1.2014 (see

Chapter 4, Chapter 6, Chapter 7, Chapter 8, Chapter 9, Chapter 10, Chapter 11, and Chapter 12);

---Modified the source reference standard for the definition of valve terms (see 3.1);

---Modified the terminology of system nominal voltage (see 3.3);

---Modified the DC high [electric] voltage term (see 3.7);

---Modified the DC low [electric] voltage term (see 3.8);

---Revised the source reference standard for the definition of converter station terms (see 3.9);

---Deleted the term lightning impact protection level (protection device) and the term operation impact protection level (protection device);

--- Deleted "local regulations (if any)" (see 4.2.1);

---Modified the content to directly quote GB/T 36271.1-2018 (see 4.2.3);

---Deleted the rated frequency content;

---Modified the sequence of the calculation formula to " $1.1 \times U_{dm}/2$ " (see 4.2.5);

--- Deleted "dust continuously accumulates on insulators and conductive surfaces in the DC electric field" (see 4.4.1);

---The calculation formula for the minimum electrical clearance of the live part has been deleted (see 5.4.1);

--- Deleted "Rotational force exceeding 6mT may be obvious, causing difficulties at around 60mT. Translational force exceeding  $10^{-4} T^2/m$

It may be obvious, equal to the gravity above  $10^{-3} T^2/m$ " (see 6.2.2);

--- Modify the height "2250mm" to "2500mm" (see 7.2.4);

---Revised the appendix title (see Appendix B);

---Modified the left symbol of formula B.1 and formula B.2 to  $U_{Tp}$  (see Appendix B).

This document has made the following editorial changes.

---In accordance with the requirements of GB/T 1.1-2020, the compilation of the "Scope" chapter was standardized;

---Adjusted references.

## Introduction