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NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 10311-2019

**Code for design of wind turbine foundations for onshore wind
power projects**

陆上风电场工程风电机组基础设计规范

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Foreword

This document was issued on 4 November 2019 by the National Energy Administration of the PRC and takes effect on 1 May 2020.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 27.180, Chinese classification P 61.

This code has been formulated by the drafting group in accordance with the requirements of the 'Notice of the National Energy Administration on Issuing the First Batch of Formulation (Revision) Plans for Energy Sector Industry Standards in 2014' (Guo Neng Ke Ji [2014] No. 298), on the basis of extensive investigation and research, a careful summary of practical experience and the wide solicitation of opinions.

The main technical contents of this code are: geotechnical properties of the ground; loads and combinations of load effects; ground calculations; foundation design; ground treatment; inspection and monitoring.

This code is administered by the National Energy Administration. It was proposed by, and its routine management is the responsibility of, the China Renewable Energy Engineering Institute (General Institute of Hydropower and Water Resources Planning and Design). The Sub-Technical Committee for Wind Farm Planning and Design of the Wind Power Standardization Technical Committee of the Energy Industry is responsible for the interpretation of the specific technical contents. Comments or suggestions arising during implementation should be sent to the China Renewable Energy Engineering Institute (address: No. 2 Liupukang Beixiaojie, Xicheng District, Beijing; postcode 100120).

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The standard was promulgated by Announcement No. 6 of 2019 of the National Energy Administration, which approved 384 energy industry standards headed by the 'Technical Code for Electrical Prospecting of Hydropower Projects' (Annex 1), 48 English versions of energy industry standards headed by the 'Technical Guide for Rock-Filled Concrete Dams' (Annex 2), No. 1 amendment sheets to 7 energy industry standards headed by the 'Technical Code for Environmental Impact Assessment of Wind Farm Projects' (Annex 3), and abolished 5 energy industry standards and plans headed by the 'Charging Standard for Survey and Design of Wind Farm Projects' (Annex 4). The announcement is dated 4 November 2019.

In Annex 1, the Catalogue of Industry Standards, this code is entered under serial number 88 as NB/T 10311-2019, with the approval date 2019-11-04 and the implementation date 2020-05-01. The columns for the superseded standard and for the adopted international standard number are blank, which shows that this code is a newly formulated standard and does not replace any earlier standard.

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Structure of the Code (from the official Contents)

Chapter 1, General Provisions, starting at page 1, sets out the purpose, the scope of application and the relationship of this code with other current national standards.

Chapter 2, Terms, starting at page 2, defines the nine terms used throughout the code, covering the five foundation types, the two embedded tower connectors and the two categories of turbine load.

Chapter 3, Basic Requirements, starting at page 3, is divided into General Requirements (page 3), Ultimate Limit State Calculation (page 5), Serviceability Limit State Verification (page 6), Durability Requirements (page 6) and Materials (page 8).

Chapter 4, Geotechnical Properties of Ground, starting at page 14, is divided into Rock and Soil Classification (page 14) and Geotechnical Properties (page 17).

Chapter 5, Loads and Action Effect Combinations, starting at page 20, is divided into Loads (page 20), Load Conditions (page 20), Action Effect Combinations (page 21) and Coefficients and Partial Factors (page 23).

Chapter 6, Ground Calculations, starting at page 26, is divided into General Requirements (page 26), Bearing Capacity Calculation (page 27), Compression Capacity Calculation (page 29), Deformation Calculation (page 33), Stability Calculation (page 35) and Ground Foundation Dynamic Stiffness Verification (page 37).

Chapter 7, Wind Turbine Foundation Design, starting at page 38, is the longest chapter and is divided into General Requirements (page 38), Spread Foundation (page 39), Raft Foundation (page 43), Rock Foundation with Prestressed Bolts (page 45), Pile Foundation (page 48), Prestressed Tubular Foundation (page 58) and Check of Connection Between Tower Connector and Foundation (page 63).

Chapter 8, Ground Treatment, starting at page 65, is divided into General Requirements (page 65), Soil-Rock Composite Ground (page 65), Compacted Fill Ground (page 66), Karst Ground (page 67) and Soft Ground (page 68).