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

NB/T 11371-2023

**Technical specification for foundation pile testing of offshore
wind power projects**

海上风电场工程基桩检测技术规程

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Foreword

This document was issued on 28 December 2023 by the National Energy Administration of the PRC and takes effect on 28 June 2024.

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 specification has been prepared in accordance with the requirements of the Notice of the General Affairs Department of the National Energy Administration on Issuing the 2020 Plan for the Formulation and Revision of Energy Sector Industry Standards and the Plan for Foreign Language Versions (Guo Neng Tong Ke Ji [2020] No. 106).

The drafting group carried out extensive investigation and research, conscientiously

summarized practical engineering experience and prepared this specification on the basis of wide solicitation of opinions.

The main technical contents of this specification are: general provisions; terms; basic requirements; the high strain method; the axial compressive static load test; the axial uplift static load test; the lateral static load test; the low strain reflected wave method; the sonic transmission method; the core drilling method; the vibration test; and pile position survey.

This specification is administered by the National Energy Administration. It was proposed by, and is under the routine administration of, the China Renewable Energy Engineering Institute (General Institute of Hydropower and Water Resources Planning and Design).

The Sub-Technical Committee on Wind Farm Construction and Erection of the Energy Industry Wind Power Standardization Technical Committee (NEA/TC1/SC2) is responsible for the interpretation of the specific technical content.

Comments and suggestions arising during the implementation of this specification should be sent to the China Renewable Energy Engineering Institute, No. 57 Jia and No. 57 Yi, Andingmenwai Dajie, Dongcheng District, Beijing, postcode 100011.

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The participating organizations are Zhejiang Huadong Surveying, Mapping and Engineering Safety Technology Company Limited, the Institute of Rock and Soil Mechanics of the Chinese Academy of Sciences (Wuhan), Guangdong Tianxin Electric Power Engineering Testing Company Limited and the Ocean University of China.

The standard was approved by the National Energy Administration under Announcement No. 8 of 2023, dated 28 December 2023, and takes effect on 28 June 2024. It is published by China Electric Power Press.

The specification is listed as item 36 of the catalogue of industry standards attached to that announcement; no superseded standard is recorded against it, so this is a newly established specification rather than a revision.

1 Scope

NB/T 11371-2023 sets out how the foundation piles of an offshore wind farm are tested, from the trial piles driven before the works begin to the acceptance testing of the production piles. It covers the whole family of methods used offshore: static load testing in compression, tension and lateral loading; high-strain dynamic testing to establish bearing capacity and pile integrity; low-strain integrity testing; sonic logging of cast-in-place piles through pre-installed access tubes; core drilling; and the driving records and pile-driving analysis used to monitor installation of driven steel pipe piles. For each method the standard fixes the equipment and its calibration, the number and choice of test piles, the

loading or excitation procedure, the data to be recorded, how the measured curves are interpreted, and how the result is judged and reported. It also addresses the conditions that make offshore testing different from testing on land - work from a jack-up platform or vessel, tide and wave windows, reaction systems bearing on the seabed or on neighbouring piles, corrosion protection and the safety rules that follow from all of this. The document applies to the design, construction and acceptance stages of offshore and intertidal wind power projects in China, and is the reference a Chinese reviewer uses when checking that a wind farm foundation has been verified properly.

Chapter 1 sets out the purpose of the specification, its field of application and the general principles governing the testing of foundation piles in offshore wind power projects.

The specification addresses the piles that carry offshore wind turbine generator foundations and offshore substation structures, where testing has to be performed in an open sea environment with tides, waves, currents and limited working windows.

It establishes that foundation pile testing shall verify the integrity of the pile shaft, the bearing capacity of the pile and the position in which the pile has been installed.

Testing is required to be planned and executed so that the results provide the evidence needed for construction acceptance and for the assessment of the completed foundations.

The chapter states the relationship between this specification and the other national and industry standards that apply to offshore wind power engineering, which remain in force alongside it.

The general provisions occupy page 1 of the standard and are followed immediately by the terminology chapter.

2 Terms

Chapter 2 defines the terminology used throughout the specification, covering pages 2 and 3.

The definitions relate to the foundation pile itself, to the quantities measured during testing and to the categories of test method applied offshore.

Terms are provided for pile integrity, for the ultimate bearing capacity determined by static and dynamic methods, and for the characteristic values derived from test data.

Further terms cover the instrumentation quantities recorded during dynamic testing, such as strain and acceleration signals measured at the pile head.

The terminology chapter provides the common vocabulary on which the acceptance criteria of Chapters 4 to 12 are based.

Where terms are also defined in the general standards for building foundation pile testing,