ICS 27.180
CCS P 61

NB

ENERGY INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

NB/T 11374-2023

Guide for suction pile jacket foundation design of offshore wind power project

海上风电场工程吸力桩式导管架基础设计导则

Issued on: December 28, 2023 **Implemented on: June 28, 2024**

Issued by: National Energy Administration of the PRC

Table of Contents

1 General provisions 1
2 Terms 2
3 Basic requirements 3
3.1 Design principles 3
3.2 Design requirements 3
4 Engineering geology 5
4.1 Geotechnical investigation 5
4.2 Geotechnical parameters for design and installation 8
5 Foundation design 10
5.1 Overall structure design 10
5.2 Jacket structural design 10
5.3 Side wall of suction pile structural design 11
5.4 Transitional section and bucket lid of suction pile structural design 25
6 Penetration installation design 27
6.1 General requirements 27
6.2 Penetration resistance calculation 28
6.3 Allowable differential pressure 30
7 In-situ bearing capacity analysis 32
7.1 General requirements 32
7.2 Geotechnical engineering analysis 32
7.3 Bearing capacity calculation 33
7.4 Deformation calculation 33
8 Transportation and installation scheme 34
8.1 Transportation scheme 34
8.2 Installation scheme 34
Appendix A Design tolerances for the cylindrical shell members 36
Explanation of wording in this guide 42
List of quoted standards 43
Addition: Explanation of provisions 45

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 guide has been prepared in accordance with the requirements of the Notice of the General Department of the National Energy Administration on Issuing the 2020 Plan for the Preparation and Revision of Sector Standards in the Energy Field and for the Translation and Publication of their English Versions (Guo Neng Zong Tong Ke Ji [2020] No. 106).

The drafting group carried out extensive investigation and research, made a careful summary of the practical experience gained in recent years in the planning and design of offshore wind power projects, and prepared this guide on the basis of a wide solicitation of comments.

This guide is divided into 8 chapters and is accompanied by an appendix and an explanation of provisions.

The main technical contents of this guide are: general provisions; terms; basic requirements; engineering geology; foundation design; penetration installation design; in-situ bearing capacity analysis; and transportation and installation scheme.

This guide is administered by the National Energy Administration.

China Renewable Energy Engineering Institute (the General Institute of Hydropower and Water Resources Planning and Design) put forward this guide and is responsible for its routine management.

The Sub-committee on Wind Farm Planning and Design of the Wind Power Standardization Technical Committee of the energy sector (NEA/TC1/SC1) is responsible for the interpretation of the specific technical contents of this guide.

Comments and suggestions arising in the course of implementation should be sent to China Renewable Energy Engineering Institute, at Jia No. 57 and Yi No. 57, Andingmenwai Street, Dongcheng District, Beijing, postcode 100011.

Chief drafting organization: Fujian Yongfu Power Engineering Co., Ltd.

Participating drafting organizations: PowerChina Huadong Engineering Corporation Limited; Shanghai Investigation, Design and Research Institute Co., Ltd.; CGN New Energy Holdings Co., Ltd.

Main drafters: twenty-seven specialists are named in the foreword, beginning with Liu Wei, Song Qiming, Fan Xialing and You Xianhui, and continuing with Li Wei, Xiao Jiandong, Wang Bin, Lin Yifeng, Chen Zhibing, Wu Yun, He Ben, Jiang Juan, Ren Yanzhong, Cai

Tianqing, Wang Kuanjun, Wang Liji, Chen Jisheng, Li Xianghui, Zhu Shengdong, Lin Peng, Liu Bingwen, Zeng Bao, Li Aixin, Zhong Linyue, Jin Fan, Huang Haihan and Li Jialong.

Main reviewers: thirty-six specialists are named, beginning with Xie Hongwen, Zhao Shengxiao, Hao Jungang and Yue Lei, and continuing with Guo Zhenni, Liu Wei, Tian Weihui, Wang Dandi, Zhong Yao, Tang Dongsheng, He Jiangfei, Luo Lunbo, Qiu Xu, Li Sen, Li Weichao, Zhang Yukun, Xu Pu, Zhang Puyang, Wu Hehe, Xu Yaobing, Wang Zhaohui, Feng Xuepei, Tian Jingkui, Liu Congzhu, Li Hongyou, Liu Lei, Qi Jun, Qi Zhicheng, Liu Donghua, Zhu Xuemin, Li Ning, Yang Jing, Zhang Yunjie, Jiang Song, Xi Jing and Li Fagui.

Publication and issuance data

Designation of the standard as printed on the cover: NB/T 11374-2023.

Classification data printed on the cover: ICS 27.180 and CCS P 61; the cover also carries the filing classification letter P and the NB emblem of the energy sector standards of the People's Republic of China.

Chinese title on the cover: offshore wind farm engineering, design guide for suction pile jacket foundations; official English title printed on the cover: Guide for suction pile jacket foundation design of offshore wind power project.

Date of issue: 28 December 2023. Date of implementation: 28 June 2024. No superseded standard is indicated on the cover or in the sector standard catalogue.

Issuing authority: National Energy Administration of the People's Republic of China.

Title page data: chief editing organization, China Renewable Energy Engineering Institute; approving department, National Energy Administration; date of entry into force, 28 June 2024.

Publisher: China Electric Power Press, Beijing, 2024.

The standard was released by Announcement No. 8 of 2023 of the National Energy Administration, dated 28 December 2023, which approved 281 energy sector standards headed by the Basic Technical Specification for the Intelligent Construction of New Energy Stations (Annex 1), 33 English versions of energy sector standards headed by the Specification for Preparation of Special Geological Report on Impoundment-Affected Area for Hydropower Projects (Annex 2), and 3 amendment notices to energy sector standards (Annex 3).

In the sector standard catalogue attached to that announcement, this guide appears as serial number 39, with the standard number NB/T 11374-2023, approval date 28 December 2023 and implementation date 28 June 2024; the columns for the superseded standard and for the adopted international standard are both blank.

Structure of the document

The structure set out below is taken word for word from the official English contents printed in the standard itself, on pages VII and VIII.

Chapter 1, General provisions, begins on page 1.

Chapter 2, Terms, begins on page 2.

Chapter 3, Basic requirements, begins on page 3 and contains 3.1 Design principles, page 3, and 3.2 Design requirements, page 3.

Chapter 4, Engineering geology, begins on page 5 and contains 4.1 Geotechnical investigation, page 5, and 4.2 Geotechnical parameters for design and installation, page 8.

Chapter 5, Foundation design, begins on page 10 and contains 5.1 Overall structure design, page 10; 5.2 Jacket structural design, page 10; 5.3 Side wall of suction pile structural design, page 11; and 5.4 Transitional section and bucket lid of suction pile structural design, page 25.

Chapter 6, Penetration installation design, begins on page 27 and contains 6.1 General requirements, page 27; 6.2 Penetration resistance calculation, page 28; and 6.3 Allowable differential pressure, page 30.

Chapter 7, In-situ bearing capacity analysis, begins on page 32 and contains 7.1 General requirements, page 32; 7.2 Geotechnical engineering analysis, page 32; 7.3 Bearing capacity calculation, page 33; and 7.4 Deformation calculation, page 33.

Chapter 8, Transportation and installation scheme, begins on page 34 and contains 8.1 Transportation scheme, page 34, and 8.2 Installation scheme, page 34.

Appendix A, Design tolerances for the cylindrical shell members, begins on page 36.

Explanation of wording in this guide begins on page 42.

List of quoted standards begins on page 43.

Addition: Explanation of provisions begins on page 45.

The body of the guide therefore runs to 35 pages, the appendix occupies pages 36 to 41, and the explanation of provisions, which is printed as an addition, starts at page 45.

Section 5.3, on the structural design of the side wall of the suction pile, is by far the longest section of the guide, running from page 11 to page 24.

Standards quoted in the readable part of the guide

GB 51395, Standard for Investigation and Survey of Offshore Wind Farms, quoted in 4.1.1 for the grading of the engineering investigation.