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

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**Petroleum and natural gas industries - Design and testing of
LNG marine transfer arms for conventional onshore terminals**

石油天然气工业 常规陆上接收站液化天然气装卸臂的设计与测试

(English Translation)

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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 for standardization documents" Drafting.

This document is modified to adopt ISO 16904:2016 "Design and application of liquefied natural gas loading and unloading arms for conventional onshore receiving terminals in the petroleum and natural gas industry".

test".

Compared with ISO 16904:2016, this document has many structural adjustments. Comparison table of structural number changes between the two documents See Appendix A.

The technical differences between this document and ISO 16904:2016 and their reasons are as follows.

--- Changed the scope of relevant content (see Chapter 1) to adapt to my country's national conditions;

--- Deleted "lower rotary joint", "cavitation", "conventional onshore LNG receiving station",

"design pressure", design temperature, angle, wharf Control room, LNG carrier, manifold side, intermediate swivel, suspended remote control, safety integrity level, short pipe, Observation line, receiving station, riser swivel, upper swivel, transmission, uninterruptible power supply" (see ISO 16904:2016

3), some terms are used only once and some terms no longer need to be defined;

--- Deleted abbreviations such as "ERS, ESD, LNG, LNGC, LN2, MHU, NG, N2, PERC, PQR, QCDC, TSA, WPS" Abbreviations (see Chapter 4 of ISO 16904:2016). Some abbreviations are described in Chapter 3 and the main text.

After years of development in the LNG industry, some abbreviations have formed a consensus and are specifically explained in other specifications;

--- Added "the allowable deviation of the deflection angle should be within $\pm 3^\circ$ " (see 5.1.2) to improve the installation accuracy of the loading and unloading arm;

--- Changed "Collision between loading and unloading arms and ships or docks should be avoided" (see 5.1.2) to adapt to my country's national conditions;

--- Deleted "If it is proved that the dynamic sensitivity of wind loads produces a higher value of gust effect factor, it is advisable to perform according to EN1991-1-4.

(See 5.2.3.8.3 of ISO 16904:2016), the content of which has been cited in Table 2;

--- Added "The seismic design of the loading and unloading arm when it is in the retracted state shall comply with the relevant provisions of GB 55001" (see 5.2.3.9), supplemented Seismic design standards for loading and unloading arms;

--- Added "The size of the nitrogen injection pipeline should be no less than 2 inches to shorten the exhaust and replacement time" (see 5.5.2), and strengthened the nitrogen injection pipeline Convenience of line use;

--- Added "the locking device should be installed above the unloading operation platform" (see 5.5.3) to facilitate on-site use and observation;

--- The normative reference GB/T 26479 replaces ISO 10497 (see 5.6.4, 6.5.1) to adapt to my country's national conditions;

--- Deleted ASME B16.5 pipe flanges and flange fittings (see 5.6.5 of ISO 16904) to adapt to my country's national conditions;

--- Changed "Flanges of pipes, valves, joints and ancillary facilities shall meet user requirements" (see 5.6.5) to adapt to my country's national conditions;

--- The normative reference NB/T 47014 replaces ASME Boiler and Pressure Vessel Code Part IX. Welding and Brazing Qualification (see 5.7, 9.3.3), to adapt to my country's national conditions;

- Added "It is advisable to configure a protective cover" (see 5.8.1) to facilitate corrosion protection of the piston rod and extend its service life;
 - The normative reference GB/T 24963-2019 replaces ISO 28460:2010 (see 6.1, 6.3.1, 6.4.3, 6.5.1) to apply in response to my country's national conditions;
 - GB/T 3836.1, GB/T 3836.2, GB/T 3836.3, GB/T 3836.4, GB/T 3836.5, GB/T 3836.6, GB/T 3836.7, GB/T 3836.9, GB/T 3836.14, GB/T 3836.15, GB/T 3836.18 generation Replaced IEC 60079-0, IEC 60079-1, IEC 60079-7, IEC 60079-11, IEC 60079-2, IEC 60079-6, IEC 60079-5, IEC 60079-18, IEC 60079-10-1, IEC 60079-14, IEC 60079-25 (see 6.5.2.3), to adapt my country's national conditions;
 - The normative reference GB/T 4208 replaces IEC 60529 (see 8.4) to adapt to my country's national conditions;
 - Deleted "All welding processes and welding operators of main structural parts shall comply with the corresponding standards and regulations" (see 9.3.3 of ISO 16904:2016), the required content is not executable;
 - The normative references GB/T 3323.1 and GB/T 3323.2 replace ISO 17636-1 and ISO 17636-2 (see 9.3.4.1) to apply in response to my country's national conditions;
 - The normative reference GB/T 14039 replaces ISO 4406 (see 9.5.1) to adapt to my country's national conditions;
 - Deleted "General requirements" (see 9.5.2.1, 9.5.3.1 of ISO 16904:2016), the content is repeated and is inconsistent with "9.5.1 General requirements" There is logical confusion.
- The following editorial changes were made to this document.
- Deleted "Stainless steel (304, 304L) should be used" (see 5.2.2), and improved the material selection level to adapt to my country's national conditions;
 - Added "Coefficient K see Table B.15" (see 5.2.3.3) to facilitate the understanding and use of this document;
 - Replace ISO 1461 and ISO 12944 with informative references GB/T 13912 and GB/T 30790 (see 5.8.1);
 - Added "Accumulators should be equipped with nitrogen pressure monitoring and alarm devices" (see 8.3) to increase the reliability of accumulator operation;
 - Added "The hydraulic station should be equipped with an electric heater according to the installation environment" (see 8.3) to facilitate the application of loading and unloading arms in different Installation environment;
 - Corrected the writing error of "the distance between the loading and unloading arm, pipeline and surrounding structure should also be checked (see Table C.1)" (see 9.5.2.3).