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

GB/T 16166-2013

**Sacrificial anode cathodic protection for seawater cooling
system in coastal power station**

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard replaces GB/T 16166-1996 "coastal seawater power plant cooling water system sacrificial anode cathodic protection", and GB/T 16166- The main technical changes compared to 1996 are as follows:

- Increased stainless steel structure protection methods (see Section 4.1.6); increased iron anode size specifications (see Table 1); increased stainless Steel, copper and copper alloy with respect to different reference electrode potential range (see Table 3);
- Modified anode driving voltage (see 43, 1996 version 4.3.); Modify the protection potential (see Chapter 3, the first edition in 1996 Chapter 3); modify the test piece weighing weighing accuracy (see 72, 1996 edition 7.2); Modify the sacrificial anode replacement conditions (see . 74, 1996 version 7.4); modified anode installation technical requirements (see 63, 1996 version 6.3).;
- Remove the protective current density cooler (see Table 2, 1996 edition of the Table 2);
- Modify the Coastal Power Plant underground pipeline cathodic protection, as a normative annex (see Appendix A, 1996 edition of Appendix A). The standard proposed by China Shipbuilding Industry Corporation. This standard by the National Standardization Technical Committee Marine boat marine materials application process Technical Committee (SAC/TC12/SC4) Centralized. This standard was drafted. China Shipbuilding Industry Corporation seventh twenty-five Institute, Qingdao Double Swiss Marine Environmental Engineering Co., Ltd. China Nuclear Power Engineering Co., Ltd., East China Electric Power Design Institute, North China Electric Power Design Institute, Shenyang Electric Power Machinery Plant. The main drafters of this standard. Wangting Yong, Yin Ping, Wang Chen phase, Chang E, Chen Kai, Xu Likun, Gui years, Wang Ren, Hai Zhu, Fu Bin, Zeng Chao, Ren Junbing. This standard replaces the standards previously issued as follows:
- GB/T 16166-1996. Coastal seawater power plant cooling water system sacrificial anode

Cathodic protection

1 Scope

GB/T 16166-2013 is the Chinese national standard on sacrificial anode cathodic protection for seawater cooling system in coastal power station, in the field of shipbuilding and marine structures. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 27 September 2013 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 May 2014. Classification: ICS 47.020.01, CCS A29. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the coastal seawater power plant cooling water system sacrificial anode cathodic protection in sea water and soil environment design criteria, installation, inspection, testing and replacement protective effect. This standard applies to coastal seawater power plant cooling water system sacrificial anode cathodic protection. Binhai other chemical plants, power plants and high electrical estuary Inland areas of groundwater conductivity power plant cooling water system Cathodic Protection can use reference.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 4948 aluminum - zinc - indium alloy sacrificial anode

GB/T 4950 Zn - Al - Cd alloy sacrificial anode

GB/T 17731 magnesium alloy sacrificial anode DL/T 5394 Power engineering underground metal structures corrosion Technical Guidelines SY/T 0029 inspection of buried steel sheet corrosion rate test method

3 Protection potential criterion

3.1 devices consisting of carbon steel, stainless steel, cast iron, copper alloys, components and piping, protective potential range should reach $-0.85\text{V} \sim -1.10\text{V}$ (With respect to the copper/saturated copper sulfate reference electrode, the same below).

3.2 devices consisting of titanium and steel, cast iron, copper alloys, titanium surface

protection potential should not be lost to -0.80V.

3.3 stainless steel equipment, components and piping, protective potential range should reach -0.35V ~ -1.10V.

3.4 copper and copper alloy equipment, components and piping, protective potential range should reach -0.50V ~ -0.65V.

4.1 Sacrificial anode material selection

4.1.1 anode material should be used in accordance with the relevant provisions of GB/T 4948, GB/T 4950, GB/T 17731 and the like, or superior electrochemical performance. The above criteria and through the identification of material.

4.1.2 seawater and brackish water medium resistivity of less than 100Ω · cm, the sacrificial anode aluminum should be used.

4.1.3 resistivity of 100Ω · cm ~ 200Ω · cm in freshwater and seawater media should be made of zinc alloy sacrificial anode aluminum alloy or a suitable sacrifice Sacrifice anode.

4.1.4 resistivity greater than 200Ω · cm of cooling water should be used magnesium alloy sacrificial anode aluminum or a suitable sacrificial anode.

4.1.5 Protection of seawater refrigeration equipment should be used for high-temperature aluminum alloy sacrificial anodes used in the media.

4.1.6 in seawater using a separate stainless steel, titanium, copper alloys and mixtures structure, should adopt the iron anode.