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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 3108-2026

Replacing GB/T 3108-1999

Impressed current cathodic protection systems for ship hulls

船体外加电流阴极保护系统

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 3108-1999 "Externally Impressed Current Cathodic Protection System for Ships". Compared with GB/T 3108-1999, except for the structure... Aside from adjustments and editorial changes, the main technical changes are as follows:

a) A new chapter on "Terms and Definitions" has been added (see Chapter 3);

b) A new chapter on "Symbols" has been added (see Chapter 4);

c) Added "Composition and Basic Parameters" (see Chapter 5);

d) A structural diagram of the propeller shaft grounding device has been added (see 5.5.1);

e) The range of protective potential for hull steel has been changed (see 6.1.1,

3.1 of the.1999 edition);

f) The protection potential range for copper propellers has been increased (see 6.1.3);

g) The input power requirements and vibration resistance requirements for potentiostats have been changed (see 6.3.1,

3.1.1 of the.1999 edition);

h) The half-load ripple factor requirement for potentiostats has been changed (see 6.3.2,

3.3.2 of the.1999 edition);

i) The requirements for the enclosure protection rating of potentiostats have been changed (see 6.3.4,

1 Scope

GB/T 3108-2026 is the Chinese national standard covering protecting a hull from corrosion with an applied current - the anodes and reference cells on the hull, the controller that holds the potential where corrosion stops without over-protecting and stripping the paint, and the shaft earthing. It replaces GB/T 3108-1999, a standard twenty-seven years old, and has been in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 3108-1999. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the composition, basic parameters, requirements, design, inspection, and testing of externally impressed cathodic protection systems for ships. This document applies to the design of impressed current cathodic protection systems used for corrosion protection of steel seagoing vessel hulls and appendages such as propellers, rudders, and shafts. Design, manufacturing, and acceptance.

The symbols and descriptions listed in Table 1 apply to this document.

5 Composition and Basic Parameters

5.1 Composition The external impressed current cathodic protection system consists of a potentiostat, auxiliary anode, reference electrode, propeller shaft grounding device, rudder grounding device, and anode shield. Composition of the shielding layer.

5.2 Potentiostat Potentiostats can be selected from magnetic saturation potentiostats, high-power transistor potentiostats, silicon controlled rectifier potentiostats, and switching power supply potentiostats. For specifications of potentiostats, please refer to CB*3220 for selection.

5.3 Auxiliary Anode The auxiliary anode for an externally impressed current cathodic

protection system can be a platinum-titanium composite anode, a platinum-niobium composite anode, or a titanium-based metal oxide anode. The specifications for auxiliary anodes can be selected with reference to GB/T 7388.

5.4 Reference Electrode Reference electrodes for externally impressed cathodic protection systems can be made of silver/silver chloride seawater, silver/silver halide seawater, zinc-aluminum-silicon, or high-purity zinc. The specifications for the reference electrode and the specific electrode can be selected according to GB/T 7387.

5.5 Propeller Shaft Grounding Device

5.5.1 The propeller shaft grounding device mainly consists of a conductive ring, carbon brush, brush holder and brush holder support frame, as shown in Figure 1.

5.5.2 The conductive ring is generally made of brass, consisting of two semi-circular slip rings, which are then fastened with bolts.

5.5.3 Carbon brushes are typically copper-graphite. A standard propeller shaft grounding system usually has at least three sets of carbon brushes, one of which is used to measure the propeller's... Due to the potential difference of the hull, the carbon brush should be insulated from the hull.

5.6 Rudder grounding device The rudder grounding device is a single-core marine flexible cable with a cross-sectional area of not less than 25mm2, which short-circuits the rudder post to the hull.

5.7 Anode Shielding Layer The shapes of the anode shielding layer include disc-shaped and strip-shaped.

6.1 Protection Potential Range

6.1.1 For hull steel with a yield strength less than 500 MPa, the protection potential range is -0.8V to -1.1V (relative to silver/silver chloride seawater). (Reference electrode, the same below) For hull steel with a yield strength of not less than 500 MPa, the most positive protection potential is -0.8V, and the most negative protection potential should be adopted. The experiment confirmed this.

6.1.2 Structures such as shafts and rudder plates should be protected simultaneously with the hull, and the protection potential range should be the same as that of the hull structural steel.

6.1.3 The protection potential range for copper propellers is -0.45V to -1.1V.

6.2 Tracking Performance When the ship's speed changes and the given potential changes, the output voltage and output current of the potentiostat should also change accordingly, and the ship's speed should be adjusted accordingly. The body reaches the protection potential range.

6.3 Potentiostat

6.3.1 The potentiostat should be able to operate reliably under the following environmental conditions.

a) The ambient temperature is -10°C to 55°C.

b) The relative humidity of the air is not greater than 95%.

c) Condensation, salt spray, oil mist, and mold are present.

d) The power supply variation range is 6% to -10% in steady state and ±20% in transient state (recovery time 1.5s); the frequency variation range is ±5% in steady state. Transient ±10% (recovery time 5s).

e) The harmonic content of the power supply voltage is not greater than 8%.

f) Vibration. 1) 2Hz~13.2Hz, displacement ±1.0mm; 2) 13.2Hz~100Hz, acceleration ±6.9m/s2.

g) Tilting and rolling 22.5°, pitching and rolling 10°.

6.3.2 The potentiostat shall have the following performance characteristics.

a) Input impedance not less than 1MOmega;

b) The potential control error is no greater than 0.02V;

c) Continuously adjustable within a given potential range;

d) Manual and automatic control adjustment;

e) The half-load ripple factor is not greater than 5%;

6.6 Propeller Shaft Grounding Device

6.6.1 The propeller shaft shall be electrically connected to the hull using a propeller shaft grounding device, and the potential difference between the propeller and the hull shall be reduced to below 0.1V.

6.6.2 The installation location of the propeller shaft grounding device should be selected in a dry, oil-free location that is easy to observe and maintain.

6.6.3 The service life of the conductive ring, brush holder and brush holder support of the propeller shaft grounding device shall not be less than 20 years, and the service life of the carbon brush shall not be less than 5 years.

6.7 Rudder grounding device To prevent electrochemical corrosion of the rudder blades, a single-core marine flexible cable with a cross-sectional area of not less than 25 mm^2 should be used inside the rudder gear compartment to connect the rudder post to the ship.