

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sacrificial Anode Material for Corrosion Protection**with type designation(s)
LONGGONG

Issued to

Shandong Hongtai Science and Technology Co., Ltd.
Zibo, China

is found to comply with

DNV GL class programme DNVGL-CP-0107 – Type approval – Sacrificial anode materials
DNV GL recommended practice DNVGL-RP-B401 – Cathodic protection design, June 2017**Application :****The mean current capacity of the sacrificial anode material after 12 months free running testing is 2642 Ah/kg. The mean closed circuit potential is -1080 mV vs. Ag/AgCl seawater. The approval is given for use in sea water at temperatures below 30°C.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2019-01-31**This Certificate is valid until **2024-01-30**.DNV GL local station: **Qingdao**for **DNV GL**Approval Engineer: **Gisle Hersvik**

Rikard Törnqvist
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Product description

LONGGONG; Aluminium based alloy (Al-Zn-In) sacrificial anode material.

Chemical Composition (%):

Fe	Zn	Si	Cu	Cd	In	Al
0.09 max	2.5–5.75	0.12 max	0.003 max	0.002 max	0.015-0.040	Remainder

Application/Limitation

Approval is given for the sacrificial anode material; not for anode design.

For cathodic protection of steel structures in sea water sediment, sea mud, subsea pipelines, ship's hull, tank internals, steel structures buried in soil, etc.

The mean current capacity of the sacrificial anode material after 12 months free running testing was calculated to be **2642** Ah/kg. The mean closed circuit potential is -1080 mV vs. Ag/AgCl seawater.

The recommended design electrochemical capacity for aluminium based alloys in seawater is 2000 Ah/kg (ref. DNVGL-RP-B401).

The approval is given for use in sea water at temperatures below 30°C.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**. Refer to Type Test Report from manufacturer of 2010-03-06 for details on the testing performed.

Testing has been performed with basis in DNV-RP-B401 (January 2005).

Marking of product

Product shall be marked with *manufacturer's name*; **Shandong Hongtai Science and Technology Co., Ltd., China** and *type designation*: "**LONGGONG**"

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after 2 and 3.5 years (Certificate Retention) and at renewal after 5 years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV GL Type Approval Certificate.



Job Id: **262.1-010089-4**
Certificate No: **TAS00001W6**

END OF CERTIFICATE