

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sacrificial Anode Material for Corrosion Protection**with type designation(s)
Al-Zn-In Sacrificial Anodes

Issued to

Sunrui Marine Environment Engineering Co., Ltd.
QINGDAO, China

is found to comply with

Det Norske Veritas' Type Approval Programme 1-601.2, 2009, Sacrificial Anode Materials
Det Norske Veritas' Recommended Practices, DNV-RP-B401 Cathodic Protection Design**Application :****The mean current capacity of the sacrificial anode material after 12 months free running testing is 2100 Ah/kg. The mean closed circuit potential is -1060 mV vs. Ag/AgCl seawater. The approval is given for use in seawater at temperatures below 30°C.**This Certificate is valid until **2019-06-30**.Issued at **Høvik** on **2015-06-26**DNV GL local station: **Qingdao**Approval Engineer: **Gisle Hersvik**for **DNV GL**

Martin Strande
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.



Job Id: **262.1-011378-3**
Certificate No: **TAS000000V**

The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

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

Application/Limitation

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

The mean current capacity of the sacrificial anode material after 12 months free running testing is calculated to be **2100** Ah/kg. The mean closed circuit potential is -1060 mV vs. Ag/AgCl seawater.

The recommended design electrochemical capacity for aluminium based alloys in seawater is 2000 Ah/kg (ref. DNV-RP-B401). Please observe Guidance notes in paragraphs 12.4.4 and 6.5.2 of DNV-RP-B401.

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

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**, refer to "Verification Report on Long Term Testing of Anode Material (Al-Zn-In) for Qualification of Electrochemical Performance", issued by DNV Shanghai 2009-10-09, for details on testing performed.

Testing has been performed with basis in DNV RP-B401 (1993).

Marking of product

Product shall be marked with *manufacturer's name* **SunRui Marine Environment Engineering Co., Ltd., Qingdao, China** and *type designation*: "**Al-Zn-In**"

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 two (2) years (Certificate Retention) and at renewal after four (4) 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.

END OF CERTIFICATE