

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sacrificial Anode Material for Corrosion Protection**

with type designation(s)

Aluminum Alloy Sacrificial Anode for Cold Seawater

Issued to

**Sunrui Marine Environment Engineering Co.,Ltd.
QINGDAO, 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 galvanostatic control testing is 2478 Ah/kg. The closed circuit potential is in the range -1053 to -1084 mV vs. Ag/AgCl seawater. Approval is given for use in sea water at temperatures below 3°C. The Aluminium Alloy Sacrificial Anode for Cold Seawater can also be used at higher temperatures up to 30°C.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-12-17**This Certificate is valid until **2023-12-16**.DNV GL local station: **Qingdao**for **DNV GL**Approval Engineer: **Gisle Hersvik**

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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

Aluminum Alloy Sacrificial Anode for Cold Seawater; 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 galvanostatic control testing is **2478** Ah/kg. The closed circuit potential is in the range -1053 to -1084 mV vs. Ag/AgCl seawater.

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

Approval is given for use in sea water at temperatures below 3°C. The Aluminium Alloy Sacrificial Anode for Cold Seawater can also be used at higher temperatures up to 30°C.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**, and as reported in "Test Report for Aluminium Alloy Sacrificial Anode Long-term Electrochemical Test", issued by Sunrui Marine Environment Engineering Co., Ltd. 2014-09-16.

Testing has been performed with basis in DNV-RP-B401 (2010).

Marking of product

Product shall be marked with *manufacturer's name* **Sunrui Marine Environment Engineering Co., Ltd, Qingdao, China** and *type designation*: **SR AI** and *date/heat/weight*.

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.

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.

END OF CERTIFICATE