DNV·GL

Certificate No:
TAS000016H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sacrificial Anode Material for Corrosion Protection

with type designation(s)
HIZANODE®

Issued to
Samgong Co., Ltd.
Busan, Republic of Korea

is found to comply with
DNV GL class programme DNVGL-CP-0107 – Type approval – 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 776 Ah/kg. The mean closed circuit potential is -1002 mV vs. Ag/AgCl/Seawater. The approval is given for use in sea water at temperatures up to maximum 60°C.

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

Issued at **Høvik** on **2017-09-08**
This Certificate is valid until **2022-09-07**.
DNV GL local station: **Gimhae Station**

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

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Product description

HIZANODE®: Zinc-aluminium-magnesium alloy sacrificial anode material.

Chemical Composition (%):

Fe	Cd	Pb	Cu	Al	Mg	Zn
0.002 max	0.001 max.	0.006 max	0.001 max	0.10-0.25	0.05-0.15	Remainder

Place of manufacture

Samgong Co., Ltd., 135 Noksansandan 17-ro, Gangseo-gu, 46751 Busan, Korea

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 **776 Ah/kg**. The mean closed circuit potential is –1002 mV vs. $Ag/AgCl_{(seawater)}$. The test temperature during the test period was approx. 60ºC.

The recommended design electrochemical capacity for zinc based alloys in seawater at temperatures up to max. 30ºC is 780 Ah/kg (ref. DNVGL-RP-B401).

Approval is given for use of the sacrificial anode material in seawater at temperatures up to max. 60ºC.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance **Type Approval documentation**.

The long-term testing has been performed with basis in DNV-RP-B401 Cathodic Protection Design (2010), ref. KTR Technical Report No. KTR-LTAT-006, Rev. 01 "QUALIFICATION TESTING OF GALVANIC ANODE HIZANODE®" of 2016-06-30. Please refer to report for details on testing performed.

Marking of product

Product shall be marked with *manufacturer's name*; **SAMGONG** and *type designation*

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 DNV GL Type Approval Certificate.

END OF CERTIFICATE