DNV·GL

Certificate No:
TAS00001X0

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sacrificial Anode Material for Corrosion Protection

with type designation(s)
CP-Al

Issued to
K.C. LTD.
Busan, Republic of Korea

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 2457 Ah/kg. The mean closed circuit potential is -1036 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 **2019-02-22**
This Certificate is valid until **2024-02-21**.
DNV GL local station: **Gimhae Station**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

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.

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Product description

CP-Al; Aluminium based alloy sacrificial anode material.

Chemical Composition (%):

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

The approval is valid for anode chemistries with Fe-content up to max. 0.06%.

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 **2457** Ah/kg. The mean closed circuit potential is -1036 mV vs. Ag/AgCl seawater.

The recommended design eletrochemical 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 KTR Technical Report No. TBU-000378(2017), Rev. 00 "Qualification Testing of Galvanic Anode CP-Al" of 2018-11-23 for details on the testing performed.

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

Marking of product

Product shall be marked with *manufacturer's name*; **K.C. Ltd., Korea** and *type designation*: "**CP-Al**"

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.

END OF CERTIFICATE