

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sacrificial Anode Material for Corrosion Protection

with type designation(s)
VPI Anode

Issued to

Vietnam Petroleum Institute (VPI)
Ha Noi, Viet Nam

is found to comply with

DNV class programme DNV-CP-0107 – Type approval – Sacrificial anode materials
DNV rules for classification – Ships
DNV recommended practice DNV-RP-B401 – Cathodic protection design, May 2021

Application :

The mean current capacity of the sacrificial anode material after 12 months free running testing is 2349 Ah/kg, the mean closed circuit potential is about -1112 mV vs. Ag/AgCl seawater. The approval is given for use in seawater at temperatures below 30°C.

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

Issued at **Høvik** on **2022-03-17**

This Certificate is valid until **2027-03-16**.

DNV local station: **Vung Tau Station**

for **DNV**

Approval Engineer: **Gisle Hersvik**

.....
Gustav Heiberg
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

VPI Anode; Sacrificial Aluminium Alloy Anode Material for Corrosion Protection.

Chemical composition (weight %):

Zn	In	Si	Fe	Cu	Cd	Others	Al
2.5-5.75	0.015-0.040	Max. 0.12	Max. 0.09	Max. 0.003	Max. 0.002	Max. 0.02 each	Remainder

Place of manufacture

Vietnam Petroleum Institute, Road 7, Dong Xuyen IZ, Rach Dua ward, Vung Tau City, Vietnam

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 **2349** Ah/kg. The mean closed circuit potential is -1112 mV vs. Ag/AgCl/Seawater.

The recommended design electrochemical capacity for aluminium based alloys in seawater is 2000 Ah/kg (ref. 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 according to **Type Approval documentation**.

The Type Testing has been performed with basis in DNVGL-RP-B401 (2017).

Marking of product

Product shall be marked with *manufacturer's name*; **Vietnam Petroleum Institute** and *type designation*; **VPI Anode**.

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 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 assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

END OF CERTIFICATE