



TYPE APPROVAL CERTIFICATE

Certificate No:
TAS00000KK
Revision No:
2

This is to certify:

That the Sacrificial Anode Material for Corrosion Protection

with type designation(s)
Galvalum III

Issued to

Cathodic Protection Technology (Johor) Sdn Bhd
SENAI, JOHOR, Malaysia

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
NORSOK Standard M-503 Cathodic protection, Edition 3, May 2007

Application :

The mean current capacity of the sacrificial anode material after 12 months free running testing is 2621 Ah/kg, the mean closed circuit potential is about -1070 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 **2022-02-28**

for **DNV**

This Certificate is valid until **2027-02-27**.

DNV local station: **Kuala Lumpur**

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.



Form code: TA 251

Revision: 2021-03

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Page 1 of 3

Product description

Galvalum III; Sacrificial Aluminium Alloy Anode Material for Corrosion Protection.

Chemical composition (weight %):

Zn	In	Fe	Si	Cu	Others	Al
2.0-6.0	0.01-0.02	Max. 0.13	0.08-0.20	Max. 0.006	Max. 0.02 each	Remainder

Manufactured by

Cathodic Protection Technology (Johor) Sdn Bhd, PLO 126 Kawasan Perindustrian Senai, Phase III 81400 Senai, Johor, Malaysia

DNV local station: Kuala Lumpur

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

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 **2621** Ah/kg. The mean closed circuit potential is -1,07 V vs. Ag/AgCl/Seawater. The mean anode current density was measured to approx. 0,7 A/m².

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

1. Assessment Report from DNV Kuala Lumpur of 2021-08-12.
2. Assessment Report from DNV Singapore of 2021-08-10.
3. Email from DNV Singapore of 2016-06-20, incl. ISO 9001-Certificate and Periodical Assessment Report from DNV GL Singapore of 2016-06-20.
4. Application for Type Approval of 2012-06-06 and letter from CP Tech of 2012-06-04.
5. Survey Report from DNV Singapore of 2012-06-04.
6. DNV Technical Report No. R2700044, Rev. 02, from DNV Bergen dated 2000-02-18 (from 12 months testing).
7. DNV Technical Report No. 27051bsc.6months, Rev. 0, from DNV Bergen dated 1999-08-30.

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Testing has been performed with basis in DNV-RP-B401 (1993) and NORSOK M-503, Cathodic protection (Rev. 2, Sept. 1997).

Marking of product

Product shall be marked with *manufacturer's name*; **C.P. TECH** and *type designation*; **N** (indicating **Galvalum III**).

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.



Job Id: **262.1-014108-3**
Certificate No: **TAS00000KK**
Revision No: **2**

Periodical assessments (for Certificate Retention and 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

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAS00002B4
Revision No:
1

This is to certify:

that the **Sacrificial Anode Material for Corrosion Protection**

with type designation(s)
CP Tech Sacrificial Zinc Anode

issued to

Cathodic Protection Technology (Johor) Sdn Bhd
Senai, JOHOR, Malaysia

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
NORSOK Standard M-503 Cathodic protection, Edition 3, May 2007

Application:

The mean current capacity of the sacrificial anode material after 12 months free running testing is 813 Ah/kg, the mean closed circuit potential is about -1016 mV vs. Ag/AgCl seawater. The approval is given for use in seawater at temperatures up to max. 50°C.

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

Issued at **Hamburg** on **2024-12-18**

This Certificate is valid until **2029-12-10**.

DNV local unit: **Singapore**

Approval Engineer: **Gisle Hersvik**

for **DNV**



Digitally Signed By:
Stefan Röhr
Location: **DNV Hamburg,**
Germany

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 USD 300 000.

Product description

CP Tech Sacrificial Zinc Anode: Sacrificial Zinc Alloy Anode Material for Corrosion Protection.

Chemical Composition (%):

Fe	Cd	Pb	Cu	Al	Other, total	Zn
0.005 max	0.025-0.07	0.006 max	0.005 max	0.1-0.5	0.1	Remainder

Place of manufacture

Cathodic Protection Technology (Johor) Sdn Bhd, PLO 126, Jalan Cyber 3, Kawasan Perindustrian Senai Phase III, 81400 Senai, Johor, Malaysia

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 **813 Ah/kg**. The mean closed circuit potential is -1,016 V vs. Ag/AgCl_(seawater).

The recommended design electrochemical capacity for zinc-based alloys in seawater at temperatures up to max. 50°C is 780 Ah/kg (ref. DNV-RP-B401).

DNV-RP-B401, Edition May 2021, Table 8-6, gives recommended design electrochemical capacity and design closed circuit potential for anode materials at seawater ambient temperatures:

Seawater temperature [°C]	Design electrochemical capacity [Ah/kg]		Reference
	Immersed in seawater	Buried in seawater sediments	
≤30	780	700	DNV-RP-B401
30	780	750	ISO 15589-2
40	780	580	
50	780	580	

* ISO 15589-2:2012 *Petroleum, petrochemical and natural gas industries -- Cathodic protection of pipeline transportation systems -- Part 2: Offshore pipelines.*

Type Approval documentation

1. Assessment Report from DNV Singapore of 2024-12-13.
2. Certificate of Conformity, CC-2611 (2024-12-06), Certificate of Analysis (2024-12-05) and Electrochemical Capacity/Potential Test Report, ECT-2336 (2024-12-05) [Result: 825 Ah/kg].
3. Assessment Report from DNV GL Singapore of 2019-08-20.
4. Technical Report CP Tech "Long Term Testing of Zinc Anode, 12 Months Results", 2019-05-25
5. Quality Plan, Flow Chart of Zinc Anode Production, Company Profile.
6. Material Specification Data Sheet (Zinc), US Mil Spec A18001K).
7. Application for Type Approval of 2019-09-05.

Tests carried out

Type Testing carried out according to **Type Approval documentation**. Refer to Technical Report from CP Tech of 2019-05-25 for details of testing.

Testing has been performed with basis in DNVGL-RP-B401 (2017) and NORSOK M-503, Cathodic protection (Ed. 3, May 2007).

Marking of product

Product shall be marked with *manufacturer's name*: **C.P. TECH** and *heat number*: **XXX SX** (where 'X' represents numerical numbers).



Job ID: **262.1-025995-2**
Certificate no.: **TAS00002B4**
Revision No: **1**

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