

TYPE APPROVAL CERTIFICATE

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 GL class programme DNVGL-CP-0107 – Type approval – Sacrificial anode materials**DNV GL rules for classification – Ships****DNV GL recommended practice DNVGL-RP-B401 – Cathodic protection design, June 2017****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 below 50°C.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2019-12-11**This Certificate is valid until **2024-12-10**.DNV GL local station: **Singapore**for **DNV GL**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.



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

Manufactured by

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

DNV GL local station: Singapore

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 is 780 Ah/kg (ref. DNVGL-RP-B401).

Approval is given for use of the sacrificial anode material in seawater below 50°C. For zinc anodes buried in seawater sediments, please refer to below table for design electrochemical capacity for temperatures up to maximum 50°C:

Seawater temperature [°C]	Design electrochemical capacity [Ah/kg]		Reference
	Immersed in seawater	Buried in seawater sediments	
≤30	780	700	DNVGL-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

Tests carried out

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

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

Marking of product



Job Id: **262.1-025995-1**
Certificate No: **TAS00002B4**

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

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 assessments (for Certificate Retention and Certificate Renewal) shall be performed according to DNVGL-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.dnvgl.com>

END OF CERTIFICATE