

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sacrificial Anode Material for Corrosion Protection**with type designation(s)
Zn-Al-based Sacrificial Zinc Anode Material

Issued to

Metec Sarl
Menzel Bourguiba, Bizerte, Tunisiais found to comply with
DNV GL class programme DNVGL-CP-0107 – Type approval – Sacrificial anode materials
DNV GL rules for classification – Ships
DNV GL offshore standards
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 796 Ah/kg. The mean closed circuit potential is -1011 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.**This Certificate is valid until **2021-12-11**.Issued at **Høvik** on **2017-07-07**
DNV GL local station: **Casablanca**for **DNV GL**Approval Engineer: **Gisle Hersvik**

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.

Job Id:
Certificate No: **TAS00000U9**
Revision No: **1**

Product description

Zn-Al-based Sacrificial Zinc Anode Material.

Manufactured by

Metec Sarl, Economiques Bizerte Parc Activites, 7050 Menzel Bourguiba, Bizerte, Tunisia

DNV GL station: Casablanca

Metec Cathodic Protection Limited, Visage House, 2 Shaftesbury Avenue, Jarrow, Tyne & Wear, NE32 3UP, United Kingdom

DNV GL station: Newcastle

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 free running testing is calculated to be **796** Ah/kg. The mean closed circuit potential is -1011 mV vs. Ag/AgCl seawater.

The recommended design electrochemical capacity for zinc based alloys in seawater is 780 Ah/kg (ref. DNV-RP-B401).

The approval is given for use in sea water at temperatures 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	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

Tests carried out

Type Testing carried out according to **Type Approval documentation**. Refer to DNV GL Technical Report No. 2016-5311, Rev. 0 "Long term anode testing of one Zn-Al-based alloy according to DNV-RP-B401 (2010), Annex C" of 2016-10-28 for details on testing performed.



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

Marking of product

For traceability to this Type Approval Certificate, the products are to be marked with *Manufacturer's name and/or trade name*.

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