



TYPE APPROVAL CERTIFICATE

Certificate No:
TAS0000MM
Revision No:
1

This is to certify:

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

with type designation(s)
Duralnode XP Aluminium Alloyed Sacrificial anodes,
Duralnode LD Marathon Aluminium Alloyed Sacrificial anodes

Issued to
MME Engineering Ltd.
Faversham, United Kingdom

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 offshore standards
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 2722 Ah/kg (Duralnode XP) and 2929 Ah/kg (Duralnode LD Marathon). The mean closed circuit potential is -1082 mV vs. Ag/AgCl seawater (Duralnode XP) and -1079 mV vs. Ag/AgCl seawater (Duralnode LD Marathon). 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 **2021-09-03**

for **DNV**

This Certificate is valid until **2026-09-02**.

DNV local station: **Southampton**

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

www.dnv.com

Page 1 of 3

Product description

Al-Zn-In-based Sacrificial Aluminium Anode Materials;

- **Duralnode XP**
- **Duralnode LD Marathon**

Elements	Duralnode XP	Duralnode LD Marathon
Zn	2.5-5.0%	2.5-5.5%
In	0.015-0.40%	0.015-0.40%
Ti	0.01-0.02%	0.01-0.02%
Cu	≤0.005%	≤0.003%
Fe	≤0.09%	≤0.06%
Si	≤0.05%	≤0.05%
Others, each	≤0.02%	≤0.02%
Others, total	≤0.05%	≤0.05%
Aluminium	Remainder	Remainder

Application/Limitation

Approval is given for the sacrificial anode material; not for anode design.

For cathodic protection of permanent and semi-permanent offshore and civil engineering structures, including FPSO's, buoys, ships etc.

The mean current capacity of the sacrificial anode material after 12 months free running testing is calculated to be;

- **Duralnode XP:** 2722 Ah/kg. The mean closed circuit potential is -1082 mV vs. Ag/AgCl seawater.
- **Duralnode LD Marathon:** 2929 Ah/kg. The mean closed circuit potential is -1079 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 sea water at temperatures below 30°C.

Type Approval documentation

1. Assessment Report from DNV GL Southampton of 2021-08-12.
2. WORKS AND TEST CERTIFICATE FOR SACRIFICIAL ANODES of 2021-08-12.
3. CMA Drawing CMA 0150-07 of 2021-07-21.
4. Application for Type Approval of 2021-08-11.
5. Assessment Report from DNV GL Southampton of 2015-04-14.
6. DNV GL Technical Report No. 2016-5214, Rev. 0 "Long term anode testing of two Al-Zn-In-based alloys at 7-10°C according to DNV-RP-B401 (2010), Annex C" of 2016-06-27 – issued to Materiaal Metingen Europe B.V.
7. ITS-9801-0001-Rev A-000-NN0 Supplement to Type Approval SA Application DNV.
8. ITS-9801-0001-Rev 0-000-NN0 Supplement to Type Approval SA Application DNV.
9. Application for Type Approval of 2015-03-24.

Tests carried out

Type Testing carried out according to **Type Approval documentation**. Refer to DNV GL Technical Report No. 2016-5214, Rev. 0 of 2016-06-27 for details on testing performed.

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

Marking of product

Products are to be marked with *Manufacturer's name/logo* and *type designation/trade name* and *heat/trace no.*

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: **262.1-019622-3**
Certificate No: **TAS00000MM**
Revision No: **1**

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