



Certificate no.:
TAA00003MR

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Shaft bearing monitoring

with type designation(s)

Thordon Bearing Condition Monitoring Wireless System (BCM-W)

issued to

Thordon Bearings Inc.
Burlington, ON, Canada

is found to comply with

DNV rules for classification – Ships

DNV rules for classification – Offshore units

DNV rules for classification – High speed and light craft

DNV rules for classification – Inland navigation vessels

DNV rules for classification – Naval vessels

DNV rules for classification – Yachts

Application:

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

Environmental classes (Temperature, Humidity, Vibration, EMC, Enclosure) are specified on page 2

Issued at **Høvik** on **2025-08-20**

This Certificate is valid until **2027-08-19**.

for **DNV**

DNV local unit: **UK & Ireland CMC & VMC**

Approval Engineer: **Sergey Gilmiyarov**

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

The Bearing Condition Monitoring – Wireless (BCM-W) system contains a proprietary radio modem which enables wireless communications between the deck and subsurface nodes. The application of this technology is to monitor bearing wear down measurements of water lubricated bearings in line with the DNV Rules for Ships Pt.6 Ch. 9 Tailshaft Monitoring (TMON) requirements.

The BCM-W hardware is separated into two key subsystems: Topside and Subsea. The Topside consists of a modem housing and battery pack mounted at the aft of the vessel or as close to the bearings as is practical. The Subsea component consists of a modem housing and a sensor attached to the bearing structure.

Topside subsystem includes the following components:

- EM-2 modem containing the radio and antennas
- Battery pack and charger
- Interconnecting cables

Subsea subsystem includes the following components:

- EM-2S modem containing the radio, antennas, and battery pack
- Wear down sensor
- Sensor bracketry
- Interconnecting cables

Parameter	Topside	Subsea
Temperature	D	A
Humidity	B	N/A (submerged housing)
Vibration	A	B
EMC	IEC 60945 Category: Portable	IEC 60945 Category: Submerged
Enclosure	C	D

Approval conditions

The Type Approval covers hardware listed under Product description.

Application/Limitation

The application of the wireless communication in this product complies with DNV Rules for Ships Pt.4 Ch.9 with appropriate exemptions where the operating frequency is concerned.

Type Approval documentation

Name	Doc. Nr.	Date	Revision
CSignum EM-2 GUI User Guide	--	2024-10	003
EM-2 link datasheet	--	--	--
Block diagram	WBCM-TD#4	2024-08-29	1
EM-2S Automated Test Procedure	2022-01-1040	2024-11-18	1
WBCM Functional Specification	2022-01-1018	2024-10-08	3
Technical Manual	2022-01-1029	2024-11-20	--
WBCMS Wiring Diagrams & Bills-of Materials	2022-01-1030	2024-11-20	1.22
Test Instruction Manual for the Components and Sub-Systems	2022-01-1033	2024-11-20	0.1
Gen 2 PCB Automated Test Procedure	109-TP2	--	1
Environmental Test Procedure PRJ2022-01-DNV-CG-339-TP01	TP01	2024-10-31	2
Environmental Test Report	75962887-01	2025-03	Issue 01
EMC testing EM-2	721001929C	2024-08	Issue 01
EMC testing EM-2S	721001929B	2024-08	Issue 01
EMC testing EM-2 and EM-2S	721001929D	2024-08	Issue 01
STATEMENT OF TEST – Vibration test	75962887	2025-03-04	Issue 1
SUBSEA MODEM ASSEMBLY	100487	2024-09-12	A
SENSOR ASSEMBLY – THORDON	100479	2024-07-02	A
EM-2 GENERAL ARRANGEMENT	100477	2024-06-05	A
Type Approval Assessment Report (Initial) UK & Ireland CMC & VMC	--	2024-11-20	--

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.
EMC testing by TUV SUD.
Functional testing at manufacturers premises.

Marking of product

Equipment Type
Part #
Serial #
Manufacturer

Manufactured by:

CSignum Ltd
On site:
Unit 9b, Pyramids Business Park, Bathgate, EH48 2EH, UK.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.
The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE