# EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Certificate no.:
**MEDB00009BC**

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

## This is to certify:

**that the Oil discharge monitoring and control system for an oil tanker**

with type designation(s)
**RD-ODME-IIA**

issued to
## Shanghai Rongde Engineering Equipment Co., Ltd.
**Shanghai**, **China**

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2024/1975,**
**item No. MED/2.5. Marpol 73/78 as amended, Annex I Regulation 31, IMO Res. MEPC.108(49) as amended and IMO MEPC.1/Circ.858**

Manufacturers authorised representative
**DARLSA ELECTRONIC APPLICATIONS S.A.**
**Athens, Greece**

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2030-01-19**.

Issued at **Høvik** on **2025-01-20**

DNV local unit:
**Shanghai**

Approval Engineer:
**Anna Piotrowska**

Notified Body
No.: **0098**

for **DNV SE**

**Christine Mydlak-Röder**
**Head of Notified Body**

The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.
This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV SE of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.
Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

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.

## Product description

The RD-ODME-IIA is an oil discharge monitoring and control system intended for installation on board oil tankers, to ensure that the overboard discharge effluent of oily mixture is automatically stopped when exceeding the specified limits under IMO Resolution MEPC.108(49) as amended by IMO Resolution MEPC.240(65).

A complete unit contains sampling probe, differential pressure transmitter, flow meter, discharge valves, sampling pump set, oil content panel, signal and control panel, sampling pump starter, valve control panel, computer unit.

## Application/Limitation

The oil content meter is tested and approved according to IMO Resolution MEPC.108(49) for crude oils, “black” and “white” products, as listed in the Appendix to this certificate.

The oil content meter is also tested and approved for the blends of petroleum oil and biofuels as given in IMO Resolution MEPC.240(65) and MEPC.1/Circ.761, to meet the requirements for testing biofuel blends containing 99% and 75% or more of petroleum oil. The blends of petroleum oil and biofuels subject to testing are listed in the Appendix to this certificate.

Arrangement drawing and updated vessel’s list of electrical equipment in hazardous areas are to be submitted for each installation.

Relevant valid Ex certificates shall be available on board the vessel at all times.

A copy of the Operation and Maintenance Manuals listed under Type Examination documentation shall be on board the vessel at all times.

## Type Examination documentation

Piping and Instrumentation Drawings:

| Drawing Title | Drawing Number | Revision (date) |
|---|---|---|
| System Diagram | 2630-00-100A | - (2012-12-01) |
| System unit arrangement diagram | 2630-00-101A | B (2012-12-01) |
| System piping arrangement | 2630-00-102A | - (2012-12-01) |

Electrical and Instrumentation Drawings:

| Drawing Title | Drawing Number | Revision (date) |
|---|---|---|
| System external wiring | 2630-00-200A | - (2012-12-01) |
| Computer panel wiring | 2630-00-201A | - (2012-12-01) |
| Oil content meter wiring | 2630-00-207A | - (2012-12-01) |

Operation and Maintenance Manuals:

| Drawing Title | Drawing Number | Revision (date) |
|---|---|---|
| User Manual for RD-ODME-IIA Oil Discharge Monitoring and Control System | 2630-00-0-05A | 2.03 (2024-12-11) |

Mechanical and Assembly Drawings:

| Drawing Title | Drawing Number | Revision (date) |
|---|---|---|
| Computer Panel Layout | 2630-00-110A | - (2012-09-14) |
| Signal and Control Panel Layout | 2630-00-120-10A | - (2012-12-01) |
| Signal and Control Panel Arrangement | 2630-00-120-11 | C (2015-01-06) |
| Oil Content Unit Layout | 2630-00-120-30A | - (2012-12-01) |
| Oil Content Unit Arrangement | 2630-00-120-31 | B (2010-03-15) |
| Sampling Pump Starter Layout | 2630-00-130A | - (2012-12-01) |
| Sampling Pump Starter Arrangement | 2630-00-131A | - (2012-12-01) |
| Sampling Pump Set Layout | 2630-00-140A | A (2010-03-15) |
| Sampling Probe Installation | 2630-00-147 | B1 (2015-01-06) |
| Flowmeter Unit Installation | 2630-00-150 | E (2012-05-15) |
| 5 Valves Set / Pressure Transmitter Unit | 2630-00-150-10 | B1 (2015-01-06) |

## Tests carried out

The RD-ODME-IIA was tested in accordance with the requirements of the specification with a reference to Part 1 of the Annex to the Guidelines and Specification contained in IMO Resolution MEPC.108(49), as amended by IMO Resolution MEPC.240(65):

- Shanghai Inspection and Testing Institute of Instruments and Automatic Systems,
  103 Cao Bao Road, Shanghai, China
  Date of testing: 2013-08-06 – 2013-09-13
  Test report No. A13-048-WT, issue date 2013-10-25

- Shanghai Inspection and Testing Institute of Instruments and Automatic Systems,
  103 Cao Bao Road, Shanghai, China
  Date of testing: 2014-12-10 – 2014-12-11
  Test report No. A13-048-WT-01, issue date 2014-12-20

## Marking of product

For traceability to this EC-Type Examination, each unit is to be marked with:

- Manufacturer’s name or trademark
- Type designation
- Serial number
- Mark of conformity

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

## Revision history

| Revision | Date of issuance | Description |
|---|---|---|
| 0 | 2025-01-20 | Initial certificate |

# APPENDIX

## TEST DATA AND RESULTS OF TESTS CONDUCTED ON AN OIL CONTENT METER IN ACCORDANCE WITH PART 1 OF THE ANNEX TO THE GUIDELINES AND SPECIFICATIONS CONTAINED IN IMO RESOLUTION MEPC.108(49)

| | |
|---|---|
| **Oil discharge monitoring and control system submitted by:** | Shanghai Rongde Engineering Equipment Co., Ltd. |
| **Tested type:** | RD-ODME-IIA |
| **Test location:** | Shanghai Inspection and Testing Institute of Instruments and Automatic Systems, 103 Cao Bao Road, Shanghai, China witnessed by Lloyd's Register |
| **Date:** | Initial type test: 2013-08-06 – 2013-09-13<br>Biofuel blends tests: 2014-12-10 – 2014-12-11 |
| **Method of sample analysis:** | ISO9377-2:2000 |
| **Samples analysed by:** | Results of tests and analysis of grab samples:<br>State Supervision and Inspection Center for Germent Quality<br><br>Types and properties of oils used in the tests:<br>Sinopec Shanghai Petrochemical Company Limited<br>Refinery and Chemical Department<br>Quality Management Monitoring Center |

Environmental testing of the electronic section of the oil content meter has been carried out in accordance with Part 2 of the Annex to the Guidelines and Specifications contained in IMO Resolution MEPC.108(49). The equipment functioned satisfactorily after completion of each test specified in the environmental test protocol.

| **CALIBRATION AND ZERO TEST** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| NO. 2 CRUDE OIL | | INDICATED | MEASURED | GRAB SAMPLE | |
| | 0 | 0 | 0 | 0 | REMARKS: |
| | 15 | 15 - 18 | 15 | 12.6 | |
| | 50 | 47 - 52 | 51 | 48.3 | |
| | 100 | 97 - 105 | 104 | 94.8 | |
| | 200 | 188 - 198 | 198 | 182.6 | |
| | 400 | 392 - 415 | 412 | 427.1 | |
| | 600 | 580 - 601 | 590 | 621.8 | |
| | 800 | 768 - 807 | 779 | 701.6 | Test Water Temperature: 32°C |
| | 1000 | 974 - 1021 | 1002 | 965.7 | Re-Zero: ~~YES~~/NO<br>Recalibrate: ~~YES~~/NO |
| **RESPONSE TESTS** | | | | | |
| NO. 1 CRUDE OIL | | | | | REMARKS: |
| | 15 | 15 - 17 | 15 | 11.9 | |
| | 100 | 103 - 108 | 103 | 98.4 | |
| 90% M.F.S.V. | 900 | 893 - 905 | 897 | 861.5 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |
| NO. 2 CRUDE OIL | | | | | REMARKS: |
| | 15 | 15 - 16 | 15 | 10.8 | |
| | 100 | 96 - 102 | 102 | 93.3 | |
| 90% M.F.S.V. | 900 | 820 - 867 | 855 | 795.9 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 20 min |

| **RESPONSE TESTS** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| | | INDICATED | MEASURED | GRAB SAMPLE | |
| NO. 3 CRUDE OIL | | | | | REMARKS: |
| | 15 | 16 - 20 | 19 | 13.9 | |
| | 100 | 104 - 106 | 104 | 106.5 | |
| 90% M.F.S.V. | 900 | 879 - 917 | 902 | 933.8 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |
| NO. 4 CRUDE OIL | | | | | REMARKS: |
| | 15 | 12 - 16 | 14 | 10.87 | |
| | 100 | 90 - 98 | 92 | 84.1 | |
| 90% M.F.S.V. | 900 | 970 - 1032 | 986 | 1056.8 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |
| NO. 5 CRUDE OIL | | | | | REMARKS: |
| | 15 | 10 - 19 | 14 | 6.6 | |
| | 100 | 96 - 108 | 106 | 113.8 | |
| 90% M.F.S.V. | 900 | 843 - 891 | 878 | 942.3 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 20 min |

| **RESPONSE TESTS** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| | | INDICATED | MEASURED | GRAB SAMPLE | |
| MARINE RESIDUAL FUEL OIL | | | | | REMARKS: |
| | 15 | 16 - 20 | 20 | 15.9 | RMG380 |
| | 100 | 99 - 112 | 105 | 111.5 | |
| 90% M.F.S.V. | 900 | 914 - 966 | 958 | 947.4 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Recalibrate: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Clean: YES/~~NO~~ |
| | | | | | Time: 15 min |
| KEROSENE | | | | | REMARKS: |
| | 15 | 11 - 17 | 15 | 14.2 | |
| | 100 | 92 - 100 | 97 | 89.3 | |
| 90% M.F.S.V. | 900 | 950 - 1030 | 963 | 1026.6 | |
| Recorded Zero | | | - | - | Re-Zero: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Recalibrate: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Clean: YES/~~NO~~ |
| | | | | | Time: 15 min |
| MARINE DISTILLATE FUEL OIL | | | | | REMARKS: |
| | 15 | 15 | 15 | 16.9 | DMA |
| | 100 | 95 - 97 | 96 | 105.2 | |
| 90% M.F.S.V. | 900 | 833 - 882 | 842 | 818.1 | |
| Recorded Zero | | | - | - | Re-Zero: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Recalibrate: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Clean: YES/~~NO~~ |
| | | | | | Time: 15 min |

| **RESPONSE TESTS** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| | | INDICATED | MEASURED | GRAB SAMPLE | |
| AUTOMOTIVE GASOLINE | | | | | REMARKS: |
| | 15 | 15 - 16 | 15 | 8.2 | |
| | 100 | 73 - 92 | 83 | 75.9 | |
| 90% M.F.S.V. | 900 | 921 - 936 | 932 | 904.3 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Recalibrate: ~~YES~~/NO |
| | | | | | Time: N/A |
| | | | | | Clean: ~~YES~~/NO |
| | | | | | Time: 15 min |

## INDIVIDUAL BIOFUEL BLENDS AND CONCENTRATIONS

| **RESPONSE TESTS** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| | | INDICATED | MEASURED | GRAB SAMPLE | |
| BIOFUEL BLEND<br>75% PETROLEUM OIL | | | | | REMARKS: |
| | 15 | 14 - 17 | 15 | 13.5 | Biofuel blends of Diesel oil (75%) and Vegetable oil (25%) |
| | 100 | 95 - 105 | 99 | 94.9 | |
| 90% M.F.S.V. | 900 | 882 - 886 | 885 | 915.0 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |
| BIOFUEL BLEND<br>99% PETROLEUM OIL | | | | | REMARKS: |
| | 15 | 17 - 20 | 19 | 17.5 | Biofuel blends of Diesel oil (99%) and Vegetable oil (1%) |
| | 100 | 101 - 110 | 106 | 107.7 | |
| 90% M.F.S.V. | 900 | 859 - 880 | 862 | 823.0 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |
| BIOFUEL BLEND<br>75% PETROLEUM OIL | | | | | REMARKS: |
| | 15 | 18 - 21 | 18 | 22.4 | Biofuel blends of Gasoline (75%) and Ethyl alcohol (25%) |
| | 100 | 96 – 106 | 100 | 96.3 | |
| 90% M.F.S.V. | 900 | 907 - 946 | 931 | 867.1 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |

| **RESPONSE TESTS** | | READINGS [ppm] | | | |
|---|---|---|---|---|---|
| | | INDICATED | MEASURED | GRAB SAMPLE | |
| BIOFUEL BLEND<br>99% PETROLEUM OIL | | | | | REMARKS: |
| | 15 | 15 - 19 | 15 | 19.7 | Biofuel blends of Gasoline (99%) and Ethyl alcohol (1%) |
| | 100 | 99 - 102 | 100 | 92.4 | |
| 90% M.F.S.V. | 900 | 900 - 910 | 906 | 862.1 | |
| Recorded Zero | | 0 | - | - | Re-Zero: ~~YES~~/NO<br>Time: N/A<br>Recalibrate: ~~YES~~/NO<br>Time: N/A<br>Clean: YES/~~NO~~<br>Time: 15 min |

**RESPONSE TIMES**

| | | | | |
|---|---|---|---|---|
| First detectable reading | | | 14 | sec. |
| | 63 | ppm | 22 | sec. ① |
| | 90 | ppm | 40 | sec. |
| Stabilized maximum reading or 100 ppm | 106 | ppm | 66 | sec. |
| First detectable drop | | | 76 | sec. |
| | 37 | ppm | 14 | sec. ② |
| | 10 | ppm | 25 | sec. |
| Stabilized minimum reading | 0 | ppm | 37 | sec. |
| Response Time = $\frac{① + ②}{2}$ = | | | 18 | sec. |

## OIL FOULING AND CALIBRATION SHIFT

### 10% OIL CONCENTRATION TEST

| | | | | |
|---|---|---|---|---|
| First detectable response | | | 1 | sec. |
| | 15 | ppm | 2 | sec. |
| | 100 | ppm | 10 | sec. |
| Off scale on highest range | | | 19 | sec. |
| On scale on highest range | | | 20 | sec. |
| | 100 | ppm | 25 | sec. |
| | 15 | ppm | 30 | sec. |
| Minimum reading | 6 | ppm | 50 | sec. |
| Further cleaning required (state extent) | | | YES | |
| Time | | | 5 | min. |

### 100% OIL CONCENTRATION TEST

| | | | | |
|---|---|---|---|---|
| First detectable response | | | 1 | sec. |
| | 15 | ppm | 3 | sec. |
| | 100 | ppm | 8 | sec. |
| Off scale on highest range | | | 16 | sec. |
| On scale on highest range | | | 22 | sec. |
| | 100 | ppm | 28 | sec. |
| | 15 | ppm | - | sec. |
| Minimum reading | 18 | ppm | 75 | sec. |
| Further cleaning required (state extent) | | | YES | |
| Time | | | 15 | min. |
| Calibration shift | | | - | ppm |

## CONTAMINANT TEST

Meter reading shift with 300 ppm non-oil contaminants mixed with water and No.2 crude oil in oil concentrations of:

| | | |
|---|---|---|
| 15 ppm | -7.7 | ppm |
| 100 ppm | -5.8 | ppm |
| 300 ppm | -6.6 | % |

## AIR ENTRAINMENT TEST

Meter reading shift with 1% air entrained in water and No.2 crude oil added in concentrations of:

| | | |
|---|---|---|
| 15 ppm | 5.0 | ppm |
| 100 ppm | -6.0 | ppm |
| 300 ppm | -6.8 | % |

## OIL PARTICLE SIZE TEST

| | | |
|---|---|---|
| Meter reading shift | -8.8 | ppm |

## TEMPERATURE TEST

| | | |
|---|---|---|
| Calibration test water temperature | 31 | °C |
| Meter reading shift at 10°C | 9.0 | % |
| Meter reading shift at 65°C | 7.0 | % |

## SAMPLE PRESSURE OR FLOW TEST

| | | |
|---|---|---|
| Meter reading shift at 50% of normal | 9.0 | % |
| Meter reading shift at 200% of normal | -9.0 | ppm |
| Deviations from this test should be stated if necessary | None | |

## SHUT-OFF TEST

| | | |
|---|---|---|
| Meter reading before shut-off | 102 | ppm |
| Meter reading after start-up (minimum dry period 8 hours) | 107 | ppm |
| Damage to meter as follows: | None | |

## UTILITIES SUPPLY VARIATION TEST

| | | |
|---|---|---|
| 110% voltage effects | 5.0 | % |
| 90% voltage effects | 3.0 | % |
| 110% air pressure effects | 6.0 | % |
| 90% air pressure effects | 7.0 | % |
| 110% hydraulic pressure effects | N/A | ppm |
| 90% hydraulic pressure effects | N/A | ppm |
| Other comments: | None | |

## CALIBRATION AND ZERO DRIFT TEST

| | | |
|---|---|---|
| Calibration drift | -10.0 | ppm |
| Zero drift | 0 | ppm |

## SHUTDOWN AND RE-ENERGIZATION TEST

| | | |
|---|---|---|
| Span drift | 10.0 | ppm |
| Zero drift | -7.0 | ppm |
| Time for warm-up and calibration | 1.0 | min. |