

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV GL 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)
SMART ODME

Issued to

Rivertrace Limited
Redhill, United Kingdom

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2019/1397**,
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

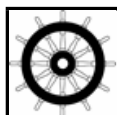
Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2025-06-28**.

Issued at **Hamburg** on **2020-06-29**

DNV GL local station:
Manchester

Approval Engineer:
Hagen Markus



Notified Body
No.: **0098**

for **DNV GL SE**

Gerhard Aulbert
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 GL 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 This certificate remains valid unless suspended, withdrawn, recalled or cancelled.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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

Oil Discharge Monitoring and Control System for an Oil Tanker

Assembly drawings

SMART ODME on Backplate/Cabinet with Electric Motor System Overview Schematic	109390 Sheet 01 to 13
SMART ODME Computer Module Assembly	109193 Sheet 01 to 04
SMART ODME VPC 3P Electric Motor on Backplate Assembly (IP56)	109201 Sheet 01 to 03

Analysing system - main components

Component	EC Type Examination Certificate
Smart Terminal ODME	SIRA 05ATEX2171X
Smart - Cell ODME	SIRA 05ATEX2170X
Zener / Solenoid Unit	SIRA 05ATEX2172
Software Computer	Version 1.2.xx ¹
Software Smart Cell	Version 1.3.xx ¹

Note

¹ In case of major software changes version to be changed to 1.3, 1.4 respectively, requires verification by notified body.

Sample conditioning unit main – components

Component	Manufacturer / Standard	Type ¹	EC Type Examination Certificate
Sample feed pump Walter	Walter Speck	Y 2951.0142	n.a.
Electric motor	HEW	DCEX 63 L2/k	BVS 14A TEX E 114X
	Euromotori	MAK71	CESI 06 ATEX 060X
Pneumatic motor	GAST	NL 22	n.a.
Pressure transmitter	teccis GmbH	E11/12/13	DMT02ATEXE114X
	Ellison SENSORS	GS4200EX0016AB	TRAC12ATEX0060X

Note

¹ Component types equivalent to the above are included

Application/Limitation

The oil content meter of type SMART-ODME is type approved for monitoring the discharge of oil contaminated water from the cargo tank areas of oil tankers for the following oil types:

Crude oils	"Black" and "White" products
Biofuel blends	
75% Petroleum Oil	Diesel Oil 75%, 25% Fatty acid methyl ester
	Diesel Oil 75%, 25% Vegetable oil
	Petrol 75%, 25% Ethanol
	Diesel Oil 75%, 25% Alkanes(C10-C26) linear and branched, FP>60°C
99% Petroleum Oil	Diesel Oil 99%, 1% Fatty acid methyl ester
	Diesel Oil 99%, 1% Alkanes(C10-C26) linear and branched, FP>60°C
	Diesel Oil 99%, 1% Vegetable oil
	Petrol 99%, 1% Ethanol



Job Id: **344.1-010323-1**
Certificate No: **MEDB00006DD**

Type Examination documentation

Job Id: **344.1-010323-1**
Certificate No: **MEDB00006DD**

Tests carried out

Test standard	IMO Resolution MEPC.108(49), as amended by Resolution MEPC.240(65).
Test location	Rivertrace Limited, Unit P, Kingsfield Business Centre, Philanthropic Road, Redhill, RH1 4DP, England
Method of sample analysis	ISO 9377-2: 2000
Test dates	Initial type tests: 5 th May 2005 Biofuel oil tests: 23 rd November 2016 (Biofuels)
Test specimen	
Model SMART - ODME	
Analysing unit	SMART ODME on Backplate/Cabinet with Electric Motor System Overview Schematic DRG.No.:109390 Sheet 01 to 09
Electronic section	Smart ODME Computer Module Assembly DRG. No.: 10 9193 SHEET 01 to 04
Software Computer	Version 1.2. xx
Software Smart Cell	Version 1.3. xx
Witnessing of tests	Hagen Markus, Horst Dölling - DNV GL, Hamburg
Samples taken by	Mr Mathew Mac Gregor, TEI-Testing Services-Plumbing Laboratory
Sample analysing and Environmental testing data see Appendix	

Marking of product

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

Scope	Example
Manufacturer name	Rivertrace Limited
Product type	SMART - ODME
MED Mark of conformity Wheel mark / notified body / Year built	 0098 /2020
Serial number	xxxxxxxxxxxxxxxxxxxx

This certificate replaces previous MED Module B certificate 12 078-10HH.

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), as amended by Resolution MEPC.240(65).

Oil content meter submitted by	RIVERTRACE ENGINEERING LTD
Test location	Redhill, Surrey, RH14DP, UK
Test dates	Initial type tests: 5 th May 2005 Biofuel oil tests: 23 rd November 2016
Test rig according to drawing	DEV 709
Method of sample analysis	ISO 9377-2: 2000
Samples analysed by	1. Tei-Testing Services, Salt Lake City, USA Report No. TS-A-01954 and TS-A-02157 2. SGS Oil Gas & Chemicals, Great Yarmouth, UK Report no. GY15-00238_..10021, GY15-00238_..10023, GY15-00306_..10190 3. GBA Gesellschaft für Bioanalytik, Pinneberg, Germany Report no. 2016P500382 / 1, 2016P500383 / 1

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), as amended by Resolution MEPC.240(65). The equipment functioned satisfactorily on completion of each test specified on the environmental test protocol.

Test were carried out at Intertek ETL SEMKO, Test report No.: 05017308, 05017205, issued at Leatherhead, UK in June 2005.

Remarks:

None

Job Id: **344.1-010323-1**
Certificate No: **MEDB00006DD**

		READINGS [PPM]			
		INDICATED	MEASURED	GRAB SAMPLE	
CALIBRATION AND ZERO TEST	0	0	0	2.8	REMARKS:
	15	16.0	18.1	15.1	Crude oil type: Arabian Light
	50	62.0	47.9	56.3	
	100	125.0	120.0	124.4	
	200	228.0	194.0	202.7	
	400	594.6	388.1	590.9	
	600	839.3	624.5	852.2	
	800	986.0	965.7	996.3	Test Water Temperature: 14.2 °C
	1000	>1000	980.0	906.7	Re-Zero: No
	0				Recalibrate: No
RESPONSE TESTS					
NO. 1 CRUDE OIL					REMARKS:
	15	29.3	29.8	29.9	Crude oil type: Nordic Yukon
	150	147.0	146.0	155.1	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
90% M.F.S.V. = 900		903.0	866.0	887.4	
Recorded Zero		0			Re-Zero: Yes
					Time: n.a.
					Recalibrate: Yes
					Time: n.a.
					Clean: See note 1
NO. 2 CRUDE OIL					REMARKS:
	15	13.0	15.7	12.7	Crude oil type: Arabian Light
	150	150.5	142.4	138.2	Measuring cell replaced due to leakage
90% M.F.S.V. = 900 (Maximum Full-Scale Value)		928.0	878.2	973.9	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
Recorded Zero		0			Re-Zero: Yes
					Time: n.a.
					Recalibrate: Yes
					Time: n.a.
					Clean: See note 1
					Time: n.a.

Job Id: **344.1-010323-1**
 Certificate No: **MEDB00006DD**

RESPONSE TESTS		READINGS [PPM]			
		INDICATED	MEASURED	GRAB SAMPLE	
NO. 3 CRUDE OIL					REMARKS:
	15	13.1	9.8	9.9	Crude oil Type: Saratov Varanday <u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test Re-Zero: No Time: n.a. Recalibrate: No Time: n.a. Clean: See note 1 Time: n.a.
	150	148.3	138.2	157.3	
	90% M.F.S.V. = 900	890.0	853.0	941.2	
	Recorded Zero	0			
NO. 4 CRUDE OIL					REMARKS:
	15	14.0	12.3	16.6	Crude oil type: Bachaquero <u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test Re-Zero: No Time: n.a. Recalibrate: No Time: n.a. Clean: See note 1 Time: n.a.
	150	160.8	142.8	175.1	
	90% M.F.S.V. = 900	913.0	928.0	976.4	
	Recorded Zero	0			
NO. 5 CRUDE OIL					REMARKS:
	15	59.0	50.0	59.9	Crude oil type: Siri Knutsen <u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test Re-Zero: Yes Time: n.a. Recalibrate: Yes Time: n.a. Clean: See note 1 Time: n.a.
	150	197.0	212.0	213.2	
	90% M.F.S.V. = 900	960.0	916.0	979.8	
	Recorded Zero	0			

RESPONSE TESTS

		READINGS [PPM]			
		INDICATED	MEASURED	GRAB SAMPLE	
MARINE RESIDUAL FUEL OIL					REMARKS:
RMG 35-ISO 8217	15	21.0	8.9	24.6	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
	150	124.0	126.2	118.7	
90% M.F.S.V. = 900		901.0	941.6	955.2	
Recorded Zero		0			Re-Zero: No Time: n.a. Recalibrate: No Clean: See note 1
AUTOMOTIVE GASOLINE					REMARKS:
	15	32.0	34.6	34.9	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
	150	136.0	153.0	142.3	
90% M.F.S.V. = 900		837.0	860.0	908.5	
Recorded Zero		0			Re-Zero: Yes Time: n.a.. Recalibrate: Yes Clean: See note 1
KEROSENE					REMARKS:
	15	28.0	27.1	25.8	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
	150	141.4	157.9	136.1	
90% M.F.S.V. = 900		835.9	849.0	862.9	
Recorded Zero		0			Re-Zero, Recalibrate: Yes Time: n.a. Clean: See note 1
MARINE DISTILLATE FUEL OIL					REMARKS:
DMA-ISO 8217	15	27.0	21.7	30.2	<u>Note 1</u> : Automatic cleaning device for measuring cell (wiper)operating during test
	150	144.3	143.0	139.5	
90% M.F.S.V. = 900		896.1	866.3	874.9	
Recorded Zero		0			Re-Zero, Recalibrate: Yes Time: n.a. Clean: See note 1

Job Id: **344.1-010323-1**
 Certificate No: **MEDB00006DD**

INDIVIDUAL BIOFUEL BLENDS AND CONCENTRATIONS

BIO-FUEL BLEND 75% Petroleum Oil	READINGS [PPM]			
	INDICATED	MEASURED	GRAB SAMPLE	
Diesel Oil 75% Fatty acid methyl ester 25%				REMARKS:
15	16	18	15	
150	97	110	91	
90% M.F.S.V. = 900	830	940	780	
Recorded Zero	0			Re-Zero: No Time: n.a. Recalibrate: No Time: n.a. Clean: No Time: n.a.
BIO-FUEL BLEND 99% Petroleum Oil Diesel Oil 99% Fatty acid methyl ester				REMARKS:
15	14	15	22	
150	105	92	105	
90% M.F.S.V. = 900	818	800	745	
Recorded Zero	0			Re-Zero: No Time: n.a. Recalibrate: No Time: n.a. Clean: No Time: n.a.

Job Id: **344.1-010323-1**
Certificate No: **MEDB00006DD**

RESPONSE TIMES

First detectable reading			5.5	sec.
	63	ppm	10.0	sec. ①
	90	ppm	15.0	sec.
Stabilized maximum reading or 100 ppm	100	ppm	21.0	sec.
First detectable drop			3.2	sec.
	37	ppm	10.8	sec. ②
	10	ppm	15.5	sec.
Stabilized minimum reading	0	ppm	20.5	sec.
Response Time = $\frac{\textcircled{1} + \textcircled{2}}{2}$			10.4	sec.

REMARKS

Delay time of the piping system measured is 7.63s, accordingly response time of the meter is 10.4s – 7.63s = 2.80s

OIL FOULING AND CALIBRATION SHIFT

10 % OIL CONCENTRATION TEST

First detectable response			1.6	sec.
	15	ppm	2.8	sec.
	100	ppm	11.5	sec.
Off scale on highest range			43	sec.
On scale on highest range			9	sec.
	100	ppm	21	sec.
	15	ppm	45	sec.
Minimum reading	0	ppm	65	sec.
Further cleaning required (state extent)			No*	
Time			--	min.

100 % OIL CONCENTRATION TEST

First detectable response			1.1	sec.
	15	ppm	1.8	sec.
	100	ppm	10.1	sec.
Off scale on highest range			48	sec.
On scale on highest range			26	sec.
	100	ppm	46	sec.
	15	ppm	214	sec.
Minimum reading	0	ppm	253	sec.
Further cleaning required (state extent)			No*	
Time			--	min.
Calibration shift	0	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	- 5.5	ppm
100 ppm	-6.0	ppm
300 ppm	-18.0	ppm

AIR ENTRAINMENT TEST

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

15 ppm	109.5	ppm
100 ppm	202.5	ppm
300 ppm	409.2	ppm

OIL PARTICLE SIZE TEST

Meter reading shift	26.0	ppm
---------------------	------	-----

TEMPERATURE TEST

Calibration test water temperature	13.0	°C
Meter reading shift at 10°C	0.0	ppm
Meter reading shift at 65°C	170.0	ppm

SAMPLE PRESSURE OR FLOW TEST

Meter reading shift at 50° of normal	22.0	ppm
Meter reading shift at 200° of normal	1.0	ppm
Deviations from this test should be stated if necessary	None	

SHUT-OFF TEST

Meter reading before shut-off	103.0	ppm
Meter reading after start-up (minimum dry period 8 hours)	95.0	ppm
Damage to meter as follows:	No damage to cell or any electrical component	

UTILITIES SUPPLY VARIATION TEST

110 % voltage effects	No effect.
90 % voltage effects	No effect.
110 % air pressure effects	n.a.
90 % air pressure effects	n.a.
110 % hydraulic pressure effects	n.a.
90 % hydraulic pressure effects	n.a.

OTHER COMMENTS

None

CALIBRATION AND ZERO DRIFT TEST

Calibration drift	3.6	ppm
Zero drift	5.8	ppm

SHUTDOWN AND RE-ENERGIZATION TEST

Span drift	8.4	ppm
Zero drift	0.0	ppm
Time for warm-up and calibration	0.0	min.

End of the Appendix