



CERTIFICATE OF TYPE APPROVAL


This is to certify that

Lloyd's Register did undertake the relevant type approval procedures of the equipment detailed below which was found to be in compliance with the essential Pollution Prevention requirements for use on ships and offshore installations classed with Lloyd's Register, and for use on ships and offshore installations when authorised by contracting governments to issue the relevant certificates, licences, permits, etc.

Manufacturer	MMC International Corp.
Address	60 Inip Drive Inwood New York 11096 United States of America (USA)
Type	OIL/WATER INTERFACE DETECTORS (POLLUTION PREVENTION)
Description	Portable Oil/Water Interface Detector Types: "D-2401-2; D2401-2UI and D-2401-2UT"
Specified Standard	IMO Resolution MEPC.5 (XIII)

The attached Design Appraisal Document forms part of this certificate.

This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

Date of issue	21 September 2019	Expiry date	20 September 2024
Certificate No.	SAS P190008	Signed	
Sheet No	1 of 3	Name	N. Siddiqui Surveyor to Lloyd's Register EMEA A Member of the Lloyd's Register Group

Note:

This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register of any modification or changes to the equipment in order to obtain a valid Certificate.

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.



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DESIGN APPRAISAL DOCUMENT

Date 21 September 2019	Quote this reference on all future communications UKITSO/MARPOL/TA/NAS/WP36812157
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ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS P190008

This Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION:

<u>Document no.</u>	<u>Revision / issue</u>	<u>Title</u>	<u>Date</u>
71097/916	2	Sensing Probe and PCB Assembly	29 Aug 2002
71097/898	2	Circuit Diagram	03 May 1996
3984	-	KDG Mobrey Test Report	06 May 1997

EQUIPMENT TESTED:

Type: Portable oil/water Interface Detector
 Model: D-2401-2
 Manufactured by: MMC International Corp.

ACCURACY AND RESPONSE TIMES TESTS:

The maximum error between measured and indicated reading was 3 mm.

In the case of lighter oils response time was less than 1 second.

In case of the heavy oil the response time was 4 seconds.

At Ambient Temperature	Fresh water Density (1.000)			Brackish water density (1.012)			Salt water density (1.025)		
	Accuracy (mm)	Indicated (mm)	Response Time (Seconds)	Accuracy (mm)	Indicated (mm)	Response Time (Seconds)	Accuracy (mm)	Indicated (mm)	Response Time (Seconds)
Unleaded Automotive Gasoline	639.5	636	<1	644.5	641	<1	643	640	<1
Light Diesel Oil	646	643	<1	650.5	648	<1	661	659	<1
Arabian Light Crude Oil	644.5 (28 °C)	641	<1	646 (28 °C)	643	<1	641.5 (27 °C)	638	<1
	644.5 (55 °C)	641	<1	646 (55 °C)	643	<1	641.5 (54 °C)	638	<1
Residual Fuel	598	595	3 to 4	590	588	3 to 4	588.5	586	3 to 4



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TEMPERATURE TEST:

In the Arabian Light Crude, the difference in level detected at 28°C and 55°C was small, less than 0.5 mm.

CONTAMINATION TEST:

The indicated interface level was within 1 mm.

The response time going from oil to water was 3 to 4 seconds, and the response time from water to oil was 3 seconds.

Salinity of water did not affect the perceived interface level.

CONDITIONS OF CERTIFICATION

1. A copy of this certificate shall be carried on board any ship equipped with the above equipment
2. An operation and maintenance manual should be supplied with each system
3. Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure that items are of the same standard as the approved prototype

PLACE OF PRODUCTION

MMC International Corp.
60 Inip Drive
Inwood
New York 11056
United States of America (USA)



Nouman Ahmad Siddiqui
Senior Specialist
Statutory Discipline Team - MARPOL
UK&I Marine and Offshore
Lloyd's Register EMEA

Supplementary Type Approval Terms and Conditions

This certificate and Design Appraisal Document relates to type approval, it certifies that the prototype(s) of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein, it does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said prototype(s).