CERTIFICATE NUMBER	22-2203931-PDA
EFFECTIVE DATE	18-Jan-2022
EXPIRY DATE	17-Jan-2027
ABS TECHNICAL OFFICE	London Engineering Department

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

CARRIER FIRE & SECURITY LTD

located at

8 NEWMARKET COURT, CHIPPENHAM DRIVE, MILTON KEYNES, United Kingdom, MK10 0AQ

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product:	**Oil Mist Detector**
Model:	**Graviner Mk7**
Endorsements:	
Tier:	**2 - PDA Issued**

This Product Design Assessment (PDA) Certificate remains valid until 17/Jan/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

SBalakan

Serkan Balakan,Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

Sensitivity: Internal & Restricted

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Web: www.kfp.co.uk

Tier: 2 - PDA Issued

Product: **Oil Mist Detector**
Model: **Graviner Mk7**
Endorsements:

Intended Service:
For use on ABS Classed Vessels and Offshore Facilities in accordance with the listed ABS Rules and International Standards.

Description:
Graviner Mk7 OMD, an auto addressed Oil Mist detection and alarm system used to monitor 2 and 4 stroke diesel engine crankcases for potential explosive conditions and early detection of bearing failures. The system analyses the optical density of oil mist samples drawn from the crankcase compartments to locally positioned Detectors. Graviner Mk7 OMD comprises an engine mounted electronic Control Unit and up to 10 individually connected oil mist Detectors. Up to 10 Control Units can be interlinked to support a multi-engine system with a total of 100 Detectors. Robust Modbus serial communications link the Control Units to the Graviner Remote Display Unit or third party Alarm Management System.

Alarm levels and Alarm output parameters are configurable from the Remote Display Unit. The Control Unit can be supplied with or without a control membrane. The control membrane has LED indication for detectors connected, push buttons for isolation and de-isolation of Detectors, as well as push buttons for Accepting and Resetting Alarms. Serial communications "in" link allow up to 10 engines to be linked and communicate with engine control room via a single cable.

Rating:
Operating Voltage: 24 VDC;
Detectors and Control Unit: IP65;
Remote Display Unit: IP32;
Detector material: Black Du Pont Nylon 70G33L
Operating temperature: Control unit and Detector - 0 to 70 degree;
Sensitivity:
Pre alarm level setting range : 0.5 to 1.2mg/l (adjustable) (Default 0.9mg/l)
Alarm level settings range: 1.3 to 2.4 mg/l (adjustable) (Default 1.8mg/l)

Service Restriction:
1. Unit Certification is not required for this product.
2. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.
3. The product is not suitable for the hazardous area.

Comments:
1. Each particular application is to be specifically approved in conjunction with the relevant engine type and installation.
2. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
3. This type approval is for hardware only.

Notes/Drawing/Documentation:
Drawing No. TL20118, Test Report - MS Testing, UK, Date: 26.01.2021, Revision: 1, Pages: 51
Drawing No. TL20118-L, Carrier Radiated Immunity Statement, Revision: 1, Pages: 1
Drawing No. TL20118-L2, Carrier Radiated Immunity Statement, Revision: 1, Pages: 1
Drawing No. 164466-745154-A, EMC-PXW Rapport Test Report, LCIE, France, Date: 19.01.2020, Revision: 01, Pages: 53

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Drawing No. 164466-745157-A, EMC-SDC Rapport Test Report, LCIE, France, Date: 19.01.2020, Revision: 01, Pages: 48
Drawing No. C15027HD01, SDC Type Test Report, SITILAS, Date: 10.12.2015, Revision: -, Pages: 13
Drawing No. 16'405 (20109669), EMC-IEC SDC 220-1200 Class C3 Test Report, Montena emc sa, Switzerland, Date: 15.02.2011, Revision: -, Pages: 41
Drawing No. Declaration of No Changes, Declaration of No Changes, Revision: -, Pages: 1
Drawing No. GM214033xrl, PDW Type Test Report, Revision: -, Pages: 1
Drawing No. Tech Data Sheet PXW 998-1218613, Pages:04
Drawing No. Tech Data Sheet SDC 998-1218617, Pages:04
Drawing No. Tech Data Sheet WXW 998-1218615, Pages:04
Drawing No. A070, Wiring Diagram UPS, Pages:01
Drawing No. 7RA9026GB, Typical Functional Description SAMPLE, Pages:12
Drawing No. 7RA9077GB, Typical Operating and Indicating Elements SAMPLE, Pages:10
Drawing No. TA34-2003_1823_1E-3828916, Seismic Test, Original TA, Pages:10
Drawing No. 980213C-3926696, EMC Test Report 980213C, Date: 03.07.2002 , Pages:04
Drawing No. 16205, RAP_Gutor_UPS, EMC Testing UPS 100kVA PDW-3100, montena emc ag, Switzerland, Revision: -, Date: 01.12.2010, Pages:25
Drawing No. 16206, RAP_Gutor_Rectifier, EMC Testing Rectifier SDC 220-800, montena emc ag, Switzerland, Revision: -, Date: 01.12.2010, Pages:35
Drawing No. 16207, RAP_Gutor_Inverter, EMC Testing Inverter WDW 3170220/400 EAN, montena emc ag, Switzerland, Revision: -, Date: 01.12.2010, Pages:40
Drawing No. TS-X-NIEP-1100335- 251, Hardware Qualification Climactic Tests SDC 220-1200 / WDW 3200-220/400 Mechanical Vibration, Date: 05.04.2011, Pages: 462
Drawing No. TS-X-NIEP-1100335- 251, Hardware Qualification Climactic Tests SDC 220-1200 / WDW 3200-220/400 Damp Heat, Date: 18.05.2011, Pages: 09
Drawing No. 11-IK-0115, Burn-in Report WEW 1010-48/120- EAN and SDC 48-315, Electrosuisse, Switzerland, Date: 26.05.2011, Pages:41
Drawing No. 21118117_001, TUV-Report_21118117_001 PEW 1020 SDC 220, TUV Rheinland Product Safety GmbH, Germany, Date: 25.05.2005, Pages: 24
Drawing No. 2272939, CSA Reports, Date: 01.12.2010, Pages:07
Drawing No. 21123079-01, 02, IEC 62040-3 Test Certificates TUV -PEW 1020-1080 PDW 3100, Date: 02.06.2006, Pages: 02
Drawing No. 21123079-01, IEC 62040-3 Test Certificates TUV - PEW 1020-1080 PDW 3100, Date: 28.04.2006, Pages: 02
Drawing No. 7.199.902, Test Report_PEW 1020, Revision: 4, Date: 17.10.2005
Drawing No. ABS 1090351, Routine Test Report, Date: 12.05.2010, Pages:53
Drawing No. 110703RPTA01, EMC-IEC PEW1015-110-220EAN, Revision A, Date: 31.10.2011, Pages:62
Drawing No. 110703RTA01, EMC-IEC EMC SDC 110-1000R, Revision A, Date: 31.10.2011, Pages:61
Drawing No. 2178625.02-AOC, Attestation of Conformity, Date: 22.12.2015, Pages: 01

Terms of Validity:
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STANDARDS

ABS Rules:
- Marine Vessels Rules (2022): 1-1-4/7.7, 1-1-A3, 1-1-A4; 4-9-9/3, 4-9-9/7, 4-9-9 Table 1 and Table 2;
- Facilities on Offshore Installations (2022): 1-1-4/9.7, 1-1-A2, 1-1-A3;
- Mobile Offshore Units (2022): 1-1-4/9.7, 1-1-A3, 1-1-A4, 6-1-1/9, 6-1-1/13; 4-3-1/9, 4-3-1/11, 4-3-1/15, 4-3-1/17;
- Steel Vessels for Service on Rivers and Intracoastal Waterways (2022): 1-1-4/7.7, 1-1-A3, 1-1-A4; 4-1-1/21, 4-5-1/9, 4-5-1/13, 4-5-1/17, 4-5-1/19;
- High Speed Crafts (2022): 1-1-4/11.9, 1-1-A2, 1-1-A3; 4-6-1/9, 4-6-1/11, 4-6-1/15, 4-6-1/17, 4-7-9/3, 4-7-9/7, 4-7-9/ 15, 4-7-9 Table 9 and Table 10;
- Steel Barge Rules (2022): 1-1-4/7.9, 1-1-A3, 1-1-A4; 4-1-3/5.7;

National:
NA

International:
IEC 60945 Ed 4.0: 2002 including Corrigendum 1: 2008
IACS UR E10 Rev 8:2021
IACS UR M67 Rev 2.0:2015

Government:
NA

EUMED:
NA

OTHERS:
NA