



Marine & Offshore

Certificate number: 42415/A1 BV

File number: AP 4634

Product code: 4440H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Green Instruments A/S

Brønderslev - DENMARK

for the type of product

ALARM, MONITORING AND CONTROL SYSTEMS

G6100 Water Monitoring System

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships
IMO Res. MEPC.259(68)

EC Code: 31

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 28 Sep 2020

For Bureau Veritas Marine & Offshore,

At BV FREDERICIA, on 03 May 2018,

Jesper Jensen



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

- Product model or type description:
G6100 Water Monitoring System

- Product description:

The **G6100 Water Monitoring System** is a continuous in situ water monitoring system. As a standard configuration the system monitors PAH, turbidity, pH and temperature. A system can consist of or be configured with extra measuring modules or G6110 PAH, G6120 Turbidity and G6130 pH/Temperature. An optional sampling cabinet (either a pump cabinet - WMP or a pressure reduction cabinet - WMR) can be necessary depending on the location of the Water Monitoring System (WM).

The G6100 Water Monitoring System is configured from the following components:

Component	Brand	Features
HMI module	Exor UniOp eTop 500 series	- 4" TFT LCD color display - Modbus TCP/IP (RJ45)
I/O modules	WAGO I/O 750 series	
Power Supply Module	Mean Well SDR-120-24	
G6110 PAH Module	TriOs EnviroFlu-HC	- Measurement range: 0-800 µg/l phenanthrene equivalence, freely configurable - Measurement technology : Fluorescence - Power supply: 14...26 VDC - Signal: Analog 4-20 mA
G6120 Turbidity Module	ABB 4690 series	- Measurement range: 0...400 NTU - Power supply: 200...260 VAC 50...60 HZ - Signal: Analog 4-20 mA
G6130 pH/Temperature Module	MJK pHix	- Measurement range: 0 to 14 pH units; 0 to 50 °C - Power supply: 14...26 VDC - Signals: 2 Analog 4-20 mA

2. DOCUMENTS AND DRAWINGS :

Green Instruments A/S:

- Component layout of the Monitoring Cabinet No.: 02313GI-CO, Rev B, dated 10-05-2017
- Installation Layout of the Monitoring Cabinet No.: 02313GI-OL, Rev C, dated 10-05-2017
- WM Main cabinet P&ID No.: 02313GI-PI, Rev A, dated 22-10-2015
- Electrical drawing No.: 02313-2475-ED-E, Rev E, dated 14-03-2018
- Water Monitoring Installation Manual No.: 02481 Version 2.4 - Revision March 2018
- Water Monitoring Operating Manual No.: 02480 Version 2.9 - Revision March 2018

For modification A1 version:

- Overview of System Changes for G6100 Water Monitoring System V1.22
- Software Quality Assurance Plan for G6100 Water Monitoring System V1.2

3. TEST REPORTS :

SP Denmark A/S:

- Environmental test report according to IACS UR E10 No.:4P06867, dated 2014-12-03

Green Instruments A/S:

- Performance tests according to MEPC.184(59), Ref.: Test Plan-G6100 TA - Version 2.2 - December 2014.

For modification A1 version:

Green Instruments A/S:

- Performance test report for G6100 TA V.2.5, dated Sept. 2017

EKTOS Testing & Reliability Services

- Climatic and Mechanical testing report Ref. P17-0003, dated 15-12-2017

4. APPLICATION / LIMITATION :

4.1 - BUREAU VERITAS Rules and Regulations for the Classification of Steel Ships.

4.2 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**

4.3 - BUREAU VERITAS Environmental Category, **EC Code: 31**

4.4 - The equipment fulfils the EMC requirements for installation on the Power Distribution Zone.

4.5 - The water monitoring system is an operator station with an optional sampling system which supplies the integrated sensor modules. The sensor modules measures PAH, turbidity, pH and temperature in accordance with MEPC.259(68).

All necessary validations of the sensor modules can be done locally using certified calibration solutions which are fully compliant with MEPC.259(68).

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above products are to be supplied by **Green Instruments A/S** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **Green Instruments A/S** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - For information, **Green Instruments A/S** has declared to Bureau Veritas the following production site:

**Green Instruments A/S
Erhvervsparken 29
9700 Brønderslev
DENMARK**

6. MARKING OF PRODUCT :

- Maker's name or trade mark.

- Serial number of the unit.

- Equipment type or model identification under which it was type-tested.

7. OTHERS :

7.1 - It is **Green Instruments A/S** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 - This certificate supersedes the Type Approval Certificate No. 42415/A0 BV issued on 28 Sep 2015 by the Society.

*** END OF CERTIFICATE ***